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THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

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Volume 45 - No. 4

April 2002

Fourth Generation Cellular Systems and Smart Antennas

Dr. Jack H. Winters
AT&T Labs-Research
jhw@research.att.com



- Date/Time:** Wednesday, April 10, 2002 at 6:00 pm
- Location:** The Radisson Hotel & Conference Center, the Naples Room
12600 Roosevelt Boulevard, St. Peterburg, Florida 33716
(727) 572-7800
- Food:** Refreshments provided at the meeting with a diner at members expense after the lecture at a local restaurant to be announced at the lecture.

Abstract: In this talk we discuss the evolution to high-speed data mobile wireless systems, with data rates in excess of 10 Mbps. We describe the extension of wireless local area networks using 802.11b and 802.11a, and cellular systems (WCDMA), to provide high-speed ubiquitous access. Smart antennas are then described and shown as a key technology to provide the needed enhancements of range extension, interference suppression, and capacity increase.

Biography: IEEE Distinguished Lecturer Dr. Jack H. Winters is Division Manager of the Wireless Systems Research Department at AT&T Labs-Research. He is also a Fellow of the IEEE, Area Editor for Transmission Systems for the IEEE Transactions on Communications, Technical Program Chair for the Fall 2001 Vehicular Technology Conference, and New Jersey Inventor of the Year for 2001. His research interests include signal processing techniques, such as smart antennas, for increasing the capacity and performance of wireless local area networks and cellular systems.

Reservations: Please notify Bror Peterson (727) 302-4710 at Raytheon Systems Company at least 48 hours in advance if you are attending. Bror_W_Peterson@raytheon.com

Directions: From I-275 take Exit 16 (686 or Roosevelt Blvd.) North 1/2 mile to 28th Street.

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March 19-20, 2003

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THE SUNCOAST SIGNAL is published monthly by the Florida West Coast Section (FWCS) of the Institute of Electrical and Electronics Engineers, Inc. (IEEE). THE SUNCOAST SIGNAL is sent each month to members of the IEEE on Florida's West Coast. Annual subscription is included in the IEEE membership dues. The opinions expressed, as well as the technical accuracy of authors, advertisers or speakers published in this newsletter are those of the individual authors, advertisers, and speakers. Therefore, no endorsement by the IEEE, its officers, or its members is made or implied. All material for THE SUNCOAST SIGNAL is due by the Friday following the 1st Thursday of the month preceding the issue month. Address all correspondence to:

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Chair's Comment

By Quang Tang



By the time you received this newsletter, several members of the Florida West Coast Section Executive Committee along with representatives from USF student branch will be in Columbia, South Carolina for Southeastcon 2002.

For all the Professional Engineers in the Florida west coast area, the required four professional development hours can be obtained by attending the upcoming seminars. The Power Engineering Society Chapter of IEEE FWCS will sponsor a seminar this month on "Theory, Application, Troubleshooting, and Repair of Variable Frequency Drives and Reduced Voltage Soft Starters" and another one in May on "Power Quality". Check out page 4 for more details.

The deadline for Educational Activities Board (EAB) Awards nomination forms is April 30, 2002. Please check out page 8 of last month Signal for awards description and details. Also, an IEEE-USA State Department Fellowship is available for a technical adviser. The application deadline for this fellowship is June 3, 2002. See article on bottom of page 8 in this issue.

Students' Corner

By Jeremy Baksh

IEEE Student Branch Internal Vice President

baksh@eng.usf.edu

Best in Show, the IEEE student chapter! Our local chapter was recently awarded the, 'Best Show' award following its laser light demonstration at this years highly successful engineering EXPO. The success of the laser show was due to the overwhelming support of our student membership, and with ever increasing numbers we expect to be out in force again next year.

Congratulations are also in order for our chapter president, Anthony Webster, who was recently named IEEE student of the year in the FWSC. Anthony has also entered a paper into the upcoming SEC for consideration, and all chapter members wish him continued success. Two other IEEE student members will also represent the local chapter at the SEC with their high tech take on the game of ping-pong, and we extend to them our support in the competition.

If you haven't checked out our website, please remember to visit us at <http://org.eng.usf.edu/IEEE-EE/>. Our web page and current T-shirt design have also been entered in to the upcoming Southeastcon competitions, and with the support of our membership we hope to be successful!

University of South Florida Electrical Vehicle Program and Fuel Cell Technology

Discussion & Demonstration

Sponsored by PES/IAS Florida West Coast Chapter



Date/Time: Tuesday April 23, 2002, 5:00PM
Location: USF Tampa Campus, CUTR 102
Speaker: Elias (Lee) K. Stefanakos, Ph.D., P.E.
Professor and Chairman, USF Electrical Engineering Department
Cost: \$10.00 (for IEEE members), \$15.00 (for non-members)
\$5.00 Student Members
*Included is the discussion, demonstration, and dinner
RSVP: Contact Ralph Fehr at r.fehr@ieee.org or 813-228-4448
Non-IEEE members and students welcome!
Online at <http://www.ewh.ieee.org/r3/floridawc/>



The University of South Florida has conducted research involving the development of various electrical vehicle technologies for over 10 years. A photovoltaic array has been developed to serve as a model for urban electrical vehicle recharging stations. The most recent development being investigated is a hybrid technology utilizing a Ford Fiesta automobile and a rare-earth permanent magnet motor coupled to a 16 horsepower Briggs and Stratton engine which will be ultimately powered by propane, yielding a hybrid vehicle capable of speeds in excess of 50 miles per hour. A new program related to a hydrogen economy and fuels cells will also be outlined.

After the discussion, there will be an opportunity to examine some of the school's electrical vehicles up close and personal.

Speaker:

Dr. Lee Stefanakos earned B.S., M.S., and Ph. D. degrees from Washington State University. He has been a member of the USF faculty since 1985, and is a senior member of IEEE. Dr. Stefanakos will discuss the research done at USF in the area of electrical vehicle technology, as well as the current state of fuel cell technology.

Mark Your Calendar... PES/IAS Upcoming Meetings in May

- Tour of Seminole Electric's Payne Creek Generating Station
- Power Quality Seminar – Tuesday, May 7, 2002

The Power Engineering Society of IEEE Florida West Coast Section will hold its May meeting at Seminole Electric's Payne Creek Generating Station. Payne Creek Generating Station is a 500 MW class combined cycle unit began commercial operation on January 1, 2002. Date and time of this tour will be determined. Watch for May Signal for more details. Please email Ghaff Khazami at gkhazami@seminole-electric.com or call (813) 739-1221 to make your reservation today.

Power Quality Seminar, Tuesday, May 7, 2002, Adams Mark Resort, Clearwater. Credit for four (4) Professional Development Hours. See the May Signal for details or contact Art Nordlinger at nordlinger@hotmail.com

PES/IAS Spring Seminar

Theory, Application, Troubleshooting, and Repair of Variable Frequency Drives and Reduced Voltage Soft Starters



- Date:** Monday, April 8, 2002
- Time:** Registration and Continental Breakfast 8:00 – 8:30 AM
Seminar 8:30 AM - 1:00 PM
- Speaker:** Jim Mitchell, President
Motortronics, Inc.
- Location:** ETRC
3650 Spectrum Blvd., Suite 100
Tampa, Florida 33612
<http://www.etr.com/ETMtgFcilty.html#WhereAreWe>
- RSVP:** Online at <http://www.weiquality.com/pes/>
Email Art Nordlinger at nordlinger@hotmail.com or
Call 727-596-9319
- Price:** Members \$20.00; Non-members \$50.00; Students \$10.00
- PDH Credits:** Professional engineers will earn 4 professional development hours upon completion of the seminar. Please provide your license number and your name as it appears on your license when registering.

Jim Mitchell of Motortronics, Inc. will present a training seminar on the theory, application, troubleshooting, and repair of variable frequency drives and soft starts used to control 3 phase AC induction motors. Mr. Mitchell has been involved in the design, application, and troubleshooting of solid state devices for both motor and non-motor loads for over 20 years.

Agenda:

- Theory and application of reduced voltage soft starts in motor applications.
- Troubleshooting and repair of reduced voltage soft starts.
- Theory and application of variable frequency drives in motor applications.
- Troubleshooting and repair of variable frequency drives.

Price includes continental breakfast. Space is limited to 35 participants. Register early.

Digital Hardware Design: High Speed Signal Integrity Part 2 "A Practical Approach to Board-level Signal Integrity Analysis"

Sponsored by Computer Society Florida West Coast Chapter

Date/Time: Thursday, April 18, 2002, 6:00 PM to 7:30 PM

Location: Honeywell International, Space Systems, Plant 5,
North Entrance, Larry Speight Learning Center
13350 U.S. Highway 19 North
Clearwater, FL 33764

RSVP: clifford.kimmery@honeywell.com

Note: You must specify if you are or are not a US citizen. Special approval from security will be arranged for non US citizens.

This is the second of a series of high speed signal analysis presentations. Jim Peterson from Honeywell will present a user's guide to High Speed Signal Integrity for circuit boards using the Mentor Interconnectix tool. This presentation will define an approach to performing signal integrity analysis on a board using the Interconnectix tool. Jim will show some of the techniques that can improve accuracy of results such as tool set-up, IBIS models, and more. Jim will define a method to help streamline the analysis and insure coverage of all critical nets.

This is an open meeting. Non members and students are welcome.

Jim Peterson: Senior Staff EE, Honeywell Space Systems. Jim's responsibilities at Honeywell include board design, custom chip design, and he is the Honeywell Electrical Design Process lead engineer.

Directions: The Honeywell campus is on Ulmerton Road (SR 688) just west of the US 19 overpass. The campus is bounded by 66th Street on the west, 62nd Street on the east, and 126th Avenue on the south. The main entrance is on 62nd Street. Plant 5 is on the south end of the campus. Use the Plant 5 north door and check in with security there. No cameras or cell phones are allowed in the building.

This is a Joint Meeting with the Programmable Logic Users Group (www.pl-ug.org)

New Member Benefit - IEEE Computer Society Announces Free Online Training Courses

The IEEE Computer Society has announced a new benefit for its members: free access to thousands of dollars worth of online training. The society's new Distance Learning Campus offers 100 interactive, Web-based courses on subjects such as Java, Cisco, HTML, Unix and Windows Network Security. Courses include the use of voiceovers, 3-D graphics, Flash animations, on-screen text, and "visual sentences" to turn complex concepts into easy-to-understand images. For more information, visit <http://computer.org/distancelearning>



Wireless & Microwave Technology 2002

An Industry/Government/Education Forum



- Date:** Saturday, April 13, 2002
- Time:** Registration begins at 8:00 am,
Presentations and Panel Sessions from 8:30 am to 4:00 pm
Social Hour from 5:00 pm on.
- Location:** Embassy Suites, Busch Gardens, 3705 Spectrum Blvd., Tampa
Phone- (813) 977-7066

ABSTRACT - The Wireless and Microwave (WAMI) Center at the University of South Florida invites you to attend this fourth annual event. The interactive forum will provide an opportunity for the exchange of information on the status and directions of wireless/microwave technology, and the educational and research challenges now being addressed. Activities will include 8 technical presentations by invited speakers and two panel sessions. Lunch and refreshments will be provided during the day, along with a social hour and tour of USF laboratories in the late afternoon.

Invited speakers will include:

- **Bob Stengel** (Motorola) – *Software Radio*
- **Britt Kane** (Agere) – *Modern Wireless Networks*
- **Steve Lardizabal** (Raytheon) – *Wideband and mm-Wave MMICs*
- **Tony Ivanov** (Agere) – *RF Silicon Germanium Device Technology*
- **Kamal Sarabandi** (University of Michigan) – *Communications Channel Modeling Using Fractal Methods*
- **John Papapolymerou** (Georgia Tech) – *RF MEMS Devices*

RESERVATIONS - Please make reservations before April 5, 2002. We welcome late registration, but appreciate a timely response in order to accommodate our planning.

REGISTRATION FEES - IEEE Student Member: \$10 (refunded at the door), IEEE Member: \$20, Non-IEEE Member: \$30. Students who are not IEEE members may register for \$20 and apply this toward a half-year IEEE Student Membership Application fee, with \$10 being refunded at the door.

RSVP and send payment to Becky Brenner, USF Dept. of Electrical Engineering, 4202 E. Fowler Ave. ENB118, Tampa, FL 33620. Voice: (813) 974-2369. Fax: (813) 974-5250. Email: brenner@eng.usf.edu. **Please make checks payable to IEEE FWCS.** You also have the option to pay on-site.

DIRECTIONS (from Tampa International Airport)

- ◆ Take I-275 to the Fowler Avenue exit, approximately 8 miles north of the I-4 interchange.
- ◆ Take Fowler Avenue east approximately 2 miles to Spectrum Blvd.

The Embassy Suites is on the north side of Fowler Avenue, immediately in front of the University of South Florida.

JOB OPPORTUNITIES

PROJECT LEADER

This position is responsible for completing a prototype extra low frequency (ELF) receiver, supervising a programmer, and writing software for performance testing of the ELF receiver and the user software. Assists Marketing Dept. in promoting sales of ELF receivers. BSEE required with a minor in Applied Physics preferred. Must have 5 years experience in electronic product design, and C, C++, Assembly programming languages.

MANAGER OF WIRELESS PRODUCTS AND SERVICES

Beckwith Electric Co. is looking for an individual to manage our wireless product line. Must be familiar with Intersil Prism 2 product line, chipset, spread spectrum technology and 802.11 protocol. Must possess BSEE or BSCE and MBA. Five years prior experience with a wireless company required.

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Brain Teaser Challenge Column

By Butch Shadwell

March BTC Solution

Last month we had a glimpse into the future where 21st century technology is child's play. In this problem, one had to understand that the voltage on a capacitor is equal to the total charge divided by the capacitance, $V_c=Q/C$. Of course for a DC current, $Q=It$, or the current times the time of current flow. Therefore, it is clear that $C= It/V$. So with 10uA for 1mS causing a voltage rise of 0.1 volts, C must equal 0.1uF . I bet you already knew that.

April BTC

I really don't like taking out the garbage. You have to lift off the lid of the trash can, and then the smell hits you. I always feel like I need to take a shower when I get back inside. It's especially unpleasant during the colder months. I never dress warm enough, so I find myself making a mad dash to get it over with before I start really feeling the cold. Of course the thing we always dread is that the cans are already full and compression is required. Trying to squeeze in the additional material without actually coming in contact with it, is something that requires great speed and dexterity.

I recall one particularly harrowing garbage day eve, I can recall thinking that there is probably a market for a device to indicate when a can has already reached it's limit. I decided I could build a stand for the cans that would have a cantilever in the support system so that I could attach strain gauges in a full bridge configuration to get a voltage signal that was proportional to the weight of each can. If I wanted to get the most stable, and repeatable, output signal voltage from this strain gauge arrangement, do you think I should use a voltage or a current source as the excitation or bias supply?

Questions or comments to the Brain Teaser Challenge, please contact Butch Shadwell at 904-223-4465 (voice), 904-223-4510 (fax), b.shadwell@ieee.org (email), 3308 Queen Palm Dr., Jacksonville, FL 32250-2328. <http://www.se.mediaone.net/~butchs/>



IEEE-USA State Department Fellowship Available

IEEE-USA is accepting applications from U.S. IEEE members interested in spending a year at the U.S. State Department as a technical adviser. The successful State Department Fellow can play an important role providing technical insights into U.S. foreign policy interests.

An applicant must be an IEEE member with U.S. citizenship, possess a Ph.D. or 10+ years of professional experience, and be able to obtain a security clearance. A stipend and relocation assistance will be provided by IEEE-USA.

The application deadline is 3 June 2002; the Fellowship will start in either September 2002 or January 2003.

For more information, go online to www.ieeeusa.org/forum/govfel/state.html; or contact IEEE-USA Government Relations Director Chris Brantley at + 1 202 785 0017, ext. 8347.

IEEE-USA is an organizational unit of The Institute of Electrical and Electronics Engineers created in 1973 to promote the careers and public-policy interests of the more than 235,000 electrical, electronics, computer and software engineers who are U.S. members of the IEEE. The IEEE is the world's largest technical professional society. For more information, go to <http://www.ieeeusa.org>.

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310-643-7328

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- AB Engineer - Manufacturing
- AC Engineer - Quality/Test
- AD Engineering Services
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- AF Corporate/General Management
- AG Press
- AH Purchasing/Procurement
- AJ Marketing/Sales
- AK Student/Educator
- AL Other

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- CG Military/Aerospace/Avionics
- CH Medical Electronics
- CJ Semiconductors/ICs
- CK Test/Measurement/Inspection
- CL Distributors
- CM Other

- BJ On Line Services
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- BS Other

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(check all that apply)

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- BD Components other than IC's
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- BF Contract Services - Design/Manufacturing/Test
- BG Workstations/EDA Tools & Engineering Software
- BH Connectors/Interconnects

5. Years Involved in Industry

- DA 1 - 2
- DB 3 - 5
- DC 6 - 9
- DD 10 or more

6. Size of your organization

- | | | |
|---------------|-----------------------------|-----------------------------|
| | At Your Location | In Entire Company |
| 1 - 49 | <input type="checkbox"/> EA | <input type="checkbox"/> EB |
| 50 - 99 | <input type="checkbox"/> EC | <input type="checkbox"/> ED |
| 100 - 499 | <input type="checkbox"/> EE | <input type="checkbox"/> EF |
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Southcon/2003

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Exhibit Hours

Wednesday, March 19
10 am - 4 pm
Thursday, March 20
10 am - 4 pm

April 2002 Calendar of Events

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2 <i>EXCOM at TECO Center Guest are always Welcome!</i>	3	4	5 <i>Southeastcon02 Columbia, SC Material Due For the Signal</i>	6 <i>Southeastcon02 Columbia, SC</i>
7 <i>Southeastcon02 Columbia, SC</i>	8 <i>PES/IAS Spring Seminar Variable Freq. Drives and ... 8:30AM at ETRC</i>	9	10 <i>SP/COMM Chapter Meeting Cellular Systems & Smart Antennas 6PM-Radisson</i>	11	12	13 <i>Joint USF & MTT/AP/ED A Forum 8AM at Embassy Suites Hotel</i>
14	15	16	17	18 <i>COMP/AESS Chapter Meeting High Speed Signal Integrity 6PM - Honeywell</i>	19	20
21	22	23 <i>Joint USF & PES/IAS Meeting Electric Vehicle 5PM at USF CUTR Room 102</i>	24	25	26	27
28	29	30				

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