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Joint Chapter Meeting: Reconfigurable Multifunctional Antennas

SPEAKER: Dr. Christos G. Christodoulou

**Antennas and Propagation Distinguished
Lecturer**

University of New Mexico

LOCATION: University of Arizona, Room ECE 530

DATE: Monday October 18, 6:00 pm

Refreshments Provided (pizza and soft drinks)

The requirements for increased functionality, such as direction finding, radar, control and command, within a confined volume, place a greater burden in today's transmitting and receiving systems. A solution to this problem is the re-configurable antenna. Antennas that can be used for multiple purposes that function over several frequency bands and that can be integrated on a package for mass-production are the ultimate goals of commercial and defense investigators. Furthermore, applications of such systems in personal and satellite communications impose the requirement for elements miniaturized in size and weight.

Key-elements to obtain re-configurability in RF circuits Radio-Frequency MicroElectroMechanical Systems (RF-MEMS). Even though RF-MEMS have been used in the past to reconfigure filters, phase-shifters, capacitors and inductors, their integration in an antenna system has been limited as it faces a plethora of issues that need to be resolved. The absence of reconfigurable RF-MEMS antenna system and the recent advances in fractal - and especially Sierpinski gasket-antennas combined with the availability of series cantilever RF-MEMS switches, sparked the pioneering idea to design a multiple-frequency antenna that will radiate on-demand the same radiation pattern at various frequencies. Such a system was designed and successfully implemented, as the first functional, fully integrated RF-MEMS reconfigurable self-similar antenna. In this talk, several reconfigurable

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antennas are presented and discussed. The antennas to be presented cover a wide range of designs such as fractal antennas, triangular antennas, dipoles and monopoles with variable sleeves. All these antennas make use of MEMS switches, to make them reconfigurable. Some of the challenges that the designer has to face in biasing and integrating these switches with the antenna has are also presented and discussed.

BIOGRAPHY

Christos G. Christodoulou received his Ph.D. in Electrical Engineering from North Carolina State University in 1985. He served as a faculty member in the University of Central Florida from 1985 to 1998. In 1999, he joined the faculty of the Electrical and Computer Engineering Department of the University of New Mexico, where he served as the Chair from 1999 to 2005. He is a Fellow of IEEE and he served as the general Chair of the IEEE Antennas and Propagation Society/URSI 1999 Symposium, as the co-chair of the IEEE 2000 Symposium on Antennas and Propagation for wireless communications, and the co-technical chair for the IEEE Antennas and Propagation society/URSI 2006 Symposium. Currently, he is an associate editor for the IEEE Transactions on Antennas Propagation, the International Journal of RF and Microwave Computer-Aided Engineering, and IEEE Antennas and Propagation Magazine. He served as a guest editor for a special issue on "Applications of Neural Networks in Electromagnetics" in the Applied Computational Electromagnetics Society (ACES) journal and he is also co-editor of the IEEE Antennas and Propagation special issue on "Synthesis and Optimization Techniques in Electromagnetics and Antenna System Design". He has published over 250 papers in journals, conferences, and book chapters. He has also co-authored 4 books. His research interests are in the areas of modeling of electromagnetic systems, reconfigurable systems, machine learning applications in electromagnetics, and smart antennas.

Message From the Section Chair

By Brenda Huettner

I'd like to invite everyone in the Tucson Section to participate in IEEE. In the last year, we've conducted activities for schools, the University of Arizona, the community, and for you, the membership. These activities are a great way to get involved in IEEE and show the impact of engineers in our community.

Before the end of the year, we'll be electing new officers, starting up a micromouse contest and a student paper contest at the U of A, starting our preparations for next year's Engineers Week, and organizing additional meetings. All of this is done on a volunteer basis.

We have a great core of volunteers but we could always use your help. I'm asking people to get involved. With more people the Tucson Section could do so much more for the membership and this community.

If you're interested in helping out or becoming an officer, contact us through the following website:

<http://www.ieee.org/tucson>

Become an IEEE Senior Member!

Do you want to become a senior member of the IEEE? The IEEE wants to promote qualified candidates to senior membership! If you have 10 years of professional experience of which five years of significant professional performance, you are qualified for a senior member upgrade. Educational experience such as a bachelor's degree in an IEEE-designated field counts 4 years to that number, a master's degree counts 5 years and a doctorate counts 6 years. In order to find out more, point your web browser to www.ieee.org and search for senior membership!

Senior Membership:

<http://www.ieee.org/web/membership/senior-members/>

Applications can be found online. You will need the references of three current senior members or fellows. If you need assistance, contact Joseph Wu at joewu@ieee.org

IEEE Student Members....

Student Paper Contest and Micromouse Competition

The Tucson Section of the IEEE sponsors a Student Paper Contest and a Micromouse competition. Winners can win cash prizes and advance to regional contests and win extra money.

For the Student Paper Contest, entries will be judged by the content of the paper and an oral presentation.

For the Micromouse, teams of students will build a microprocessor controlled mouse to negotiate a maze to find the center.

These contests will be held in March or April of 2011 so stay tuned for details!

Keep Up with the Tucson Section: Join our email list!

The Tucson Section email list delivers the latest IEEE Tucson news right to your email box. To join, simply send an email to

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Put the following in the body of the message:

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Other News

The University of Arizona Electrical and Computer Engineering Department turns 100!

The UA Department of Electrical and Computer Engineering is 100 years old in 2010, and to celebrate its first century, ECE has organized an exciting program of events to highlight how engineering affects every aspect of our lives.

For the celebration, there are events planned, including a gala evening to raise funds for student scholarships, a public lecture series, a book launch, and an exhibition on the UA Mall of planetary exploration rovers designed by an ECE professor.

For more information see the following websites:

<http://ece.arizona.edu>

<http://www.engineering.arizona.edu/news/story.php?id=191>

Upcoming Conferences

2010 IEEE International Workshop on Robotic and Sensors Environments (ROSE), Oct 15-16, Arizona State University, Phoenix, AZ

2010 IEEE International Workshop on Haptic Audio Visual Environments and Games (HAVE 2010), Oct 16-17, Arizona State University, Phoenix, AZ

2010 6th Embedded Systems Week (ESWeek), Oct 24-29, The Westin Kierland, Scottsdale, AZ, USA

2010 8th IEEE Workshop on Embedded Systems for Real-Time Multimedia (ESTIMedia), Oct 28-29, The Westin Kierland, Scottsdale, AZ

IECON 2010 - 36th Annual Conference of IEEE Industrial Electronics, Nov 7-10, Renaissance Hotel & Spa Glendale, AZ

2010 4th IEEE International Conference on E-Learning in Industrial Electronics (ICELIE), Nov 7-10, Renaissance Glendale Hotel & Spa, Glendale, AZ

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We need to hear from you!

How can we make IEEE a better organization? We can only do it with your help. As a volunteer organization, IEEE depends on your participation to accomplish all of our goals.

As you can see from this newsletter, there are lots of activities where you can actively contribute. Are you good at organization? Volunteer to head one of our Chapters or to help organize our general meetings. Want to show off or improve your internet skills? Volunteer to help with our Web site. Interested in promoting our field to the next generation of engineers? Help with Engineers Week, or as a judge for any of our student competitions.

Even if you only have a little bit of time, there's sure to be an IEEE opportunity that will interest you. Even if you have no free time at all, but have ideas for meetings or activities that promote engineering and the IEEE, let us know! We'd like to hear from you. Please contact Joseph Wu at joewu@ieee.org or at 325-4781.

We're on the Web!

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<http://www.ieee.org/tucson>

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