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TECHNICAL BRIEFS

TECHNICAL REVIEW OF THE 63RD IEDM CONFERENCE

BY BARBARA DE SALVO AND SUMAN BANERJEE

The IEEE 63rd IEDM conference (www.ieee-iedm.org) was held December 2–6, 2017 at the Hilton San Francisco Union Square Hotel. Highlights of the conference include the technology platform presentations by Intel and Globalfoundries detailing their competing new 10 nm/7 nm FinFET technology platforms. In addition, AMD President & CEO Lisa Su spoke on multi-chip technologies for high-performance computing. There was also the plenary talk by Nobel Laureate Dr. Hiroshi Amano during Wednesday morning plenary on “*Development of Sustainable Smart Society based on Transformative Electronics*.”

Of high interest at the conference was the competing technology platform presentations by Intel and Globalfoundries on FinFETs. FinFETs are high-performance transistors for ultra-dense, powerful integrated circuits (ICs). They have a multi-sided gate surrounding a fin-shaped channel for precise transistor control even at the nanoscale. The most advanced FinFETs in volume production are at the 14 nm/16 nm technology node. FinFETs are a major driver of the continued progress of the electronics industry, and at the IEDM, Intel and Globalfoundries unveiled their forthcoming state-of-the-art integrated FinFET technology platforms.

Intel researchers presented a 10 nm logic technology platform with excellent transistor and interconnect performance and aggressive design-rule scaling. They demonstrated its versatility by building a 204 Mb SRAM having three different types of memory cells: a high-density 0.0312 μm^2 cell, a low voltage 0.0367 μm^2 cell, and a high-performance 0.0441 μm^2 cell. The platform features 3rd-generation FinFETs fabricated with self-aligned quadruple patterning (SAQP) for critical layers, leading to a 7 nm fin width at a 34 nm pitch, and a 46 nm fin height; a 5th-generation high-k metal gate;

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YOUR COMMENTS SOLICITED

Your comments are most welcome. Please write directly to the Editor-in-Chief of the Newsletter at clilley@uic.edu

REGIONAL NEWS

EUROPE, MIDDLE EAST & AFRICA (REGION 8)

ED Scotland

—by Marc Desmulliez

In November of last year, the Scottish Chapter of the IEEE Electron Devices Society was very pleased to host a lecture by Professor Kunihiro Asada, Director of the VLSI Design and Education Center (VDEC) at the University of Tokyo. Professor Asada presented the exciting work going on within the VDEC research facility to an audience of academics, industrialists and research students at the University of Edinburgh's Institute for Integrated Micro and Nano Systems (IMNS). In particular, he spoke on two of his current research interests. The first of these was the development of integrated magnetic sensors that enable the diagnosis of semiconductor

devices. He then went on to describe his laboratory's work on single photon avalanche diode (SPAD) arrays with fast access circuits. The chapter would like to thank Professor Asada for his stimulating talk and for taking the time after his presentation to discuss his work further with interested members of the audience.

~ Jonathan Terry, Editor

ED/AP/MTT/COM/EMC Tomsk Chapter

—by Oleg Stukach

Our Tomsk Chapter has regularly organized conferences on various fields not only in the Siberia region. First Euro-Asian Conference on Future Energy together with International Siberian Conference on Control and Communications (SIBCON) was held in June in Astana, capital of Kazakhstan with EDS technical co-sponsorship. The financial support was provided by Saken Seifullin Kazakh Agrotechnical University. Since 1995, SIBCON has been organized biannually. It focuses on advances in devices for control, communications and technology innovations from different points of view, in order to improve the understanding in the field. Our goal is also a propagation of EDS development by formation of the chapters. We believe that it is necessary to form chapters in big academic and industrial cities of

Kazakhstan by fields of strategic activities: communication, control, future green agriculture, energetics.

Representatives of different Kazakhstan, Siberian, foreign academia, and R&D companies participated in the conference. A high professional activity was demonstrated by participants. The invited and regular papers were presented in 32 oral sessions organized in 8 tracks. The sessions addressed key problems of modern electronic devices, modern manufacturing technologies, as well as some related topics. Different types of presentations were made, namely ordinary presentations, new ideas, valuable conclusions from experience, the state-of-the art and instructive survey communications. All presented papers were published in IEEE *Xplore*. Several active conference participants, both engineers and students, received best paper awards.

A tutorial on the modern level of technical and information means usage in measurement services was also organized by R&D branch of National Instruments Russia. The conference included also the special session "Join the IEEE" demonstrating the Institute membership benefits.

One of the best traditions of Tomsk conferences, the social program, was particularly rich and included the banquet with Astana street seeing tour. Astana is a brilliant city merging historical and modern objects. It is a new



Professor Kunihiro Asada of the University of Tokyo with former ED Scotland Chair Professor Anthony Walton of the University of Edinburgh



Participants of the SIBCON 2017 Conference

venue for the IEEE events due to luxurious places, the exotic culture, and excellent service. An increased interest in the Tomsk Chapter conferences was clearly observed. We cordially invite you to the Moscow Workshop on Electronic and Networking Technologies (MWENT) in March 14–16, 2018. For more information visit, <http://mwent.hse.ru>.

Finally, the Tomsk Chapter thanks EDS for sponsorship and hopes for the continuation of mutually advantageous cooperation.

MTT/ED/AP/EP/SSC West Ukraine Chapter

(XXII International Seminar/Workshop DIPED-2017)

— by Mykhaylo Andriychuk

The XXII International Seminar/Workshop on Direct and Inverse Problems of Electromagnetic and Acoustic Wave Theory (DIPED-2017) was organized by the MTT/ED/AP/EP/SSC West Ukraine and MTT/ED/AP Georgian Chapters. This year, DIPED was held at Oles Honchar Dnipro National University (DNU), Dnipro, Ukraine, on September 25–28. Besides DNU, DIPED-2017 was co-organized by Ivane Javakhishvili Tbilisi State University (TSU) and

Pidstryhach Institute for Applied Problems of Mechanics and Mathematics, NASU, Ukraine. The IEEE Electron Devices Society, Antennas & Propagation Society, and Microwave Theory & Techniques Society provided the technical co-sponsorship for the Seminar/Workshop. The IEEE Solid State Circuits Society and IEEE Ukraine Section were the supporting IEEE institutions.

Prof. Oleg O. Drobakhin, Chairman of the Organizing Committee, Dr. Tamar Gogua, IEEE MTT/ED/AP Georgian Chapter Secretary, and Prof. Kakhaber Tavzarashvili, IEEE MTT/ED/AP Georgian Chapter Chairman, expended a lot of effort for the general and local organization of the event.

The DIPED-2017 technical program consisted of 57 papers, including 5 invited talks. Scientists from Georgia, Germany, Greece, Israel, Russia, South Africa, Turkey, and Ukraine brought forward their works. The papers were arranged at the following sections:

- Diffraction and Scattering,
- Waveguide and Layered Structures,
- Inhomogeneous Media,
- EM Field Applications,
- Antenna Design,
- Numerical Computational Techniques,
- Acoustics and Application.

Like previous years, many regular students, PhD students and young scientists attended the Seminar/Workshop. The Best Young Speaker Awards were granted to five researchers:

- Mr. Giorgi Kapanadze (Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia) for *“ELF Radio Emission Associated With Strong M6.0 Earthquake”*;
- Mr. Vyacheslav Gorev (Oles Honchar Dnipro National University, Dnipro, Ukraine) for *“On the Kinetics of a Many-Body Dissipative System Placed in a Random Field”*;
- Mr. Pavle Tsotskolauri (Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia) for *“Tbilisi State University Extremely Low Frequency Radiation Research Net (ELFTSU Net): the First Measurements at Station Locations”*;
- Mr. Mykola Medvedev (V. N. Karazin Kharkiv National University, Kharkiv, Ukraine) for *“Electromagnetic Near-Field of Arc Slot, Cut in Coaxial Line Shield”*;
- Mr. Evhen Shulga (O. Ya. Usikov Institute of Radiophysics and Electronics, NASU, Kharkiv, Ukraine) for *“Interaction of Eigen Oscillations in a Cylindrical Cavity with Composite Material”*

The recipients of the Awards were recognized with a special certificate from the Program Committee and a financial grant from the Organizing Committee.

Following the DIPED tradition, free lobby discussions were a considerable part of the conference.

An excursion tour to the Aero Cosmic National Center in Dnipro, where the latest achievements in the field of rocket engineering and space technology of the former Soviet Union and independent Ukraine are demonstrated, and a bus tour to the ancient Cossack fortress, Kodak, were organized in the framework of the Seminar/Workshop social program.

The traditional Seminar/Workshop dinner was held after closing of the technical program and included presentations of the The Best Young



Prof. Oleg O. Drobakhin, DIPED-2017 Organizing Committee Chairman, presenting the historical overview about the Department of Applied and Computer Radiophysics at the Oles Honchar Dnipro National University