From the Guest Editor's Desk

High on High Frequency

■ **Gayle Collins**

Greetings and welcome to the special issue of *IEEE Microwave Magazine* for The 2013 International Microwave Symposium (IMS2013). As I write this column shortly after the New Year, my thoughts are with the great team that has made not only this issue happen but IMS2013 as well. In this issue, we have put together a stellar collection of technical articles, informative articles about the technical and social programs, and a little bit about one of the best spots on earth: Seattle. We trust that this issue of the magazine will be an informative and useful tool for those attending 2013, a preview of what's to come for those who are not, and a foundation of technical articles to support several of the current themes in our industry. The official theme of this year's symposium is "High on High Frequency," and I hope to impart the anticipation with which many of us approach IMS week.

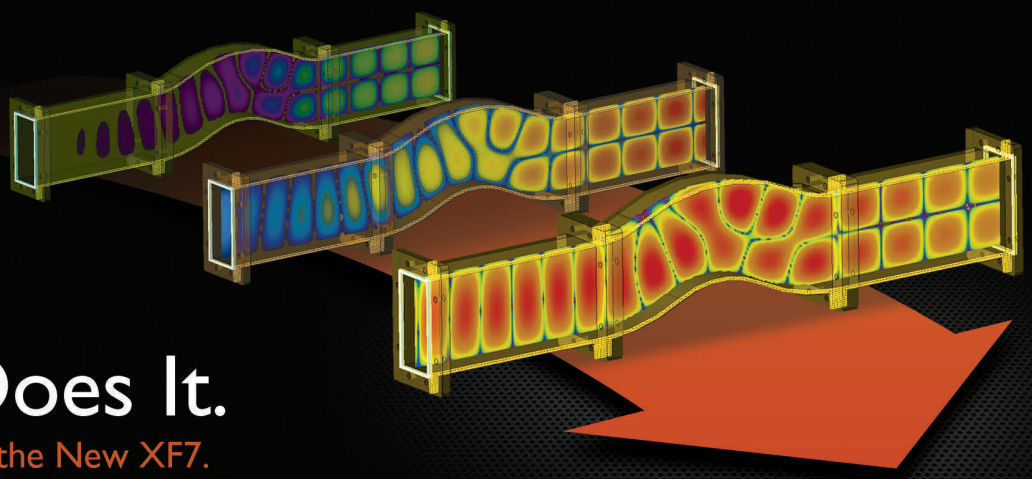
In this issue you will find contributions from many of the IMS Steering Committee members describing different events and programs that will occur during the week. We also have columns from representatives of both ARFTG and RFIC describing those conferences and what to expect. The IMS2013 technical program has a rich array of panel sessions, generally held at lunchtime, rump sessions held on Tuesday evening, as well as the focus, special, and technical sessions. There are student events, including a wide range of competitions to showcase their research and design skills. The workshops are on a variety of topics, as outlined in this issue, providing opportunity for participants from academia and industry to share and discuss their current research and development experience in an informal setting. There will be live streaming of IMS events during the week on IEEE TV at ieeetv.ieee.org. Please see the individual columns on each of these events presented in this issue and use these overviews to aid in planning your week.

WASHINGTON STATE CONVENTION CENTER

There are four technical articles in this issue, representing just a fraction of the topics covered at IMS2013 that have been contributed by leading experts in their fields. The articles are a timely discussion of some of the current topics in our field. Bumman Kim and his group at POSTECH have contributed a comprehensive insight into of the design of envelope tracking amplifiers. Envelope tracking (ET) provides a solution in the quest for high efficiency in power amplifiers (PA). In any application, the PA consumes the greatest amount of power in terms of heat dissipation thus lowering the overall system efficiency. PA efficiency is a metric that describes the amount of dc power that is converted to RF power. ET is an advanced PA architecture that aims to increase the efficiency of PAs in complex modulation schemes that require a high peak to average power ratio (PAR). This is achieved by varying the supply voltage of the PA concurrent with the envelope of the RF signal. This technical feature presents an in-depth look at ET while contrasting it with similar methods such as envelope elimination and restoration.

Gayle Collins (gayle_collins@ieee.org) is with MaXentric Technologies, La Jolla, California.

Digital Object Identifier 10.1109/MMM.2013.2240837
Date of publication: 2 April 2013



Easy Does It.

▶ Introducing the New XF7.

XF7 simulating a TE_{20} to TE_{10} tri-bend mode converter.

Electromagnetic Applications:

Antenna Design & Analysis: WiFi, Wireless LAN, WiMAX, Arrays, Mobile

Antenna Placement: On-Platform, Human Interaction

Biomedical: Imaging, Implantables

EMI/EMC Testing

Metamaterials/Special Materials

Microwave Devices: Waveguides, Rotman Lens

Photonics and Optical

Radar and Scattering, RCS

Signal Integrity

Static Discharge

Wireless Propagation

Visit Us at IMS 2013
Booth #920.

XFdtd® 3D Electromagnetic Simulation Software is powerful enough to handle the toughest simulations. It's tremendously fast by leveraging NVIDIA's most modern CUDA-enabled GPUs. And it's easy to use and engineered to replicate real-world processes.

Power, Speed, and Usability — Experience XF7 at IMS 2013!

Recent enhancements:

- MPI + XStream® GPU Acceleration for simulating massive problems exceeding billions of cells
- Waveguide ports
- Bend, stretch, and twist geometry
- Static solver now solves for all good conductors
- ODB++ PCB import within CAD Merge, allowing retention of previous modifications to the PCB
- Time Domain Reflectometry (TDR) and Time Domain Transmission (TDT) output types

Release 7.3 highlights at: **www.remcom.com/xf7-waveguides**

Find resources for your specific electromagnetic application at:
www.remcom.com/electromagnetic-applications

REMCOM®

+1.888.7.REMCOM (US/CAN)
+1.814.861.1299
www.remcom.com

David Runton and crew from RFMD have provided a detailed review of high power gallium nitride (GaN) technology, from its process development through reliability qualification to market specific products. The development of GaN processes has been driven by the requirement of power and bandwidth at higher frequencies for both military and commercial applications. GaN process technology development is covered as well as manufacturing concerns such as reliability assessment and qualification. After the GaN PA technology is qualified, the focus is moved the foundry, to subassemblies and packaging with market-specific targets. The benefits of unmatched parts, prematched parts, and fully matched parts are discussed and contrasted. The GaN process can also be optimized for linearity and compete favorably with GaAs and LDMOS in terms of bandwidth. This article is a well thought out and presented description of what it has taken to bring GaN to market, from developing the process to the final product.

The third feature article is an entertaining and instructive chronicle of the art of signal integrity by Brent Grossman and his colleagues at Intel. Correlation of measured data to simulation results is important in its impact of the quality of the design that results from the simulation. Following the protagonist, Bert the newly minted engineer, the reader is given a clear picture of the why there is a need for measurement verses simulation. As we follow Bert, we learn the underlying assumptions and misconceptions we are likely to encounter when we embark of ensuring the reliability of our simulated results. A descriptive summary of the different techniques for assessing the comparison and quantifying error is given. The different approaches are compared and contrasted highlighting the ramifications engineers can face when ensuring the reliability of their data and simulation. We are left with thought provoking questions at the end of the article that illustrate the challenges that lie ahead in this field.

The final technical contribution is an interesting proposition on the synthesis of "smart skins" with radio frequency identification (RFID), power harvesting, and low-cost manufacturing to create large-scale sensing topologies for ambient intelligence. It has been generated by Ben Cook et. al. of Manos Tentzeris' group at Georgia Tech. The term "smart skin" refers to an ultrathin electronic patch than can be affixed to surfaces and has the mechanical properties of skin. The circuit stretches, crumbles, and moves with the ease and flexibility of skin. Combined with RFID and sensors, it can be used to monitor structural stress of buildings and airplanes or to monitor levels of gas, or even in biomedicial applications to monitor nerve and muscle activity. It is expected that in the future that smart skins will be able to modify the environment that they are placed in through the use of RFID technology. This provocative feature presents an overview of sensing technologies that have potential for integration with large-scale smart skins resulting in a technology that will impact and improve your quality of life.

In addition to the technical features and technical program, this special issue contains information on the conference logistics, local arrangements, and opportunities for networking. Along with the opportunity for learning and inspiration, IMS2013 provides an unparalleled opportunity for reaffirming friendships and collaborative partnerships, as well as discovering fresh paths for research and forming new contacts in our microwave community. As *IEEE Microwave Magazine* Guest Editor, I would like to thank the editor-in-chief, Dr. John Wood for his facilitation and guidance in creating this special issue. I want to express my appreciation to Venkata Kodukula for sharing the role of guest editor to the *IEEE Microwave Magazine* IMS2013 special issue. I also would like to acknowledge Janet O'Neil, Publications Committee chair, Leonard Hayden, TPC chair, and Tom Raschko, general chair, for their invaluable comments and suggestions that aided in creating this issue. Further thanks go to all on the Steering Committee who have contributed the informative articles about IMS2013, and to all of the staff at *IEEE Microwave Magazine* who have provided us with great support in putting together this magazine. We hope to see all of you in Seattle for a very great week!