



## IEEE COMCAS 2013 – Technical Program\*

\*subject to changes

**MONDAY, October 21, 2013**

### 9:15-10:30 (75 min) - PLENARY SESSION

#### 9:15-10:30 1A1: INVITED SPEAKERS

1A1-1: GaN Market Opportunities and Outlook

Dr. Asif Anwar, Strategy Analytics Inc., Milton Keynes, U.K.

Abstract: While military applications continue to drive the GaN device market, commercial applications are finally emerging and going into volume production. Both wireless infrastructure and CATV networks are becoming increasingly data-centric with an emphasis on technologies that can offer wider bandwidths and higher linearity coupled with high voltage operation thus opening the door for increased use of GaN. As GaN technologies mature, similar performance requirements will come from markets that typically operate at higher frequencies with opportunities emerging in VSAT/satellite and point-to-point radio markets. GaN will also see increasing use in the military sector with radar and communications applications adding to early implementation in electronic warfare systems.

1A1-2: SiGe:C Devices and MMIC's for Microwave Links and Active Safety Systems

Dr. Franz Dielacher, Infineon Technologies Austria, Villach, Austria

Abstract: The millimetre-wave frequency range of the electromagnetic spectrum is increasingly used for high-data-rate communications and pro-active safety systems like car-radar, identification and e-safety. Steady progress in integrated circuit and packaging technology enable the integration of complete transceivers on a chip or in a package including even the antenna. After describing criteria and trade-offs for technologies and system partitioning, this talk addresses low-cost high performance technologies such as CMOS and SiGe-bipolar and low loss, low cost organic packaging materials. Efficient millimetre-wave radios and transceiver concepts will be presented with examples and measurements. In addition to the performance of electrical components, major criteria are high reliability, long lifetime and high yield fabrication. Advanced packaging technologies including MEMS, embedded passive components, 3D integration and package co-design will be addressed as well.

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## 11:00-12:40 (100 min) - PLENARY SESSION

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### 1A2: OPENING SESSION

1A2-1: Opening Remarks

Dr. Shmuel Auster, Conference Chair

Ron Huldai, Mayor of the city of Tel Aviv - welcome address

Dr. Stephen Weinstein, Technical Program Chair

Prof. Madhu Gupta, MTTTS President

Dr. Doug Zuckerman, ComSoc, IEEE Div. III Director

Prof. Moshe Kam, IEEE President 2011: "In memory of Roger Pollard"

1A2-2: Keynote address

"Connecting the Future"

*Dr. Shmuel Eden, President, Intel Israel*

Abstract (tentative): Dr. Eden will cover the evolution of personal computing devices from his personal experience to the way we see the future of these devices. He will describe some of the technologies that are enablers of future devices from a wide perspective as well as specifically the communication aspects.

1A2-3: Keynote address

"Spectrum Imperatives and Technology Challenges for Wireless Systems"

*Dr. Adam Drobot, Chairman, OpenTechWorks Inc., Dallas, USA*

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## 14:00-15:40 (100 min) - PARALLEL SESSIONS 1A3, 1B3, 1C3, 1D3

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### 14:00-15:40 1A3: RFICs

Chair: Dr. Eran Socher, Tel Aviv University

Co-Chair: Aleksey Dyskin, Technion - Israel Institute of Technology

1A3-1: On-Chip Transmitter with an EIRP of +2.8 dBm at 217 GHz in 90 nm CMOS

B. Khamaisi, S. Jameson, E. Socher, Tel-Aviv University, Tel-Aviv, Israel

1A3-2: CMOS Distributed Amplifiers Using High-Pass and Low-Pass Artificial Transmission Lines

I. Gertman, E. Socher, Tel-Aviv University, Tel-Aviv, Israel

1A3-3: A 6.6 mW Inductorless Static 2:1 Frequency Divider Operating up to 60 GHz in 28 nm CMOS

V. E. Issakov [1], B. Parvais [1], K. Vaesen[1], V. Vidojkovic [1], P. Wambacq [1,2], [1]IMEC, Leuven, Belgium, [2] Vrije Universiteit Brussel, Brussels, Belgium

1A3-4: Performance Evaluation of Broadband Drivers for Radio Frequency Applications

N. Joram, R. Wolf, F. Ellinger, Technische Universitaet Dresden, Dresden, Germany

1A3-5: Broadband Receiver Frontend with High Dynamic Range for Multi-standard Digital Radio

B. Lindner, N. Joram, A. Strobel, U. Yodprasit, F. Ellinger, Dresden University of Technology, Dresden, Germany

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## **14:00-15:40 1B3: MILLIMETER WAVE AND TERAHERTZ TECHNOLOGIES AND SYSTEMS**

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Chair: Dr. Solon Spiegel, Rio Systems

Co-Chair: Prof. Asher Yahalom, Ariel University

1B3-2: Millimeter- and Submillimeter-Wave Monolithic Integrated Circuits Based on Metamorphic HEMT Technology for Sensors and Communication

M. Schlechtweg [1], A. Tessmann [1], A. Leuther [1], H. Massler [1], S. Wagner [1], R. Aidam [1], J. Rosenzweig [1], O. Ambacher [1], I. Kallfass [2], U. Lewark [2], R. Sommer [3], A. Wahlen [3], S. Stanko [3], J. Ender [3]; [1] Fraunhofer IAF, Freiburg, Germany, [2] Karlsruhe Institute of Technology, Karlsruhe, Germany, [3] Fraunhofer FHR, Wachtberg, Germany

1B3-3: Uncooled and Passive 0.5-1.5 THz FPA Imager

E. Shumaker [1], D. Corcos [1], N. Kaminsky [1], D. Elad [1], T. Morf [2], B. Klein [2]; [1] IBM, Haifa, Israel, [2] IBM, Zurich, Switzerland

1B3-4: Transmission Line Modeling of Active Microwave Pulse Compression Systems

S. P. Savaidis [1], Z. C. Ioannidis [2], N. A. Stathopoulos [1], S. A. Mitilneos [1], C. Tsitouri [1]; [1] Technological Educational Institute of Piraeus, Athens, Greece, [2] National and Kapodistrian University of Athens, Athens, Greece

1B3-5: Sheet Electron Beam Millimeter-Wave Amplifiers at the Naval Research Laboratory

B. Levush, D. K. Abe, Naval Research Laboratory, Washington, United States

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## **14:00-15:40 1C3: SENSOR SYSTEMS AND APPLICATIONS**

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Chair: Prof. Nadav Levanon, Tel Aviv University

Co-Chair: Prof. Yael Nemirovsky, Technion, Israel Institute of Technology

1C3-1: TECSAR – Program Status

U. Naftaly, O. Oron, ELTA Systems Ltd, Ashdod, Israel

1C3-2: Feasibility of a Radar Altimeter for an Unmanned Aerial Vehicle Cruising in the Mars' Atmosphere

S. Yonemura [1,2], A. Tomiki [2], T. Toda [2], T. Kobayashi [1]; [1] Wireless Systems Laboratory, Adachi-ku, Japan, [2] Institute of Space and Astronautical Science, Sagami-hara-shi, Japan

1C3-3: Komarov Crater Analysis: Its Origin & Classification to Floor-Fractured Craters

O. N. Calla, S. Mathur, M. Solanki, International Centre for Radio Science, Jodhpur, India

1C3-4: A Self-Calibration Method for an Implantable Displacement Sensor

S. Hao, Michigan State University, East Lansing, United States

1C3-5: Vehicle Proximity Map Formation in VANET

Y. Allouche, M. Segal, Ben-Gurion University of the Negev, Beer-Sheva, Israel

1C3-6: [title to be supplied]

Ori Oron, Elta Technologies, Ashdod, Israel

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## **14:00-15:40 1D3: ADVANCES IN ELECTROMAGNETICS AND ANTENNAS (invited session)**

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Chair: Prof. Amir Boag, Tel Aviv University, Israel

The session will cover some recent advances in computational electromagnetics, and antenna development. Novel differential and integral equation based approaches for the numerically efficient solution of electromagnetic scattering and antenna problems will be presented. Two papers will describe carbon nanotube and plasmonic nano-antennas bridging the gap between electromagnetics and optics. Finally, advances in the design of reconfigurable antennas will be discussed.

1D3-1: Towards an infinitely thin PML

Rafi Kastner, Tel Aviv University, Tel-Aviv, Israel

1D3-2: Reconfigurable Slot Antenna for Cognitive Radio Applications

Yehuda Leviatan, Technion, Haifa, Israel

1D3-3: UWB Dual-Vivaldi nano-antennas

Zeev Iluz & Amir Boag, Tel Aviv University, Tel-Aviv, Israel

1D3-4: Antenna effects in the infrared and terahertz response of carbon nanotubes

Gregory Slepyan, Tel Aviv University

1D3-5: Analysis of Scattering by Essentially Convex Bodies Using the Directive Source Integral Equation

Arkadi Sharshesky [1], Vitaliy Lomakin [2], & Amir Boag [1]; [1] Tel-Aviv University, Tel-Aviv, Israel; [2] University of California, San Diego, USA

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## **14:00 – 16:00 (120 min) - 1P1: POSTER SESSION\***

1P1-1: Waveguide E-Plane Folded Cross-Coupled Filters

J. Meyler, K. Garb, R. Kastner, Tel Aviv university, Tel Aviv, Israel

1P1-2: Fabrication and characterization of RF MEMS high isolation switch up to X-band

S. Dey, M. S. Parihar, S. K. Koul, Indian Institute of Technology, Delhi, New Delhi, India

1P1-3: A Class-F-1 GaN HEMT Power Amplifier Optimized for Envelope Tracking with Gain-Efficiency Trajectory Analysis and Comparison

Z. Wang, Nokia, Beijing, China

1P1-4: Analysis of a Switched Ultra-Low Power Bandgap Reference Source for Passive RFID Tags

J. G. Schulze [1], S. J. Spiegel [2]; [1] Technische Universität Dresden, Dresden, Germany, [2] Rio Systems, Givat Shmuel, Israel

1P1-5: A Quad 1.25GSps 8 bit ADC with 3.2GHz input bandwidth and its use in communication systems.

A. Glascott-Jones, N. Chantier, M. Wingender, F. Bore, E. Bouin, E2v, St Egreve, France

1P1-6: An X-band GaN HEMT Hybrid Power Amplifier with Low-loss Wilkinson Division on AlN Substrate

G. C. Barisich [1], S. Pavlidis [1], C. A. Donado Morcillo [1], O. L. Chlieh [1], E. Gebara [2], J. Papapolymerou [1]; [1] Georgia Institute of Technology, Atlanta, United States, [2] I2R Nanowave, Incorporated, Atlanta, United States

1P1-7: Moving target Speed calibrator for Multanova 6F speed radar (34.3GHz)

U. Nissan(Nissanov), A. Yahalom, Ariel University of Samaria, Ariel, Israel

1P1-8: The methods of the bandwidth enhancement of the flash ADC with the differential input

N. N. Prokopenko, A. I. Serebryakov, P. S. Budyakov, Don State Technical University, Rostov-on-Don, Russian Federation

1P1-9: Substrate Integrated Waveguide Fixed Phase Shifter for 90°-degree Directional Coupler

T. Castellano1, O. Losito [1], L. Mescia [1], M. Chiapperino [1], G. Venanzoni [1], D. Mencarelli [1], G. Angeloni [2], C. Renghini [2], F. Bigelli [2], P. Potenza [2], F. Prudeniano [1]; [1] Politecnico di Bari, Bari, Italy, [2] Somacis Spa, Castelfidardo, Italy.

\*Note: Posters will be displayed from 8:00 till 17:00. Poster frontal presentations will take place between the indicated hours.

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## 16:00-17:40 (100 min) - PARALLEL SESSIONS 1A4, 1B4, 1C4

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### 16:00-17:40 1A4: SOLID-STATE DEVICES, RFICS, CIRCUITS AND MODELING

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Chair: Dr. Claudio Jakobson, Samsung Electronics

Co-Chair: Prof. Aleksey Dyskin, Technion - Israel Institute of Technology

1A4-1: TSV Multi-Signal Connection Compact Modeling

E. Mina [1], S. Shlafman [2], R. A. Gordin [2], B. Sheinman [2], D. Elad [2], [1] IBM, Burlington, United States, [2] IBM, Haifa, Israel

1A4-2: Process Effective Power Mosfet Integrated in 0.18um platform with Very Low Rdson

S. C. Levy, S. Levin, A. Heiman, N. Berkovitch, S. Shapira, TowerJazz, , Migdal Haemek, Israel

1A4-3: Modeling of SAW Resonators Fabricated on GaN/Si

A. Stefanescu [1], V. Buiculescu [1], A. Dinescu [1], A. Cismaru [1], A. Muller [1], G. Konstantinidis [2], A. Stavrinidis [2], G. Stavrinidis [2], [1] IJMT-Bucharest, Bucharest, Romania, [2] Forth-Iesl-Mrg, Heraklion, Greece

1A4-4: Efficient Electromagnetic Analysis of Spiral Inductor Patterned Ground Shields

J. C. Rautio, J. D. Merrill, M. J. Kobasa, Sonnet Software, North Syracuse, United States

1A4-5: AlGaIn/GaN HEMT Development Targeted for X-band Applications

W. Wohlmuth, M. Weng, C. Lin, J. Du, S. Ho, T. Chou, S. Li, C. Huang, W. Wang, W. Wang, WIN Semiconductors, Kuei Shan Hsiang, Taiwan

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### 16:00-17:40 1B4: MICROWAVE AND TERAHERTZ SENSORS, IMAGING, DETECTING AND TOMOGRAPHY - II

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Chair: Prof. Asher Yahalom, Ariel University

Co-Chair: Prof. Yosef Pinhasi, Ariel University

1B4-1: Passive non-imaging mm-wave sensor for detecting hidden objects

B. Kapilevich, B. Litvak, A. Shulzinger, Ariel University, Ariel, Israel

1B4-2: New Approach to Estimation of Chirp Signal with Unknown Parameters

I. Rusnak, L. Peled-Eitan, Rafael, Haifa, Israel

1B4-3: Constrained-Beam Amplitude Monopulse Technique for Bearing Estimation in Passive Radar with Uniform Circular Dipole Array

J. Hwang, Y. Pang, J. Li, Y. Chiu, Yuan-Ze University, Chung-Li, Taiwan

1B4-4: 3D Millimeter wave imaging system using chirp radar and Glow Discharge Detector pixel

D. Rozban [1,2], A. Aharon (Akram) [2,1], A. Levanon [2], A. Abramovich [1], N. S. Kopeika [2]; [1] Ariel University, Ariel, Israel, [2] Ben Gurion University, Beer sheva, Israel

1B4-5: Application of Super-Rayleigh Resolution in Radio Astronomy and Passive Radio Imaging

Y. A. Pirogov, A. I. Chulichkov, S. S. Batova, V. B. Khaikin, M.V. Lomonosov Moscow State University, Moscow, Russian Federation.

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### 16:00-17:40 1C4: MEDICAL TECHNOLOGIES & APPLICATIONS OF RF AND ULTRASOUND (invited session)

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Chair: Ruth Rotman, Elta Technologies, Ashdod, Israel

Co-Chair: Stephen Weinstein, Commun. Theory & Technol. Consulting

Abstract: RF and ultrasound techniques and devices, and accompanying computational methods, are already widely deployed in medical practice and hold great potential for future benefits. This invited session describes several of those promising technologies, plus environmental cueing for patient support systems.

1C4-1: Multi-Cue Unit: An Independent Device and Actuator of a Wearable System for Gait-Support in Parkinson Patients

Y. Zhao [1], F. Anhalt [1], U. Fietzek [2], L. T. D'Angelo [1], [1] Technische Universitaet Muenchen, Munich, Germany, [2] Schoen Klinikum Muenchen Schwabing, Munich, Germany

1C4-2: A Fingerprint for Cancer; Identification of the Proteome Cancer Fingerprint in Blood Plasma via Image Analyses of Subcellular Translocation in a Novel Cell Based Chip for Early Cancer Detection and Diagnostics  
Liron Agiv [1], Stanley Rotman [2], Yoram Altchuler [3]

Affiliations: [1] Dept. Biomedical Engineering, Univ. Ben Gurion of the Negev; [2] Dept. Electrical Engineering, Univ. Ben Gurion of the Negev; [3] CSO, NovellusDx Ltd., Jerusalem Bio-Park, Hadasah Medical Center Campus, Jerusalem, Israel

1C4-3: Processing of Acceleration Signals for Physiological State Identification

Guy Tsrur [1], Sharona Bistry [1] & Stanley Rotman [2]

[1] Dept. of Biomedical Engineering Univ. Ben Gurion of the Negev, [2] University of Ben Gurion of the Negev

1C4-4: The Advantages and Pitfalls of Sensor Fusion for Target Detection in Medical and Geophysical Applications

Ruth Rotman, Elta Electronics Industries, Ashdod Israel

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## 9:00-10:40 (100 min) - PARALLEL SESSIONS 2A1, 2B1, 2C1, 2D1, 2E1

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### 9:00-10:40 2A1: POWER AMPLIFIER AND DEVICE MODELING

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Chair: Dr. Danny Elad, IBM Research Lab, Haifa, Israel

Co-Chair: Dr. Solon Jose Spiegel, RIO Systems

2A1-1: Efficiency Study of a 2.2-kV, 1-ns, 1-MHz Pulsed Power Generator Based on a Drift-Step-Recovery Diode  
L. M. Merensky [1], A. S. Kesar [1], A. F. Kardo-Sysoev [2]; [1]Soreq Nuclear Research Center, Yavne, Israel, [2] Ioffe Physical Technical Institute, St. Petersburg, Russian Federation

2A1-2: High Efficiency Ka-Band Gallium Nitride Power Amplifier MMICs  
C. F. Campbell, Y. Liu, M. Kao, S. Nayak, TriQuint, Richardson, United States

2A1-3: Integrated 60V Vertical DMOS on 0.18um platform for Power over Ethernet IC  
N. Berkovitch [1], T. Herman [2,1], S. Levin [1], S. Shapira [1], H. Jebory [3]; [1] TowerJazz, Migdal Haemek, Israel, [2] Consultant, LA, United States, [3] TowerJazz, Newport Beach, United States

2A1-4: 1kW GaN S Band Radar Transistor  
J. L. Walker, G. Formicone, F. Boueri, B. Battaglia, Integra Technologies, Inc., El Segundo, United States

2A1-5: Tunable Pulse Generators Based on Drift-Step Recovery Effect in COTS Power Rectifier Diodes  
D. Sostanovsky<sup>1,1</sup>, A. Boryssenko<sup>2,2</sup>, IRatio, Kiev, Ukraine, 2A&E Partnership, Belchertown, United States

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### 9:00-10:40 2B1: WIRELESS COMMUNICATION IN THE 21st CENTURY (invited session)

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Chair: Irving Kalet, Azrieli College, Jerusalem, Israel and Columbia University, USA

This open panel session addresses the possible directions for wireless communications in the near future, beginning with the now almost "classic" wireless communications systems e.g., 4G-LTE and Wi-Fi. The topics to be discussed include 5G (fifth generation) cellular systems, and new very wideband systems operating in the millimeter microwave range (e.g., WiGig). We will also discuss new directions in the use of wireless communications in areas such as satellite communications and the bio-medical field. Members of the audience are invited to join members of the panel in suggesting new ideas for future directions in wireless communications.

2B1-1 Keynote Overview  
Irving Kalet, Azrieli College of Engineering, Jerusalem and Columbia University, New York, USA

2B1-2: The future of Wi-Fi Type Systems  
Matti Wax, CTO, Alvarion, Rosh Hayain, Israel

2B1-3: Milli-microwave (60 GHz-WiGig) mobile communications  
Gal Basson, VP, Wilocity, Caesarea, Israel

2B1-4: The Future of Wireless Communications in the Twenty-First Century: Global and Regional Views  
Haim Mazar, Deputy Director, RF Spectrum and Licensing & Vice Chairman, ITU-R, Study Group I

2B1-5: Academic research in future wireless communications  
Shlomo Shamai (Shitz), Technion, Haifa, Israel

2B1-6: Possible additional presentation on Satellite Communication

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## **9:00-10:40 2C1: MIMO AND MINIATURIZED ANTENNAS**

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Chair: Eli Levin, The Open University of Israel

Co-Chair: Asaf Katz, Saron A.C.A Ltd, Israel

2C1-1: A Dual-band Shorted Planar Monopole Antenna with slots for WLAN

H. Yang, R. Zhang, Y. Shen; Beijing University of Posts and Telecommunications, Beijing, China

2C1-2: A Design-Algorithm for MIMO Radar Antenna Setups with Minimum Redundancy

A. Kirschner, U. Siart, J. Guetlein, J. Detlefsen, Technische Universitaet Muenchen, Munich, Germany

2C1-3: Design and Testing of a Miniaturized Dual Polarized VHF Array Element for AIS Space Application

L. J. Foged [1], A. Giacomini [1], F. Saccardi [1], L. M. Tancioni [1], A. Di Cintio [2], G. Della Pietra [2], A. Caliumi [2], G. Duchini [2], P. de Maagt [3], N. J. Fonseca [3], J. M. Baracco [4]; [1] MVG, Pomezia, Italy, [2] CGS Space, Milano, Italy, [3] Esa Estec, Noordwijk, Netherlands, [4] Mardel, Venice, United States

2C1-4: Basic Performances of Triple Band MIMO Antenna for WiMAX by using a Folded Monopole Antenna with a Parasitic Element

T. Ito [1], M. Nagatoshi [1], S. Tanaka [2], H. Morishita [1]; [1] National Defense Academy, Yokosuka, Japan, [2] Yazaki Corporation, Yokosuka, Japan

2C1-5: An Electrically Small Elliptic PIFA for RFID in Harsh Metallic Environments

J. Sidén, H. Nilsson, Mid Sweden University, Sundsvall, Sweden

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## **9:00-10:40 2D1: MULTI-ANTENNA/PHASED ARRAY SYSTEM CALIBRATION AND TRAINING (invited session)**

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Chair: Prof. Caleb Fulton, Univ. of Oklahoma, USA

Abstract: This session focuses on the calibration and training of phased array systems, highlighting the synergies in techniques and challenges between the successful implementation of various multi-antenna applications. A number of diverse topics are discussed, including channel estimation for array-based passive imaging, in-situ conformal array calibration for weather polarimetry, near-field equivalence techniques, and model-based feedback mechanisms for waveform optimization.

2D1-1: Calibration strategy for a TDM FMCW MIMO radar system

Johanna Guetlein, Andreas Kirchner & Juergen Detlefsen

Fachgebiet Hochfrequente Felder und Schaltungen, Technische Universitaet Muenchen, Germany

2D1-2: A 2D Synthetic Aperture Radiometry Demonstrator by Switching Strategy at X Band

Y. Aouial, S. Meric, O. Lafond, Mohamed Himdi, Institute of Electronic & Telecommunication of Rennes, Rennes, France

2D1-3: Equivalent current reconstruction technique for array and radar antenna diagnostic

Lars Jacob Foged, F. Saccardi, L. Scialacqua, T. Turrin, R. Soerens, R. Braun, J.L. Quijano, G. Vecchi  
MVG, Pomezia, Italy; OrbitFR, Horsham, USA; Univ. Nacional de Colombia, Bogota; LACE, Politecnico di Torino, Italy

2D1-4: Cylindrical polarimetric phased array radar: A multi-function demonstrator and its calibration

Caleb J. Fulton, G. Zhang, L. Lei, W. Cocangel, R. Kelley, M. McCord

Univ. of Oklahoma, Norman (Oklahoma) USA & National Severe Storms Lab, Norman, USA

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## **9:00-10:40 2D1: MULTI-ANTENNA/PHASED ARRAY SYSTEM CALIBRATION AND TRAINING (invited session) - continued**

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2D1-5: Phased array antenna model-in-the-loop radar waveform optimization  
S.A. Seguin, J. Jakabosky, B.D. Cordill, S. Blunt, Univ. Kansas, Lawrence, USA

2D1-6: Photonic beamforming system challenges and opportunities  
Moshe Tur, Tel Aviv University, Israel

## **9:00-10:40 2E1: RELATING THE STATE OF THE ART IN HYPERSPECTRAL DATA ANALYSIS TO SYNTHETIC APERTURE RADAR IMAGE PROCESSING (TUTORIAL)**

Presenter: Stanley Rotman , University of Ben Gurion of the Negev

Abstract: A large number of analysis techniques have been developed for the processing of multispectral and hyperspectral imagery. These techniques include Principal Component Analysis (PCA), Anomaly Detection (AD) and Matched Filter Target Detection (MFTD). On the surface this multi-dimensional data analysis should not be relevant to SAR images, which are traditionally single images taken of wide-scale imagery. However, with the advent of dual polarization imagery and multiple multi-look imagery, we can think of SAR imagery as having many of the characteristics of the hyperspectral imagery. In this lecture we will review several of the major methods of hyperspectral data analysis and relate this work to SAR imagery

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## **11:00-12:40 (100 minutes) - PARALLEL SESSIONS 2A2, 2B2, 2C2, 2D2, 2E2**

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### **11:00-12:40 2A2: MICROWAVE AND MM-WAVE CIRCUITS AND TECHNOLOGIES**

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Chair: Dr. Michael Schlechtweg , Fraunhofer Institute IAF, Germany

Co-Chair: Dr. Solon Jose Spiegel, RIO Systems

2A2-1: An active up conversion mixer covering the entire 71-86GHz Eband range in SiGe Technology  
B. Sheinman [1], R. Carmon [1], R. Ben-Yishay [1], O. Katz [1], N. Mazor [1], R. Levinger [1], A. Bruetbart [2], A. Golberg [2], D. Elad [1]; [1] IBM, Haifa, Israel, [2] Tadiad, Information Technologies & Services , M.P. Ashrat, Israel

2A2-2: A V-band 8.5Gbps transmitter in 65nm CMOS  
A. Rubin, E. Socher, Tel Aviv University, Tel Aviv, Israel

2A2-3: Performance Comparison for Millimeter-Wave Single-Pole Double Throw Switches  
A. Dyskin [1], S. Wagner [2], D. Ritter [1], I. Kallfass [3]; [1] Technion - Israel Institute of Technology, Haifa, Israel, [2] Fraunhofer Institute of Applied Solid State Physics, Freiburg, Germany, [3] University of Stuttgart, Stuttgart, Germany

2A2-4: Analysis of Cross-Coupled Common-Source Cores for W-Band LNA Design at 28nm CMOS  
T. Heller [1,2], E. Cohen [1], E. Socher [2]; [1] Intel Corporation, Haifa, Israel, [2] Tel-Aviv University, Tel-Aviv, Israel

2A2-5: Broadband Design of RF MEMS SPDT switch  
U. Sharma, M. Kumar, K. K. Jain, Solid State Physics Lab, Delhi, India

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## 11:00-12:40 2B2: COMMUNICATION ALGORITHMS AND STRATEGIES

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Chair: Prof. Jay Weitzen, University of Massachusetts - Lowell, USA

Co-Chair: Dr. Stephen Weinstein, Commun. Theory & Technol. Consulting

2B2-1: Wireless Sensor Network Security: A Critical Literature Review

A. Betts, F. Meyer-Bodemann, F. Muller, S. Zhu, University of Derby, Derby, United Kingdom

2B2-2: Wireless Software Defined Networks: Challenges and Opportunities

C. Chaudet [1], Y. Haddad [2]; [1] Telecom ParisTech, Institut Telecom Paris, Paris, France, [2] Jerusalem College of Technology, Jerusalem, Israel

2B2-3: Gossip-based transmission algorithms performance in Wireless Sensor Networks (WSN)

M. Martinez Espinoza, M. Yarleque Medina, Pontificia Universidad Catolica del Peru, Lima, Peru

2B2-4: Managing and Measuring Performance of Large Femtocell Networks

J. A. Weitzen [2,1], R. Wakim [2]; [1] Airvana, Chelmsford, United States, [2] University of Massachusetts Lowell, Lowell, United States

2B2-5: Slotted Adaptive Frequency Hopping and Rolling Scheme for Multi-net Cognitive Radio with Experimental Result

J. Hwang, S. Li, J. Li, Y. Chiu, M. Chang, Yuan-Ze University, Chung-Li, Taiwan

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## 11:00-12:40 2C2: METAMATERIAL AND THz ANTENNAS

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Chair: Reuven Shavit, Ben-Gurion University Of the Negev

Co-Chair: Yehuda Leviatan, Technion-Israel Institute of Technology

2C2-1: Compact Tunable Printed Antennas for Medical and Commercial Applications

1100-1120

A. Sabban, Ort Braude, Kiryat Yam , Israel

2C2-2: Planar Ka band Antenna for Satellite Communication Based on Metamaterial Technology

R. Shavit, R. Joffe, E. Falek, Ben-Gurion Univ, Beer-Sheva, Israel

2C2-3: Wideband planar skirt antenna and its application for the detection of terahertz radiation

N. Kaminski [1], D. Corcos [1], E. Shumaker [1], D. Elad [1], T. Morf [2], B. Klein [2], U. Drechsler [2], M. Despont [2]; [1] IBM research Haifa, Haifa, Israel, [2] IBM research Zurich, Rueschlikon, Switzerland

2C2-4: Metamaterial Perfect Absorber for Millimeter wavelength region

Y. Azoulay, A. Abramovich, Ariel University , Ariel , Israel

2C2-5: Antenna packaging of a 32 element TX/RX phased array RFIC for 60 GHz Communications

E. Cohen, M. Ruberto, M. Cohen, H. K. Pan , S. Ravid, Intel, Haifa, Israel

# IEEE COMCAS 2013 – Technical Program\*

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**TUESDAY, October 22, 2013**

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## **11:00-12:40 2D2: AUTOMOTIVE APPLICATIONS - RADAR (invited session)**

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Chair: Dr. Igal Bilik, General Motors Advanced Technikal Center, Herzliya, Israel

Co-Chair: Dr. Ran Gazit, General Motors Advanced Technical Center, Herzliya, Israel

Abstract: The session focuses on automotive radar technology, including system design and implementation challenges, directions for possible solutions and state-of-the-art developments in the area of automotive radar. Topics included in the session are automotive radar system, challenges in automotive radars, technology trends of next generation automotive radar systems, advanced concepts and signal processing for automotive radars, and components of automotive radars enabling new applications.

2D2-1: Target classification in automotive radar

Igal Bilik, General Motors Advanced Technical Center, Herzliya, Israel

2D2-2: Computationally Efficient Ambiguity Mitigation in LFM Automotive Radars

Shamgar Gurevich [1], Alex Fish [2], Igal Bilik[3] and Kobi Sheim [3], ""

Affiliations: [1] University of Sydney Australia; [2] University of Wisconsin, USA; [3] General Motors Advanced Technical Center, Herzliya, Israel

2D2-3: Automotive MIMO Radar

Joseph Tabrikian, Ben Gurion University, Israel

2D2-4: Automotive Radar on Chip

Eran Soher, Tel Aviv University, Israel

2D2-5: Multipath exploitation in automotive radars

Jeff Krolik, Duke University, USA

2D2-6: Feature Selection for Classification of Human Micro-Doppler

S. Z. Gürbüz [1], B. Tekeli [1], M. Yüke [1], C. Karabacak [2], A. C. Gürbüz [1], M. B. Guldogan [3],

Affiliations: [1] TOBB University of Economics and Technology, Ankara, Turkey; [2] TUBITAK Space Technologies Research Institute, Ankara, Turkey; [3] Turgut Ozal University, Ankara, Turkey

2D2-7: LTCC Parasitic Patch Antenna for 77 GHz Automotive Applications

A. Bunea [1], D. Neculoiu [1], M. Lahti [2], T. Vaha-Haikkila [2]; [1] National Institute of R&D in Microtechnologies - IMT Bucharest, Bucharest, Romania; [2] VTT Technical Research Centre of Finland, Espoo, Finland

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## **11:00-12:40 2E2: DATA FUSION (TUTORIAL)**

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Presenter: Moshe Kam (Past President, IEEE), Drexel University, Philadelphia, USA

Abstract: Multi-Sensor data fusion is the process that integrates information from multiple data sources and sensors about the same physical object or phenomenon into a coherent, consistent and useful representation. The goal is to obtain from a suite of inputs related to the object/ phenomenon a better understanding of its features and characteristics than could be achieved by a single source or by simple averaging of all available inputs. Data Fusion techniques borrow from detection and estimation theory, statistical signal processing, and information theory, and have been applied to medical diagnostics, radar target detection and tracking, air traffic control, oil exploration, military command and control, electric power networks, robot navigation, weather prediction, remote sensing, and wireless sensor networks. This tutorial would provide an overview of the most popular fusion algorithms, topologies and methods, including those that emanate from Bayesian decision theory, sequential detection and Kalman filtering. We will also review hard/soft fusion techniques which address data and opinions generated by humans along with readings from automatic sensors and detectors. We will review specific results related to the theme of COMCAS 2013.

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## 14:30-16:10 (100 min) - PARALLEL SESSIONS 2A3, 2B3, 2C3, 2D3, 2E3

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### 14:30-16:10 2A3: NOVEL PASSIVE AND ACTIVE COMPONENTS AND MODELS

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Chair: Aleksey Dyskin, Technion, Haifa, Israel

Co-Chair: Dr. Claudio Jakobson, Samsung Electronics

2A3-1: A Compact Wideband Filter Based on a Grounded Transversal Resonator

N. Jankovic, V. Crnojevic-Bengin, University of Novi Sad, Novi Sad, Yugoslavia

2A3-2: Scaling Quad-Flat No-Leads Package Performance to E-band Frequencies

S. S. Cahill [1], E. A. Sanjuan [1], D. Regev [2], [1] BridgeWave Communications, Santa Clara, United States, [2] Presto Engineering, Migdal Ha'emek, Israel

2A3-3: A Small Size Low Cost Electronically Tunable Bandpass Filter with Integrated Bias Control

P. Quednau, R. Trommer, L. Schmidt, Friedrich-Alexander-University Erlangen-Nuremberg, Erlangen, Germany

2A3-4: Lossy Inverters and Their Influence on Coupled Resonator Filter Characteristics

M. Zukocinski, A. Abramowicz, Warsaw University of Technology, Warsaw, Poland

2A3-5: Lumped Element Model for Arbitrarily Shaped Integrated Inductors - A Statistical Analysis

F. M. Passos [1], M. H. Fino [1], E. R. Moreno [2], R. G. Echevarría [2], F. F. Fernández [2]; [1] New University of Lisbon, Caparica, Portugal, [2] Institute of Microelectronics of Seville, CSIC and University of Seville, Seville, Spain

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### 14:30-16:10 2B3: MICROWAVE AND TERAHERTZ SENSORS, IMAGING, DETECTING AND TOMOGRAPHY - I

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Chair: Prof. Yosef Pinhasi, Ariel University

Co-Chair: Prof. Boris Kapilevich, Ariel University

2B3-1: The detector array system for 3-mm wavelength video imaging

V. Shahkin [1], Y. Belov [2], P. Volkov [1], A. Goryunov [1], I. Illarionov [1], A. Serkine [2]; [1] The Institute for Physics of Microstructures RAS, Nizhni Novgorod, Russian Federation, [2] Radio Physics Research Institute of the Ministry of Education and Science, Nizhni Novgorod, Russian Federation

2B3-2: Heterodyne detection and polarization effects at 300 GHz using Ne Indicator Lamp Glow Discharge Detectors

A. Aharon (Akram) [1,2], D. Rozban [3,2], A. Abramovich [2], N. S. Kopeika [1,3]; [1] Ben-Gurion University of the Negev, Beer-Sheva, Israel, [2] Ariel University, Ariel, Israel, [3] Ben-Gurion University of the Negev, Beer-Sheva, Israel

2B3-3: Simulations of 2D Metamaterial Apertures for Coherent Computational Imaging

G. Lipworth, A. Mrozack, J. Hunt, D. Brady, D. R. Smith; Duke University, Durham, United States

2B3-4: Solutions of Mutual Shadowing Effect between People Tracked by UWB Radar

J. Rovnakova, D. Kocur, Technical University of Kosice, Kosice, Slovak Republic

2B3-5: Usage of Amplitude, Phase and Polarization Readout for Sub-Pixel Resolution in RADAR Images

S. Cohen, Z. Zalevsky, Bar-Ilan Univ., Ramat-Gan, Israel

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## **14:30-16:10 2C3: ANTENNA DESIGN AND MODELING**

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Chair: Rafi Kastner, Tel Aviv University

2C3-1: Semi-Passive RFID tags with Double Loop Antennae Arranged as a Shifted Gate System for Stability Optimization Under Delayed Electromagnetic Interferences

O. Aluf, Tel-Aviv University, Tel Aviv, Israel

2C3-2: Methods for Extending the Bandwidth of Field Compensation

M. Haridim, B. Levin, S. Revich, Holon Institute of Technology, Holon, Israel

2C3-3: Transparent Antenna with Conical Feed

B. Levin, M. Haridim, S. Chulski, Holon Institute of Technology, Holon, Israel

2C3-4: Analysis and Design of Antenna Radomes

J. Moreno [1], L. Lozano [1], F. Catedra [2], I. Gonzalez [2]; [1] University of Alcala, Alcala de Henares, Spain, [2] Newfasant, Guadalajara, Spain

2C3-5: On the Impact of Edge Roughness to Narrowband and Wideband Flat Dipole Antennas

J. Sidén, J. Gao, H. Nilsson, Mid Sweden University, Sundsvall, Sweden

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## **14:30-16:10 2D3: AUTOMOTIVE APPLICATIONS - COMMUNICATION (invited session)**

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Chair: Dr. Moshe Laifenfeld, General Motors Advanced Technical Center, Herzlia, Israel

Abstract: The session focuses on a variety of wired and wireless automotive applications, from infotainment, through connectivity, to intra-vehicular communications. The theoretical and practical aspects include design and implementation challenges, potential solutions and state-of-the-art technologies that can fit into the automotive space. Topics included in the session include automotive cellular (LTE, M2M, offload); infotainment; vehicle to vehicle and infrastructure communications; intra-vehicular networks and applications; distributed vehicular computing; wireless power and charging; autos in smart grid and power line communications (PLC); and sensing and energy harvesting.

2D3-1: Experimenting With A Wireless Mesh Network Towards Sensing Inside a Vehicle's Transmission

M. Laifenfeld [1], K. Vaknin [1], L. Hardy [2], A. Goll [2]; [1] General Motors, Herzlia, Israel; [2] Virtual-Extension, Beit Dagan, Israel

2D3-2: Global Routing with Energy Balancing in Intra-Vehicular Environment

G. R. Tsouri [1], M. Laifenfeld [2]; [1] Rochester Institute of Technology, Rochester, United States; [2] General Motors, Advanced Technical Center, Herzlia, Israel

2D3-3: Vehicular Relay Nodes for Cellular Deployment: Downlink Channel Modeling and Analysis

Scheim & N. Lavi, General Motors, Herzliya, Israel

2D3-4: Comparative Characterization of Four Antennas for VANETs by On-Field Measurements

G. A. Gavilanes Castillo [1], M. Reineri [1], D. Brevi [1], R. Scopigno [1], M. Gallo [2], M. Pannozzo [2], S. Bruni [2], D. Zamberlan [2]; [1] Istituto Superiore Mario Boella, Turin, Italy; [2] Calearo Antenne S.p.A., Isola Vicentina, Italy;

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### 14:30-16:10 2D3: AUTOMOTIVE APPLICATIONS - COMMUNICATION (invited session) – continued

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2D3-5: TeaCP: a Toolkit for Evaluation and Analysis of Collection Protocols in Wireless Sensor Networks  
W. Si [1], M. Hashemi [1], I. Warszawski [1], M. Laifenfeld [2], D. Starobinski [1], A. Trachtenberg [1]; [1] Boston University, Boston, USA; [2] GM Advanced Technical Center, Herzliya, Israel

2D3-6: Vehicle Proximity Map Formation in VANET  
Y. Allouch & M. Segal; Ben-Gurion University of the Negev, Beer-Sheva, Israel

2D3-7: Magnetic-resonant wireless power transfer for an automotive environment  
Matt Chabalko & David Ricketts, M.I.T., Cambridge, USA

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### 14:30-16:10 2E3: MODERN METHODS FOR MICROWAVE FILTER NETWORK SYNTHESIS (TUTORIAL)

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Presenter: Richard Cameron, British Telecom, U.K.

Abstract: This tutorial lecture, minimizing mathematics and jargon, introduces the state-of-the-art coupling matrix filter synthesis method to microwave equipment designers, helping to meet the very stringent specifications that are demanded by modern telecommunication, radar and scientific/earth observation systems. One important advantage over classical synthesis methods is a one-to-one correspondence between the elements of the coupling matrix and the individual physical components of the filter. Another is the ability to reconfigure the coupling matrix through similarity transforms to arrive at a different coupling topology, corresponding to the available coupling elements of the particular microwave structure that has been selected for the application. The coupling matrix will naturally accommodate critical specifications such as asymmetric characteristics, transmission zeros and group delay equalization.

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## 14:30-16:30 (120 min) – PARALLEL POSTER SESSIONS 2P2, 2P3, 2P4\*

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### 14:30-16:30 2P2 POSTER SESSION - RF AND MICROWAVE TECHNIQUES AND TECHNOLOGIES, RADAR

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Chair: TBA

2P2-1: Millimeters wavelength imaging system based on Flat Parabolic Surface  
G. G. Litmanovitch, Ariel University, Ariel, Israel

2P2-2: Persistent Scatterers Detection In Open Area In High Resolution SAR Imagery - Case Study: Sendai, Japan  
A. Shalev, A. Yagev, Y. August, D. G. Blumberg, S. R. Rotman; Ben Gurion University of the Negev, Beer-Sheva, Israel

2P2-3: Atmospheric effects ultra wide band Frequency-Modulated Continuous-Wave (FMCW) RADAR operating in the millimeter and sub-millimeter wavelengths  
N. Balal, G. A. Pinhasi, Y. Pinhasi; Ariel University, Ariel, Israel

2P2-4: A Study on Novel Broadband Ku-band Spatial Power Divider/Combiner  
Y. Zhang [1], K. Yang [1], S. Xie[1], X. Ren [1], Y. Liu [2]; [1] University of Electronic Science and Technology of China , Chengdu , China, [2] Beijing University of Posts and Telecommunications, Beijing, China

2P2-5: Electromagnetic Heating Apparatus having Decoupled Excitations  
I. Chaimov, S. R. Rogers, GOJI, Hod-Hasharon, Israel

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### 14:30-16:30 2P3: POSTER SESSION - ANTENNAS (120 min)

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Chair: Shmuel Auster, Elta Systems Ltd

2P3-2: A Cheap Matching Component for Correcting Ill-matched Antennas  
L. Sigawy, M. M. Mayost, H. Matzner, JCE – Jerusalem College of Engineering , Jerusalem, Israel

2P3-3: Asymmetric Coplanar Strip Fed Zeroth Order Directional Antenna  
D. Raghavan Nair, V. V K Thalakkatukulathil, J. Palassery, D. C. Mukund, M. Pezholil, Cochin University of Science and Technology, Cochin, India

2P3-4: Planar Differential Antenna for UWB Pulse Radar Sensor  
D. Pepe1, D. Zito2,1, 1Tyndall National Institute, Cork, Ireland, 2University College Cork, Cork, Ireland

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### 14:30-16:30 2P4: POSTER SESSION - SPECIAL APPLICATIONS (120 min)

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Chair: Doug Zuckerman, Applied Communication Sciences, USA

Co-Chair: Shmuel Auster, Elta Systems, Israel

2P4-1: Active-passive remote sensing of rains  
A. Linkova, G. Khlopov, Usikov Institute of Radiophysics and Electronics of National Academy of Sciences of Ukraine, Kharkov, Ukraine

2P4-2: Gun Muzzle flash detection using CMOS sensors  
T. Merhav, V. Savuskan, Y. Nemirovsky, Technion-Israel Institute of Technology, Haifa, Israel

\*Note: Posters will be displayed from 8:00 till 17:00. Poster frontal presentations will take place between the indicated hours.

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WEDNESDAY, October 23, 2013

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## 09:00-10:40 (100 min) - PARALLEL SESSIONS 3A1, 3B1, 3C1

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### 9:00-10:40 3A1: CMOS CIRCUIT DESIGN (TUTORIAL)

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Presenter: Shruga Kraus, Technion, Israel

Abstract: Analog circuit design for baseband will be studied, with emphasis on the role of baseband circuits in receiving and transmitting chains. Guidelines for proper design of the building blocks will be provided, as well as considerations for putting the blocks together and embedding the whole baseband section in a communication system.

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### 9:00-10:40 3B1: CAD, MEASUREMENTS AND POWER DIVIDING TECHNIQUES FOR MICROWAVE AND COMMUNICATIONS DEVICES

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Chair: Dr. Michael Schlechtweg, Fraunhofer Institute IAF, Germany

Co-Chair: Prof. Boris Kapilevich, Ariel University, Israel

3B1-1: Monostatic Superscattering in Cylindrical Structures

V. Vulfin, R. Shavit, Ben-Gurion University of the Negev, Beer-Sheva, Israel

3B1-2: Avoiding crosstalk in multiconductor TEM waveguides

R. Ianculescu, Shenkar College of Engineering and Design, Ramat Gan, Israel

3B1-4: Pulsed S-parameter measurements: on resolution, duration, and uncertainty

J. Martens, Anritsu, Morgan Hill, California, USA

3B1-5: Comparison of Scattering from 2-D and 3-D Structures with Frequency-Dependent Materials in Time and Frequency Domains

D. I. Olcan [1], D. S. Petrovic [2], B. M. Kolundzija [1,2]; [1] University of Belgrade, Belgrade, Yugoslavia, [2] WIPL-D d.o.o., Belgrade, Yugoslavia.

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### 9:00-10:40 3C1: TECHNOLOGIES FOR HIGHER PERFORMANCE COMMUNICATIONS

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Chair: Stephen Weinstein, Communication Theory & Technol. Consulting, USA

Co-Chair: Doug Zuckerman, Applied Communication Sciences, USA

3C1-1: Optimal order estimation for modeling and predistortion of power amplifiers

T. Gotthans [1,2], G. Baudoin [1], A. Mbaye [1]; [1] Universite Paris-Est, Noisy Le Grand, France, [2] Brno University of Technology, Brno, Czech Republic

3C1-2: On the Potential of Application Based Coordinated Multi-Point (CoMP)

R. Nossenson, Y. Bellaiche, D. Hababou, Jerusalem College of Technology, Jerusalem, Israel

3C1-3: DCSR: A Dynamic channel and resolution sampling for a Compressive Sensing Receiver to acquire GPS signals

A. Albu-Rghaif, I. A. Lami, University of Buckingham, Buckingham, United Kingdom

3C1-4: PAPR Reduced OFDM Visible Light Communication using Exponential Nonlinear Companding

K. Bandara, N. Pararajasingam, Y. Chung, Pukyong National University, Busan, Republic of Korea

3C1-5: Incoherent Compression of Complementary Code Pairs for Laser Ranging and Detection

D. Kravitz [1], D. Grodensky [1], N. Levanon [2], A. Zadok [1]; [1] Bar-Ilan University, Ramat Gan, Israel, [2] Tel-Aviv University, Tel-Aviv, Israel

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## 11:00-12:40 (100 min) - PARALLEL SESSIONS 3A2, 3C2

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### 11:00-12:40 3A2: RECENT ADVANCES IN OPTICAL COMMUNICATIONS, INTRODUCING SPATIAL DIVISION MULTIPLEXING (TUTORIAL)

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Presenter: Moshe Tur, Tel Aviv University, Israel

Abstract: This tutorial addresses new, promising technique to enhance both free space optical and fiber optic communication. Special emphasis is placed on orbital momentum techniques.

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### 11:00-12:40 3C2: MMWAVE INTEGRATION IN SILICON DRIVEN BY 60G SYSTEMS (TUTORIAL)

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Presenter: Emanuel Cohen, Intel Israel, Haifa, Israel

Abstract: This tutorial presents recent progress of highly scaled Si-based technologies in the domain of millimeter-wave (MMW) applications traditionally dominated by the III-V technologies. It reviews recently developed architectures, circuit design and systems currently being investigated that benefit from the massive integration and sophisticated digital processing for RF assistance that CMOS process has to offer. The focus is on MMW applications for wireless high data rate communications especially at 60 GHz describing the building blocks for a full phased array system from the component design through the system testing and packing of a full solution in CMOS. A brief roadmap into the future of Sub-mm-wave and terahertz frequencies for imaging and communication applications will also be offered.

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## 14:00-15:00 (60 min) - SESSION 3A3

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### 14:00-15:00 3A3: CLOSING SESSION

3A3-1: Best paper awards

Dr. Steve Weinstein, Program Chair

3A3-2: Closing remarks

Dr. Shmuel Auster, Conference Chair