

THE BEEET



Bulletin of the IEEE Tucson Section

April 2011
Volume 11, Issue 2

U of A Microwave Theory and Techniques Student Branch Chapter Presents: MICROWAVE NEAR-FIELD IMAGING OF HUMAN TISSUE: HOPES, CHALLENGES, OUTLOOK

Speaker: Dr. Natalia K. Nikolova, McMaster University

LOCATION: University of Arizona, Room ECE 530

DATE: Monday April 30, 6:00 pm

Refreshments Provided (pizza and soft drinks)

More than 40 years ago, Larsen and Jacobi experimented with microwaves in the imaging of the canine kidney. Their pioneering work triggered high hopes for a new diagnostic modality in medicine but also identified serious challenges. Research effort in this area continues unabated, focused especially on early-stage breast-cancer detection. The need for alternative cancer diagnostic tools is urgent and perceived worldwide as a high priority for research and development. Yet the very few clinical trials of experimental microwave imaging systems have not satisfied the requirements of today's medical diagnostics. This talk briefly reviews past and recent developments in near-field microwave methods for tissue imaging. In the context of these developments, the major challenges are discussed - challenges which have so far prevented microwave imaging from becoming a clinically viable modality. Promising new directions of research are described that have the potential to bring about a breakthrough. These include advances in hardware design and characterization (sensor arrays, custom and laboratory measurement instrumentation), methodologies for tissue-parameter characterization, and the development of data-processing and reconstruction algorithms. Many of these new developments draw upon recent successes of microwave and millimeter-wave imaging systems used for concealed-weapon detection, through-the-wall imaging and underground surveillance. Thus, it is shown how the ever expanding field of microwave imaging is converging to address some of society's most urgent needs.

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BIOGRAPHY

Natalia K. Nikolova received the Dipl. Eng. (Radioelectronics) degree from the Technical University of Varna, Bulgaria, in 1989, and the Ph.D. degree from the University of Electro-Communications, Tokyo, Japan, in 1997. From 1998 to 1999, she held a Postdoctoral Fellowship of the Natural Sciences and Engineering Research Council of Canada (NSERC), during which time she was initially with the Microwave and Electromagnetics Laboratory, Dalhousie University, Halifax, Canada, and, later, for a year, with the Simulation Optimization Systems Research Laboratory, McMaster University, Canada. In 1999, she joined the Department of Electrical and Computer Engineering, McMaster University, where she is currently a Professor. Her research interests include theoretical and computational electromagnetism with applications in inverse scattering, microwave imaging and computer-aided design. Prof. Nikolova has published more than 200 refereed manuscripts. She has authored 4 book chapters and has delivered many invited lectures on the computer-aided microwave analysis and design as well as on microwave near-field imaging.

Prof. Nikolova holds a Canada Research Chair in High-frequency Electromagnetics. She is a Fellow of the IEEE.

Message from the Section Chair

By Joseph Wu

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.

Save the date....

Tucson Section Micromouse Contest

University of Arizona
ECE Building, 1230 E Speedway
Saturday, April 28, 2012

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

listserv@listserv.ieee.org

Put the following in the body of the message:

[subscribe TUCSON-SECTION-ALL yourfirstname yourlastname](#)

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Other News

Upcoming Conferences

2012 IEEE 21st Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS)
21 Oct - 24 Oct 2012
Tempe Mission Palms Hotel
Tempe, AZ, USA
www.epeps.org

INTELEC 2012 - 2012 IEEE International Telecommunications Energy Conference
30 Sep - 04 Oct 2012
Talking Stick Resort and Conference Center
Scottsdale, AZ, USA
www.intelec.org

2012 34th Electrical Overstress/Electrostatic Discharge Symposium (EOS/ESD)
09 Sep - 14 Sep 2012
Westin La Paloma
Tucson, AZ, USA
www.esda.org

2012 IEEE Phoenix Waves and Devices Chapter Technical Workshop on Millimeter Wave to Terahertz Devices and Technologies
27 Apr - 27 Apr 2012
Arizona State University
Tempe, AZ, USA
ewh.ieee.org/r6/phoenix/wad/

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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.

We're on the Web!

Visit us at:

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

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