VIRGINIA MOUNTAIN SECTION
NEWSLETTER

IEEE Region 3, Council 09, Section 65 January 2003

January 16, Clarion Hotel Roanoke Airport

Student Paper Contest

Presentation of Papers by Undergraduate Students from VMI and Virginia Tech on

A Listening Machine, Wireless Network Vulnerability, Wearable Electronic Textiles,

Semiconductor Device Fabrication, Parking Guidance System

Reservations

Date: Thursday January 16, 2003
Social: 6:30 PM
Dinner: 7:00 PM
Talk: 8:00 PM
Cost: Member or Guest $15.00
Student $ 8.00
Reserve by **5 PM** **Monday** Jan. 13

Mark Shepard (540) 387-8710
mshepard@ieee.org
Please specify number of attendees.

Directions to
Clarion Hotel Roanoke Airport

2727 Ferndale Drive NW
I581 Exit 3 Hershberger Rd West
1st Rt. onto Ordway Drive,
¼ mile, Rt. Into Parking Lot.

Please mark the date and plan on coming. Learn about interesting student projects and undergraduate research at VMI and Virginia Tech.

Using Piezoelectric Materials for Wearable Electronic Textiles

Joshua Edmison

An open issue for electronic textiles (e-textiles) used for wearable computing is the choice of materials. This paper describes the desirable characteristics of piezoelectric materials for wearable e-textiles, including shape sensing, sound detection, and sound emission. The paper then describes an initial prototype of a glove for user input that employs piezoelectrics to sense the movement of the hands to illustrate the design issues involved in using piezoelectrics. This included interfacing of the film piezoelectric sensor with other electronic components, placement of the sensors, and development of a processing algorithm. .

Joshua Edmison is a Computer Engineering major at Virginia Tech. He is from Middletown, Delaware.

Semiconductor Device Fabrication Study

Tsung-ta Ho & Michael Shealy,

Our study involves the design and fabrication of semiconductor devices in the first semiconductor fabrication laboratory at the Virginia Military Institute. As this is a new laboratory, preliminary wet and dry Si-oxidation studies are performed to: 1) develop necessary photolithography skills, 2) thoroughly characterize oxidation equipment, and 3) determine the proper processing parameters for both barrier and transistor gate oxide layers for device realization. The future plan of our study involves the fabrication of semiconductor devices, including resistors, p-n junction diodes, and n-channel E-MOS transistors

Tsung-ta Ho, from Taiwan and Michael Shealy from Richmond, VA are ECE majors at VMI.

Audio Spectral Processing and Recognition:Implementation of a "Listening Machine"

Arshia Cont

The dream of a true virtual reality, a complete human-computer interaction system and robotic age, will not come true unless we try to give some perception to machines and make them perceive the outside world as humans do. Machine perception comes before any intelligence system consideration. In this research experience, done in the DSP Research Laboratory of Virginia Tech, studies were undertaken for developing a "listening machine", a system that can model human's hearing perception and mostly music perception. A listening system was implemented using DSP and Psychoacoustics concepts which can extracts low-level musical concept and is suitable for higher level recognition and other audio applications.

Arshia Cont is an Electrical Engineering and Applied Mathematics Senior at Virginia Tech. He is from Fairfax, VA

Parking Guidance System

Brian Holt & Jenny Dinneen

We present a parking guidance system that uses associated algorithms to maximize parking spot usage. This system uses sensors placed in the vicinity of each parking spot to detect vacancy. The data from the sensors is then transmitted to a main computer. A display of questions, for example preferred store to park by, size of vehicle etc, is listed for the user to answer. The user can input answers to the questions that best correspond with his or her parking needs. Algorithms calculate the optimal parking location for the driver entering the garage that best corresponds with the driver's input. This information is communicated to the user via a display at the entrance, and is also printed on a ticket. Parking information, like parking space availability, can also be obtained remotely via the Internet through a web server, which constantly updates every couple of seconds.

Brian Holt, from Manassas, VA, and Jenny Dinneen from Ohio, are ECE Seniors at VMI.

Securing the AODV Ad Hoc Routing Protocol from the Black Hole Vulnerability

Farooq Ali

The Ad hoc On-Demand Distance Vector (AODV) routing protocol assumes that all nodes truthfully carry out routing operations. The resulting security risk is that a malicious node could forge a route to a destination and act as a black hole in the network, where possibly important and confidential information is losing integrity. Security features add-ons for AODV, which allow survival in the face of black hole attacks are important. We have modified the AODV modeling framework in NS-2 (Network Simulator 2) to accommodate for a routine that checks for the validity of a received RREP by using Further Request/Further Reply packets. Once validated, we plan to release this model in public domain.

Farooq Ali is a Computer Engineering & Mathematics Sophomore at Virginia Tech. He is from: Karachi, Pakistan

SECTI0NS CONGRESS

Cy Harbourt, Dan Jackson and Mark Shepard represented VMS at the IEEE 2002 Sections Congress in Washington, DC in October 2002. After three days of interacting and attending workshops at the Sections Congress, all of the delegates and attendees met in "Regional Caucuses". There were ten caucuses, one for each region, and each region was allocated four recommendations as the output of their Caucus. These were brainstormed, prioritized, downselected, and wordsmithed in the Caucuses. The full Sections Congress then prioritized the forty recommendations. The prioritized listing is available at: http://www.ieee.org/organizations/rab/sc/2002/index.html

Sections Congress Top 3 Recommendations

1. Facilitate accurate and complete electronic communication through active verification and correction of membership data.

2. Review student membership dues structure to reverse adverse membership growth and retention.

3. Develop industry-focused programs and incentives to attract wider participation and support from industry.

Region 3 authored recommendations #1, #3, and #6 (IEEE acknowledging to employers the contributions of volunteers). Mark Shepard led the working group that hammered out the details and wording of #1.

IECON 2003 to be in Roanoke

The 29th Annual Conference of the IEEE Industrial Electronics Society will be held at the Hotel Roanoke Conference Center on November 2-6, 2003.

The call for papers is available at: http://iecon03.crts.vt.edu).

Topics of interest include:
Computer & Control Systems
Industrial Information Technology
Power Electronics
Sensors & Actuators

Paper submission deadline is April 30, 2003.

2002-2003 MEETING SCHEDULE

DATE	SPEAKER/TOPIC	MEETING PLACE
September 19	**Brian Lindholm** Six Sigma Methods at General Electric	Clarion Hotel Roanoke
October 17	**Daniel Stilwell** Enabling Technologies for Platoons of Cooperating Autonomous Underwater Vehicles	Best Western, Blacksburg
November 21	**David Stocker** LIDAR Technology for Fully Automatic Crane Operation	Clarion Hotel Roanoke
January 16	**Undergraduate Student Paper Contest**	Clarion Hotel Roanoke
February 20	TBD	Clarion Hotel Roanoke
March 20 **Spouses' Night, 2003**	TBD	Clarion Hotel Roanoke
April 17	**John Bay** DARPA Information Exploitation Office (IXO) Programs	Clarion Hotel Roanoke
May 15	**Plant Tour**	**TBD**

IEEE Virginia Mountain Section

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Anyone may submit material for the Newsletter
Deadline:
Monday following each meeting

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