



## **WESTERN NORTH CAROLINA SECTION**

### **Forty Year Anniversary in 2005**

## *Newsletter for June, 2005*

Again, there have been a lot of things happening in your WNC Section of the IEEE. Don't forget, you can keep up with all the activities by checking you **WNC Section website**: <http://www.ewh/ieee.org/r3/wnc>

Here's a list or the items presented this quarter. Read more about each item in the report below:

- **Student/Educational Activities**
  - WCU Senior Project Final Design Review
  - UNCA Senior Project Final Design Review
  - Teacher In-Service Training
- **Regular Membership Meetings**
  - Blue Ridge Movie Studio Tour
  - Tour of the Pisgah Astronomical Research Institute (PARI)
- **Professional Activities**
  - WNC IEEE Local Consultant's Network (LCN)
  - I7 Forum
  - SouthEastCon – Fort Lauderdale. FL
- **Awards**
  - Bob Moog – “Region 3 Engineer of the Year”
  - Senior Membership
- **Next Fall**

### **Student/Educational Activities**

This is the area in which our Section works with aspiring engineers in an effort to give back to the profession some of the benefits that we have received from it. This is a very enjoyable and rewarding endeavor and we would like to see more of our members become involved, particularly those that are retired. Your experiences are very valuable and it is a joy to share them with the young to encourage them and bring them into the field. If you think you might be interested in sharing your experience with these young students, please contact Fred Orland at: [fredorland@ieee.org](mailto:fredorland@ieee.org)

## WCU Senior Project Final Design Review

Last December several members of our WNC Section were invited to do a Design Review on each of the WCU Senior Project designs, at the Preliminary Design stage. Then on April 27, the end of the school year, the entire WNC Section was invited back for a Final Design and demonstration of the working prototypes.

It was extremely interesting to see how Engineering education has progressed and how the new graduates handle these projects, especially following our initial design reviews where we stressed many of the items that went far beyond the prototyping stage. In particular, our members highlighted the things they would encounter in industry (competitors, costs, schedules, Presentation methods, etc.). Here is a short review of a couple of the projects, presented by A.J. Burke, one of our members who was in attendance at the final review. There were four groups, with a total of 14 Seniors in all.

### Group 1 - Wireless Communications

- Ultra Wide Band Data Communications System - Fred Bengtson, Scott Heggen

Fred and Scott initially attempted to build an Ultra Wide Band (UWB) transmitter/receiver pair from scratch, but had problems with detection of synch due to frequency response problems with 74LS components switching speeds. When it became apparent that their homemade lab experiment was of limited capability, they turned instead to using what they had learned to writing a paper and submitting it to a competitively reviewed DARPA sponsored event in which they subsequently won an award! This led them to be further aware of a DARPA research grant and \$10,000 worth of commercial UWB equipment from 'Time Domain Company' being presented to the WCU Engineering Program. This award will allowed for Fred and Scott to acquire graduate stipends for continuing their UWB studies after they receive their BSEE on a MSEE via the WCU Engineering Program. (reviewed by *A.J. Burke*) A copy of their PowerPoint presentation to the IEEE as well as a copy of their paper submitted to the *National Conference on Undergraduate Research in Lexington, Virginia on April 21 – 23, 2005* can be had by contacting the section Secretary at: [jimcorr@ieee.org](mailto:jimcorr@ieee.org)

[We congratulate Fred and Scott on their hard work and success!](#)

- BPSK/QPSK Digital Communications System - Rocio Perez, Micheal Boone, Andy Long

### Group 2 - Underwater Submersibles

The Underwater Submersibles may yield several additional projects in the years to come.

- Underwater Temperature, Pressure and Conductivity Sensors - Aaron Cannistra

- Sonar Collision Avoidance System - Alan Windham
- Digital Compass for an Underwater Autonomous Vehicle - Paolo Zambrano

### **Group 3 - Networking and Power Control**

- Engineering and Technology Department Server - Tom Bock

Initially the goal was to architect and set up new departmental servers for the WCU Engineering Department on the campus-wide network. But when campus Information Technology moved ahead on this configuration, Tom modified the project to include documentation of the network and selection/installation of some new applications for the WCU Engineering Department. The Engineering Department's new computer configuration includes a Dell 745N Network Attached Storage (NAS) Server, Dell 2650 Applications Server, Dell 122T Tape Storage Server and various Nortel and Juniper firewall, router and switching components configured in 2 Virtual Local Area Networks (VLANs). The application that was ultimately recommended by this Senior Project was an Electronic Document Storage software called DocuXploer to be used in conjunction with the Dell 745N StorageWorks server to store all the various department staffs 'courseware' for all the EE programs at WCU.(reviewed by *A. J. Burke*)

- A Computer Network for the Haywood County School System - Bill Driver

This Senior Project likewise was to conduct of a review of a network system that was already in place, Haywood County Schools WAN/LAN. This school system has 17 sites with about 90% of the sites serviced by a single T1-class circuit (1.5 MBPS) provided by the phone company (Bellsouth). In the recent hurricane-related flooding the county school network was down for an extended period (36 hours) and it became apparent to the county school IT staff that they needed a more redundant network system. Also, there were complaints that there were Internet-access speed problems throughout the school system at peak times and a network traffic analysis was also conducted.

In the end, new higher speed Internet connections at the aggregation point (county school offices) of 6 MBPS (previously only 3 MBPS) were added and redundant Internet connections based upon cable modems were added at each school (up to 3 MBPS on the downlink side). This, however, introduced a new problem in that in switching the schools over to the cable modem backup system the centralized firewall/content filtering that is required for school systems by state law would be bypassed. Thus the recommendation of this study was that each of the 17 sites be re-configured with a similar capability to the existing the Linux-based Smoothwall firewall/content filter system in a 'distributed firewall

system' approach that would mitigate this concern of switching the county over to the cable-based backup system an inadvertently allowing unfiltered access to the Internet. (reviewed by *A.J. Burke*)

- Three Phase Power Control - Charlie Gentle

#### **Group 4 - Digital Electronics Projects**

- Object Avoidance for Wheelchairs - Jonathan Crawford
- Drag Racing Starting Lights - Eric Dotson
- Musical Light Display - Adam DeBoer

### **University of North Carolina – Asheville (UNCA)**

Last February several members of our WNC Section were invited to do a Design Review UNCA Senior Project design, at the Preliminary Design stage. This was a one semester project in which all 6 Graduating Seniors participated. It was on project divided into two sections. Then on April 28, the end of the school year, the entire WNC Section was invited back for a Final Design and demonstration of the working prototype, as described below..

- Fire Fighting Robot - Chris Chilton, Jarrod Coomer, Abraham Greenwell, Mark Henderson, Jerry Wang, Jason Woodby

After a excellent PowerPoint presentation of their team effort to design, fabricate and demonstrate a fire-fighting robot capable of extinguishing a small campfire-sized fire, we where privileged to watch the robots first official 'field test'. It is good to note that the Student Design team took many of the recommendations of the IEEE Review Team (Jim Corr, Chuck Stonecypher, AJ Burke, Jim Erickson) to heart and included new 'conceptual' slides at the beginning of the presentation, extended the 'Design Approach' with a 'Criteria' slide including performance and structure data as well as adding 'Systems Overview' and additional 'Concept' information. Being electrical/electronics engineers we where glad to see the addition of at least one electronic circuit diagram covering the 'Radio & Control System' as well.

Also, on the 'Budget' slide we saw that they came in at about 80% of the forecasted budget, but did not get to follow-on with an autonomous digital control system as they would have liked. Perhaps this will provide a project for some of next years seniors in the UNCA Mechatronics Program. Finally, we got the chance to see the robot in action putting out a small fire in the park located a block or so from our meeting room at the UNCA campus. Overall, both the IEEE

Review Team and IEEE general membership present felt the evening was a great success and the students had accomplished all the crucial aspects of their Senior Design Project. (*A.J. Burke*)

The Presentation, pictures and movie clips of the of the robot in actions during the final design review can be seen by contacting the Section Secretary at: [jimcorr@ieee.org](mailto:jimcorr@ieee.org)

## **Regular Membership Meetings**

- Tour of the Pisgah Astronomical Research Institute (PARI)

The PARI Tour was on Tuesday, May 24 2005 at 7:00 P.M., with a catered dinner prior to the event. This extremely interesting event was attended by over 30 members and guests. For those that did not attend, here is a little history of the facility:

PARI was originally known as the Rosman Research Station operated by NASA during the 1960's and 1970's for tracking manned and unmanned space flights. In 1981, the facility was transferred to the Department of Defense for use as an intelligence gathering facility for U.S. defense and satellite communications. In 1995, the Department of Defense closed the facility, and turned the site over to the U.S. Forest Service. In 1999, the site was purchased from the U.S. Forest Service and gifted to PARI for use as an astronomical research and educational facility.

Equipment includes the following Radio Telescopes and associated electronics:

1. Two 26 meter antennas with five scanning spectrometers and one 66 MSPS FFT spectrometer receivers. Antennas are equipped with computer controlled synchro motors for quick acquisition or slow tracking.
2. 12 Meter antenna and 4.6 meter antenna.
3. 17-30 Mhz range tracking antenna.
4. Very Low Frequency 8 - 300 Khz antenna.
5. 217 Mhz Meteor and Object trackers.

Several research projects are presently in progress. Other funded projects are welcome. Some telescopes are configured for internet remote control for high school studies. This was an extremely interesting tour, given by the Director, Mr. Charles Osborne, one of our members.

## **Professional Activities**

- WNC IEEE Local Consultant's Network (LCN)

On Wednesday, June 29, 2005, we will have our **1<sup>st</sup> ever meeting of the WNC IEEE Local Consultant's Network**. For anyone that is interested, this meeting will be held at **7:00 P.M.** at the **UNCA Campus Highsmith Center – Swannanoa River Room (room 104)** (new building next to the Dining Hall).

We believe this is the beginning of a very exciting program for our members and for the small business community of Western North Carolina. The idea is to get our very substantial community of Retirees as well as existing Consultants together as a group to provide a resource for an embattled small manufacturing business community in WNC. The concept is as follows:

### IEEE WNC Local Consulting Network

1. **RATIONALE:** The purpose of this meeting is to determine if there is sufficient interest within our membership for part time consulting/contract engineering work to justify development of a Local Consulting Network (LCN) for utilization by Western North Carolina companies.
2. **CONCEPT: Provide part-time, short and/or long term employment opportunities for members of the IEEE WNC Section** through development and deployment of a 'capabilities database' for local companies. We suspect that many firms could efficiently utilize the skilled expertise within the IEEE for:
  - Short term trouble shooting of technical problems
  - Unique design requirements for limited periods
  - Proposal Development
  - Strategic market and management strategies

Our substantial retired membership could provide a range of capabilities to support full engineering programs for local companies and the active membership could take advantage of the program opportunities to network and develop new employment opportunities.

WNC companies would benefit through the availability of a matrix of capabilities which they would not otherwise be able to afford. Smaller companies will be able to bring the full engineering capability aboard for a fixed duration, without long term commitments until the manufacturing revenues support the venture.

You should have already gotten a meeting notice. However, if you did not and are interested in attending please contact Chuck at: [chuck@ieee.org](mailto:chuck@ieee.org)

- I7 Futures Forum

Several of our Section members attended the i7 Futures Forum which was held on the campus of Western Carolina University on April 13<sup>th</sup>. This was the first time that we introduced the idea of our IEEE Local Consulting Network (above). We spoke to several members of the forum. All of which expressed their enthusiasm for the program.

The i7 Futures Forum was designed as the first part of an on-going effort to help shape the direction of Western's recently announced Millennial Initiative, a comprehensive regional economic development strategy that includes the addition of 344 acres of property adjacent to the main campus.

"The Millennial Initiative represents the university's creative engagement with the economy, culture and aesthetics of the region and its global counterparts. It will enable the application of the best ideas of the region while also serving as a center of inspiration for students and other regional citizens determined to turn their creativity and education into a viable livelihood," said Western Chancellor John W. Bardo. "The i7 Futures Forum represents our hopes for the inclusive and dynamic scope of the Millennial Initiative."

Participants in the forum were from a variety of backgrounds, including health care, biotechnology, tourism, environment, government, engineering, architecture, education, business, communications, philosophy and art.

The forum consisted of numerous panels – or "strands" – held throughout the day on a wide variety of topics: allied health industries; applied science, biotechnology and native botanicals; recreation, tourism and environment; government policy and research; creative and performing arts; engineering, technology and green construction; architecture and design; new economy workforce; the creative class; teaching and learning; entrepreneurial creation and financing; communications and broadband; the search for meaning; sociology and native culture; and student ingenuity and ideas for the future

- SouthEastCon – Fort Lauderdale. FL

Fred Orland traveled to Ft. Lauderdale FL for this year's SouthEastCon on the weekend of April 8, as representative of the WNC Section and also attended the NC Sections Council meeting held on that Friday. Fred brought back a great amount of relevant information applicable to our Section.

## Awards

- Bob Moog – "Region 3 Engineer of the Year"

As reported in the last Newsletter, Bob Moog, a world famous Electronics Engineer for his work in electronic music synthesis and a member of IEEE WNC Section was nominated for this year's Region 3 "Engineer of the Year". It's now official, [Bob has won this prestigious award](#) and it will officially be presented to him at our next WNC Section Awards Banquet.

*[Congratulations Bob!](#)*

- Senior Membership

Two of our members have been elevated to IEEE Senior Member status. They are;

Thomas Blooming and Dr. Robert Cannon

*Congratulations Tom and Dr. Cannon!*

**We continue to encourage members to apply for the rank of IEEE Senior Member. If you are interested, please contact Fred Orland at:**

[fredorland@ieee.org](mailto:fredorland@ieee.org)

## **Next Fall**

Some of the possible activities planned for next Fall include:

- Senior Project Design Reviews at both WCU and UNCA
- Career Roundtable meeting at WCU and UNCA
- Digital Photography – Dinner Meeting
- Tour of the Emergency Response (Dial 911) Center and dinner meeting
- WNC Section Awards Banquet

Submitted by:

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