
Tel Aviv, Israel
21-23 October 2013
IEEE COMCAS 2013 – Technical Program

MONDAY, October 21, 2013

9:15-10:30 (75 min) - PLENARY SESSION Salon A, B, C

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 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.

10:30 – 11:00 COFFEE BREAK
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11:00-12:40 (100 min) - PLENARY SESSION Salon A, B, C

1A2: OPENING SESSION

1A2-1: Opening Remarks
Shmuel Auster, Conference Chair
Hila Oren, CEO, Tel-Aviv Global & Tourism - welcome address
Dr. Stephen Weinstein, Technical Program Chair
Prof. Madhu Gupta, MTTS President
Dr. Doug Zuckerman, ComSoc, IEEE Div. III Director
Prof. Moshe Kam, IEEE President 2011: "In memory of Roger Pollard"
Mr. Mark Pierpoint, Vice President & General Manager, Agilent Technologies

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
To accommodate the rapidly increasing consumer demand for broadband wireless communications, there are trends toward i) improved efficiency for currently assigned spectrum blocks; ii) capabilities for wide band spectrum sharing schemes; and iii) exploitation of higher frequencies for commercial use. These require significant investment in, development, and rethinking of the basic hardware architectures in common use today. The most challenging design aspects include antenna performance, miniaturization, adaptive multi-channel capabilities, spatial diversity, wide band operation, energy efficiency, and advanced signal processing, realized through advanced sub-systems and components. Manufacturing ultimately determines the competitiveness and economic viability of the designs and is one of the key questions. This talk surveys the high level requirements to meet the growth in demand and offers a view of possible approaches and outstanding challenges.

12:40 – 14:00 LUNCH

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

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
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

14:00-15:40 1B3: MILLIMETER WAVE AND TERAHERTZ TECHNOLOGIES AND SYSTEMS  
Chair: Dr. Solon Spiegel, Rio Systems  
Co-Chair: Prof. Asher Yahalom, Ariel University

1B3-1: A Monolithic Analog to Digital converter in 32nm CMOS for broadband radar applications.  
Roger Levinson, VP Strategy and Innovation Group, and Craig Hornbuckle, VP Systems Engineering, Kenneth Dyer, Director of Data Converter Development, Semtech Corporation

Abstract: There have been several architectural advancements in phased array radar systems over the past decades. Each advancement has required improved analog receiver channel performance and has been addressed by advancements in available technologies capable of supporting circuit implementation. With the scaling of CMOS technologies to 32nm and below, the ability to integrate extremely powerful DSP solutions at manageable power consumption has become a reality. In addition, we now have the ability to implement Analog to Digital Converters capable of digitizing the entire spectrum of interest while maintaining the required dynamic performance. These two factors combine to enable the implementation of monolithic, multi-channel receivers, thus decreasing board space and power constraints. In this presentation, we will show the fundamental architectural evolution of receive channels, the required circuit performance to achieve a broadband digitizing solution and an example of an 8-bit, 64GSPS ADC capable of achieving 6 ENOB up to 20GHz of input Bandwidth. We will also show the next steps to achieving higher levels of performance utilizing the next technology node, 14nm FinFET.

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

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

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

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     Salon C
Chair: Prof. Nadav Levanon, Tel Aviv University
Co-Chair: Prof. Yael Nemirovsky, Technion, Israel Institute of Technology

1C3-1: TECSAR – Program Status  51
U. Naftaly, O. Oron, ELTA Systems Ltd, Ashdod, Israel

1C3-4: A Self-Calibration Method for an Implantable Displacement Sensor  55
S. Hao, Michigan State University, East Lansing, United States

1C3-5: Vehicle Proximity Map Formation in VANET  60
Y. Allouche, M. Segal; Ben-Gurion University of the Negev , Beer-Sheva, Israel

1C3-6: Sink hole monitoring using SAR imagery  N/A
Ori Oron, Elta Technologies, Ashdod, Israel

14:00-15:40 1D3: ADVANCES IN ELECTROMAGNETICS AND ANTENNAS (invited session)     Royal H
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  N/A
Rafi Kastner, Tel Aviv University, Tel-Aviv, Israel

1D3-2: Reconfigurable Slot Antenna for Cognitive Radio Applications  N/A
Lev Pazin, Yehuda Leviatan, Technion, Haifa, Israel

1D3-3: UWB Dual-Vivaldi nano-antennas  N/A
Zeev Iluz & Amir Boag, Tel Aviv University, Tel-Aviv, Israel

1D3-4: Antenna effects in the infrared and terahertz response of carbon nanotubes  N/A
Gregory Slepyan, Tel Aviv University

1D3-5: Analysis of Scattering by Essentially Convex Bodies Using the Directive Source Integral Equation  N/A
Arkadi Sharshevsky [1], Vitaliy Lomakin [2], & Amir Boag [1]; [1] Tel-Aviv University, Tel-Aviv, Israel; [2] University of California, San Diego, USA

15:40 – 16:00    COFFEE BREAK
1P1-1: Waveguide E-Plane Folded Cross-Coupled Filters 65
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 70
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 75
Z. Wang, Nokia, Beijing, China

1P1-4: Analysis of a Switched Ultra-Low Power Bandgap Reference Source for Passive RFID Tags 79

1P1-5: A Quad 1.25GSps 8 bit ADC with 3.2GHz input bandwidth and its use in communication systems. 84
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 89
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) 93
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 98
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 N/A

*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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MONDAY, October 21, 2013

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

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

Chair: Dr. Claudio Jakobson, Samsung Electronics
Co-Chair: Aleksey Dyskin, Technion - Israel Institute of Technology

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

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

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: AlGaN/GaN HEMT Development Targeted for X-band Applications

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

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

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

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

1C4-4: The Advantages and Pitfalls of Sensor Fusion for Target Detection in Medical and Geophysical Applications
Ruth Rotman, Elta Electronics Industries, Ashdod Israel

18:00 Welcome Cocktail sponsored by Agilent (Royal J)
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TUESDAY, October 22, 2013

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

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

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

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

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. Sostanovsky1,1, A. Boryssenko2,2, 1Ratio, Kiev, Ukraine, 2A&E Partnership, Belchertown, United States

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

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 N/A
Irving Kalet, Azrieli College of Engineering, Jerusalem and Columbia University, New York, USA

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

2B1-3: Information Theory in Wireless Communications: Past, Present and Future N/A
Shlomo Shamai, Technion, Haifa, Israel

2B1-4: Challenges and Future Directions in Next Generation Wi-Fi Networks N/A
Matti Wax, CTO, Alvarion, Rosh Hayain, Israel

2B1-5: IEEE802.11ad: 60 GHz Multi-Gigabit Wi-Fi and More N/A
Gal Basson, VP, Wilocity, Caesarea, Israel

2B1-6: Satellite Internet for Consumer Market N/A
Motti Chorev, Microwave System Engineer, Elta, Israel
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9:00-10:40 2C1: MIMO AND MINIATURIZED ANTENNAS
Salon C
Chair: Eli Levin, The Open University of Israel
Co-Chair: Asaf Katz, Suron A.C.A Ltd, Israel

2C1-1: Design and Testing of a Miniaturized Dual Polarized VHF Array Element for AIS Space Application  173

2C1-3: A Design-Algorithm for MIMO Radar Antenna Setups with Minimum Redundancy  176
A. Kirschner, U. Siart, J. Guetlein, J. Detlefsen, Technische Universitaet Muenchen, Munich, Germany

2C1-5: An Electrically Small Elliptic PIFA for RFID in Harsh Metallic Environments  181
J. Sidén, H. Nilsson, Mid Sweden University, Sundsvall, Sweden

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9:00-10:40 2D1: MULTI-ANTENNA/PHASED ARRAY SYSTEM CALIBRATION
Royal H
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  185
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  190
Y. Aouial, S. Meric, O. Lafond, Mohamed Himdi, Institute of Electronic & Telecommunication of Rennes, Rennes, France

2D1-3: Cylindrical polarimetric phased array radar: A multi-function demonstrator and its calibration  194
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

2D1-4: Equivalent current reconstruction technique for array and radar antenna diagnostic  199
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

TUESDAY, October 22, 2013

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

2D1-5: Phased array antenna model-in-the-loop radar waveform optimization  204
S.A. Seguin, J. Jakabosky, B.D. Cordill, S. Blunt, Univ. Kansas, Lawrence, USA

2D1-6: Photonic beamforming system challenges and opportunities  N/A
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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

10:40 – 11:00  
COFFEE BREAK

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

11:00-12:40 2A2: MICROWAVE AND MM-WAVE CIRCUITS AND TECHNOLOGIES
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  209

2A2-2: A V-band 8.5Gbps transmitter in 65nm CMOS  213
A. Rubin, E. Socher, Tel Aviv University, Tel Aviv, Israel

2A2-3: Performance Comparison for Millimeter-Wave Single-Pole Double Throw Switches  217

2A2-4: Analysis of Cross-Coupled Common-Source Cores for W-Band LNA Design at 28nm CMOS  222
T. Heller [1,2], E. Cohen [1], E. Socher [2]; [1] Intel Corporation, Haifa, Israel, [2] Tel-Aviv University, Tel-Aviv, Israel
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11:00-12:40 2B2: COMMUNICATION ALGORITHMS AND STRATEGIES
Chair: Prof. Jay Weitzen, University of Massachusetts - Lowell, USA
Co-Chair: Dr. Stephen Weinstein, Commun. Theory & Technol. Consulting

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


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

2B2-4: Managing and Measuring Performance of Large Femtocell Networks 242

2B2-5: Slotted Adaptive Frequency Hopping and Rolling Scheme for Multi-net Cognitive Radio with Experimental Result 246
J. Hwang, S. Li, J. Li, Y. Chiu, M. Chang, Yuan-Ze University, Chung-Li, Taiwan

11:00-12:40 2C2: METAMATERIAL AND THz ANTENNAS
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 251
1100-1120
A. Sabban, Ort Braude, Kiryat Yam, Israel

2C2-2: Planar Ka band Antenna for Satellite Communication Based on Metamaterial Technology 254
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 257

2C2-5: Antenna packaging of a 32 element TX/RX phased array RFIC for 60 GHz Communications 261
E. Cohen, M. Ruberto, M. Cohen, H. K. Pan, S. Ravid, Intel, Haifa, Israel
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TUESDAY, October 22, 2013

11:00-12:40 2D2: AUTOMOTIVE APPLICATIONS - RADAR (invited session)
Chair: Dr. Igal Bilik, General Motors Advanced Technical 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, possibilities for 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 N/A
Igal Bilik, General Motors Advanced Technical Center, Herzliya, Israel

2D2-2: Computationally Efficient Ambiguity Mitigation in LFM Automotive Radars N/A
Shamgar Gurevich [1], Alex Fish [2], Igal Bilik[3] and Kobi Sheim [3]."

2D2-3: Automotive MIMO Radar N/A
Joseph Tabrikian, Ben Gurion University, Israel

2D2-4: Automotive Radar on Chip N/A
Eran Soher, Tel Aviv University, Israel

2D2-5: Multipath exploitation in automotive radars N/A
Jeff Krolik, Duke University, USA

2D2-6: Feature Selection for Classification of Human Micro-Doppler 266
S. Z. Gürbüz [1], B. Tekeli [1], M. Yükse [1], C. Karabacak [2], A. C. Gürbüz [1], M. B. Guldogan [3],

2D2-7: LTCC Parasitic Patch Antenna for 77 GHz Automotive Applications 271

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

14:30-16:10 2A3: NOVEL PASSIVE AND ACTIVE COMPONENTS AND MODELS
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  276
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  281

2A3-3: A Small Size Low Cost Electronically Tunable Bandpass Filter with Integrated Bias Control  286
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  290
M. Zukocinski, A. Abramowicz, Warsaw University of Technology, Warsaw, Poland

2A3-5: Lumped Element Model for Arbitrarily Shaped Integrated Inductors - A Statistical Analysis  295

14:30-16:10 2B3: MICROWAVE AND TERAHERTZ SENSORS, IMAGING, DETECTING AND TOMOGRAPHY - I
Chair: Prof. Yosef Pinhasi, Ariel University
Co-Chair: Prof. Boris Kapilevich, Ariel University

2B3-2: Heterodyne detection and polarization effects at 300 GHz using Ne Indicator Lamp Glow Discharge Detectors  300
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  305
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  309
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  314
S. Cohen, Z. Zalevsky, Bar-Ilan Univ., Ramat-Gan, Israel
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TUESDAY, October 22, 2013

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

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

14:30-16:10 2D3: AUTOMOTIVE APPLICATIONS - COMMUNICATION (invited session)
Chair: Dr. Moshe Laifenfeld, General Motors Advanced Technical Center, Herzliya, Israel

Shmuel Auster, Elta Systems

The session focuses on automotive aspects in wireless and wired communications on a variety of automotive applications, from infotainment, through connectivity, to intra-vehicular communications. Both theoretical as well as practical aspects are of interest including 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: Vehicle Proximity Map Formation in VANET
Y. Allouch & M. Segal; Ben-Gurion University of the Negev, Beer-Sheva, Israel

Abstract: In this paper we introduce the Cluster-Based Beacon Dissemination Process (CB-BDP) based on inter vehicle communication in highway scenarios. This process aims to provide vehicles with a local vehicle proximity map of their vicinity. Based on this map, safety applications can be used for accident prevention by informing drivers about evolving hazardous situations. The CB-BDP is designed under the two following objectives. First, since it is used for safety applications, we want the map to be detailed and as accurate as possible. Second, we want the map to be coordinated with nearby vehicles, thereby allowing synchronized and coordinated reactions of nearby vehicles to evolving hazardous situations. In [1] we have introduced a clustering scheme design to provide an optimized topology for an efficient and reliable beacon dissemination process. The topology is adaptive and robust in order to meet the challenging VANET conditions. In this paper, we propose a cluster based aggregation-dissemination beaconing process that uses this optimized topology to distribute the vehicle proximity map. An accurate and detailed map results in a heavy load of beacon messages. Our proposed scheme deals with this load by integrating a contention-free medium access control (MAC) strategy for reliable communication.
Abstract: This paper proposes a novel cost-effective heterogeneous networks (HetNet) deployment approach based on nomadic vehicular relay nodes (VeRNs). VeRN downlink performance are analyzed in two deployment models, which focus on VeRN impact on the network as a function of its placement. The 2-hop relay link via a VeRN is analyzed compared to the cellular direct-link for the proposed deployment models investigating both link level and spectral efficiency (SE) aspects. The analysis is based on extensive simulations with an indicative proposed figure of merit. The results show significant improvement in link level as well as substantial increase in spectral efficiency when using VeRNs across a set of deployment parameters.

2D3-3: Comparative Characterization of Four Antennas for VANETs by On-Field Measurements

Abstract: Vehicular ad-hoc networks (VANETs) have been extensively studied by simulations and trials and are getting closer and closer to the practical deployment. Despite this, only few studies have investigated the issues of antenna placement, even if it is far from being negligible: depending on the antenna position, a stronger or a weaker signal may be received and the overall effectiveness of safety messages carried by VANETs may get affected. This paper aims at digging into the problem of antenna placement for VANETs by a field-test comparative analysis of four candidate antennas, differing in their design and, particularly, in their positions.


Abstract: Several collection protocols have been developed to achieve efficient gathering of data in Wireless Sensor Networks (WSN) including intra-car WSN. Though there exist WSN tools capable of controlling, monitoring, and displaying sensor data, there is still a need for a general benchmarking tool capable of visualizing, evaluating, and comparing the network layer performance of these protocols. In an effort to fill this gap, we present TeaCP, a prototype Toolkit for the evaluation and analysis of Collection Protocols in both simulation and experimental environments. Through simulation of an intra-car WSN and real lab experiments, we demonstrate the functionality of TeaCP for comparing the performance of two prominent collection protocols, the Collection Tree Protocol (CTP) and the Backpressure Collection Protocol (BCP).

2D3-5: Magnetic-resonant Wireless Power Transfer for an Automotive Environment
M. Chabalko and D. Ricketts; Carnegie Mellon University, Pittsburgh USA.

Abstract: Magnetic-resonant wireless power transfer (MR-WPT) has become a popular means to efficiently transfer power over near to mid-ranges. Many previous works have focused solely on the efficiency of the wireless link. In an automotive environment, however, several other significant constraints present themselves that must be considered when using MR-WPT. In this talk we will discuss three key parameters that must be considered: impedance detuning due to mobile loads, impedance detuning and parasitic loss due to neighboring metallic components and human safety and exposure to magnetostatic fields. We will describe these challenges and how they affect the design of WPT systems for an automotive environment. Our conclusions show that these constraints do not limit the application of MR-WPT, but rather require different design techniques than many traditional MR-WPT systems.
2D3-6: Experimenting With A Wireless Mesh Network Towards Sensing Inside a Vehicle's Transmission

Presenter: Leor Hardy

Abstract: In this paper we study experimentally Diversity Path Mesh (DPM), a proprietary cooperative mesh network technology that is based on superimposed radio signaling and flooding, for the purpose of real-time sensing inside a vehicle’s transmission. The harsh, highly metallic environment, of the vehicle’s transmission interior is a challenging environment for any wireless radio technology especially when footprint, throughput and cost are among the primary concerns. We find that DPM can potentially provide a robust and reliable solution with a low price tag. We further provide a theoretical intuition why DPM is optimal in terms of packet error probability among all re-transmission strategies for the in-transmission sensing application.

2D3-7: DC-BUS powerline communication for monitoring high voltage battery packs

Y. Maryanka [1], O. Amrani[2], [1] Yamar, Tel Aviv, Israel. [2] Tel Aviv University, Tel Aviv, Israel
Presenter: Yair Maryanka

Abstract: The presentation describes a Battery Management System (BMS) for electrical vehicles, using unique DC-BUS powerline communication that monitor and manage multiple-cell rechargeable Lithium-Ion battery packs over the powerline connecting these battery packs eliminating extra wires, providing simple galvanic isolation between the high voltage power battery and the vehicle’s monitoring ECU. The communication based on a semiconductor device designed to operate effectively over the DC powerline with strong Inverter's switching noise is described.

2D3-8: Global Routing with Energy Balancing in Intra-Vehicular Environment

Presenter: Moshe Laifenfeld.

Abstract: Global routing in vehicular sensor networks is considered with the aim of balancing energy consumption across the nodes to achieve longer network lifetime. To this end, a routing protocol based on Dijkstra’s routing algorithm with an augmented link cost function is used. Performance of the routing protocol is evaluated using a hardware experimental setup comprising 8 nodes positioned throughout the car and an access point placed near the dashboard. Real-time experiments implementing the routing algorithm are performed. Results demonstrate efficient balancing of energy consumption across all nodes in the network and a substantial increase in network lifetime.
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14:30-16:10 2E3: MODERN METHODS FOR MICROWAVE FILTER NETWORK SYNTHESIS  362

Presenter: Richard Cameron, COM DEV Europe, Aylesbury 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.

TUESDAY, October 22, 2013

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

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

Chair: TBA

2P2-1: Millimeters wavelength imaging system based on Flat Parabolic Surface  431
G. G. Litmanovitch, Ariel University, Ariel, Israel

2P2-2: Persistent Scatterers Detection In Open Area In High Resolution SAR Imagery - Case Study: Sendai, Japan  435
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/A
N. Balal, G. A. Pinhasi, Y. Pinhasi; Ariel University, Ariel, Israel

2P2-4: A Study on Novel Broadband Ku-band Spatial Power Divider/Combiner  440
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  445
I. Chaimov, S. R. Rogers, GOJI, Hod-Hasharon, Israel

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

Chair: Shmuel Auster, Elta Systems Ltd

2P3-2: A Cheap Matching Component for Correcting Ill-matched Antennas  449
L. Sigawy, M. M. Mayost, H. Matzner, JCE – Jerusalem College of Engineering , Jerusalem, Israel

2P3-3: Asymmetric Coplanar Strip Fed Zeroth Order Directional Antenna  N/A
D. Raghavan Nair, V. V K Thalakkatukalathil, J. Palassery, D. C. Mukund, M. Pezholil, Cochin University of Science and Technology, Cochin, India
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2P3-4: Planar Differential Antenna for UWB Pulse Radar Sensor  452
D. Pepe1, D. Zito2,1, 1Tyndall National Institute, Cork, Ireland, 2University College Cork, Cork, Ireland

14:30–16:30 2P4: POSTER SESSION - SPECIAL APPLICATIONS (120 min)
Chair: Doug Zuckerman, Applied Communication Sciences, USA
Co-Chair: Shmuel Auster, Elta Systems, Israel

2P4-1: Active-passive remote sensing of rains  N/A
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  456
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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APPLICATIONS SEMINARS

11:00 – 12:00 APPLICATION SEMINAR – Sponsored by ASCOTECH

A Robust 80W, 48V, 100-1000 MHz Broadband GaN Amplifier
Ray Baker, Nitronex, LLC

Abstract: This work presents a 80W broadband power amplifier for use in the 100 to 1000 MHz frequency band. Through the combination of a custom 4:1 impedance transformer and a 48V GaN device we achieve 80W of CW output power over nearly a decade of bandwidth utilizing a single ended device. To the authors’ knowledge, this work utilizes the first ever commercially available 48V GaN devices mounted in a plastic package. In addition to the bandwidth, this device exhibits state of the art robustness, surviving a 15:1 VSWR test with no observed degradation in linear RF performance.

12:00 – 13:00 APPLICATION SEMINAR – Sponsored by EIM

Power Sub-Miniature (PSM) Connectors for Space Applications

Abstract: This paper presents a newly developed SMA-like connector for High Power Space applications that can withstand more than 1500 Watts in the P- and L-Band for a pulsed signal of 2% duty-cycle. This implies an improvement of 50 per cent compared to other powerful connectors such as TNC while the mass is reduced by more than 60 per cent with respect to a TNC connector. In the L-band a 7th order PIM power of less than -140dBm has been measured for input powers of 47dBm per carrier. The frequency range is 0 – 18 GHz, the insertion loss <0.1 dB (typical <0.05 dB), and the VSWR <1.1 in the full range.

14:30 – 15:30 APPLICATION SEMINAR – Sponsored by Freescale

Rugged LDMOS
Yan Vainter

Abstract: Traditional RF applications required power transistors that could withstand high mismatch conditions, but the ability of the latest generation of devices to handle even more severe mismatches has enabled new and emerging high-power RF applications, as well as dramatically improving reliability and simplifying more mature applications.

WEDNESDAY, October 23, 2013

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

9:00-10:40 3A1: CMOS CIRCUIT DESIGN (TUTORIAL)
Presenter: Dr. Shraga 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
Chair: Dr. Michael Schlechtweg, Fraunhofer Institute IAF, Germany
Co-Chair: Prof. Boris Kapilevich, Ariel University, Israel

3B1-1: Monostatic Superscattering in Cylindrical Structures  460
V. Vulfin, R. Shavit; Ben-Gurion University of the Negev, Beer-Sheva, Israel

3B1-2: Avoiding crosstalk in multiconductor TEM waveguides  465
R. Ianconescu, Shenkar College of Engineering and Design, Ramat Gan, Israel

3B1-4: Pulsed S-parameter measurements: on resolution, duration, and uncertainty  469
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  474

9:00-10:40 3C1: TECHNOLOGIES FOR HIGHER PERFORMANCE COMMUNICATIONS
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  479

3C1-2: On the Potential of Application Based Coordinated Multi-Point (CoMP)  483
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  485
A. Albu-Rghaif, I. A. Lami, University of Buckingham, Buckingham, United Kingdom

3C1-4: PAPR Reduced OFDM Visible Light Communication using Exponential Nonlinear Comanding  490
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  495
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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Additional Papers

3C1-5: The Detector Array System for 3-mm Wavelength Video Imaging  500
V.I. Shashkin, P. V. Volkov, A. V. Goryunov, I.A. Illarionov, Yu I. Belov, A. G. Serkin

11:00-12:40 (100 min) - PARALLEL SESSIONS 3A2, 3B2, 3C2

11:00-12:40 3A2: RECENT ADVANCES IN OPTICAL COMMUNICATIONS, INTRODUCING SPATIAL DIVISION MULTIPLEXING (TUTORIAL)
Presenter: Moshe Tur, Tel Aviv University, Israel
11:00-12:40 3B2: Recent Advances in Software Defined Radio and Cognitive Radio (Tutorial)
Organized by Dr. Arie Reichman, Ariel University and Ruppin Academic Center

3B2-1: SDR and CR: Overview, standards and trends
Dr. Arie Reichman

Abstract: Software Defined Radio (SDR) and Cognitive Radio (CR) techniques provide more efficient management of radio resources and improve re-usability of equipment. Standardization in these fields has great potential for spreading the use of SDR and CR. The challenges include design of energy-efficient SDR solutions for broadband standards, dynamic spectrum management, improving spectrum sharing efficiency.

3B2-2 The present status of standardization of SDR and CR and penetration of usage of these standards.
Implementation tools for SDR and CR
Dr. Amir Abramovich

Abstract: Methods for design and implementation of SDR based on graphic programming tools will be presented. A demonstration of design will be shown.

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

12:40 – 14:00 LUNCH

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

Closing remarks
Dr. Shmuel Auster, Conference Chair