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ACES 2013 Technical Program

The 29th Annual Review of Progress in Applied Computational Electromagnetics
Monterey, California

Sunday, March 24

08:00-10:00 **Vendor Workshop Registration (Pre-Convene Area)**

08:00-05:00 **Vendor Workshops (Laguna A and B)**

02:00-05:00 **Conference Registration (Pre-Convene Area)**

02:00-05:00 **ACES Board of Directors Meeting (El Camino)**

05:30-7:30 **Reception**

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Andy Peterson, ACES President

08:30-08:40 **Welcome Message N/A**
Atef Z. Elsherbeni, Osama Mohamed, and C. J. Reddy
Conference General Chairs

08:40-09:20 **Advancement of Analytical and Computational EM Methods and Software, and their Impact on Electromagnetic Technology During the Last Half Century N/A**
Constantine Balanis
School of Electrical, Computer and Energy Engineering
Arizona State University

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Makoto Ando
Department of Electrical and Electronic Engineering
Tokyo Institute of Technology

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Session Chairs: Branko Kolundzija and Branislav Notaros

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Moeness G. Amin
Department of Electrical and Computer Engineering
Villanova University

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Vince Rodriguez
Antenna Product Manager
ETS – Lindgren

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Arun K. Bhattacharyya
Northrop Grumman Space Technology

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Mohammad Shafieipour, Ian Jeffrey, Jonatan Aronsson, and Vladimir Okhmatovski

02:20-02:40 "Supercomputing 3-D Cloaking Optimization of Arbitrary Objects" 665
Luis Landesa, Fernando Obelleiro Javier Rivero, José M. Taboada,
and Marta G. Araujo

02:40-03:00 “Application of a Parallel MLFMA to Composite Structures with Arbitrary Material Properties” 669
Ozgur Ergul and Levent Gurel

Room: **Laguna A** **Session 20**
01:00-05:00 **Modeling and Simulation in Electromagnetic Engineering**
Session Organizers: Levent Sevgi and Alkim Akyurtlu
Session Chairs: Levent Sevgi and Alkim Akyurtlu

01:00-01:20 “Ideal Polarizer Using the WCIP” 675
Alexandre Serres, Georgina Karla De Freitas Serres, Glauco Fontgalland, Raimundo Freire, and Henri Baudrand

01:20-01:40 “RCS2D: A 2D Scattering Simulator for Mom vs. FDTD Comparisons” 681
Mehmet Uslu, Levent Sevgi, and Gizem Toroğlu

01:40-02:00 “A New via Hole Model Using the Wave Concept Iterative Procedure (WCIP)” 687
Georgina Karla De Freitas Serres, Alexandre Serres, Raimundo Freire, Glauco Fontgalland, and Henri Baudrand

02:00-02:20 “Time Domain Modeling of All-Optical Switch Based on PT-Symmetric Bragg Grating” 693
Sendy Phang, Ana Vukovic, Hadi Susanto, Trevor M. Benson, and Phillip Sewell

02:20-02:40 “Parametric Design of 2D Reflector Antenna Structures with Analytical Regularization Method” 699
Okan Mert Yucedag and Ahmet Serdar Turk

02:40-03:00 “A Simplified Analytical Solution for Characterizing Edge Currents Along a Finite Ground” 705
Chijioke Obiekezie, Dave Thomas, Angela Nothofer, Steve Greedy, Luk Arnaut, and Phil Sewell

03:00-03:20 Break **(Laguna D)**

03:20-03:40 “Low Frequency Continuity Equation Based Stabilization of Boundary Integral Equations” 711
Lucy Weggler, Marlize Schoeman, and Ulrich Jakobus

03:40-04:00 “FDTD-Based Fast Radar Cross Section (RCS) Predictor” 717
Gonca Cakir, Mustafa Cakir, and Levent Sevgi

04:00-04:20 “Determination of Complex Permittivity of Materials with High or Low Losses in Rectangular Waveguide Using Hybrid Numerical Method” 723
Kotaro Momoeda, Teppei Kobata, Yuki Konishi, and Toshihide Kitazawa

04:20-04:40 “A Method for Simulating the Superconducting Properties in Nano-Size Ferromagnetic” 729
Ali E. Ozmetin

Room: **Laguna EFG** **Session 21**

03:20-05:40 **Computational Nanophotonics: Time – Domain Multiphysics, Meshless Methods and Non – Linear Optics**
Session Organizers: Alexander Kildishev and Nikita Arnold
Session Chairs: Alexander Kildishev and Nikita Arnold

03:20-03:40 "Cloud Computing Simulation Tools for Nanophotonics at Nanohub.Org" 735
Ludmila J. Prokopeva, Urcan Guler, Jieran Fang, Rohith Chandrasekar, Vladimir M. Shalaev, Nikita Arnold, Thomas Klar, Boris Luk'yanchuk, George B. Adams III, Alexander V. Kildishev, Xingjie Ni, Vladimir P. Drachev, Zhengtong Liu, Alexander O. Korotkevitch, and Zengbo B. Wang

03:40-04:00 "Effective Material Parameter Retrieval and Surface Wave Extraction for Periodic Metamaterials Through Rigorous Methods of Computational Electromagnetics" 741
Xiaoyan Xiong, Li Jun Jiang, Vadim A. Markel, and Igor Tsukerman

04:00-04:20 "An Explicit and Unconditionally Stable Finite-Difference Time-Domain Method for Electromagnetic Analysis" 747
Md Gaffar and Dan Jiao

04:20-04:40 "A Phase Object Approach to Wave Propagation Through Nonhomogeneous Dielectrics with Shock-Like Profiles" 753
Nathan Ida and Grigory Adamovski

04:40-05:00 "Bi-Anisotropic Homogenization of Metasurfaces" 759
Amr Shaltout, Vladimir M. Shalaev, and Alexander V Kildishev

05:00-05:20 "A Novel FETD Scheme for Nonlinear Maxwell" 765
Jiefu Cen, Bao Zhu, Hongwei Yang, Qing H. Liu, and Wanxie Zhong

05:20-05:40 Modeling the Local Response of Gain Media in Time-Domain 771
Alexander Kildishev, Nikita Arnold, and Ludmila Prokopeva

Room: **Laguna B** **Session 22**
03:20-05:40 **EM Applications Using WIPL-D**
Session Organizer: Branko Kolundzija
Session Chairs: Branko Kolundzija and Saad Tabet

03:20-03:40 "WIPL-D Optimization of a Harmonic RF Tag" 777
Herbert Aumann and Nuri W. Emanetoglu

03:40-04:00 "Determining Transmission Line Impedances by Moment Method EM Simulations" 781
Ronald H. Johnston and Milos Pavlovic

04:00-04:20 "Dual Band Antenna Composed of Ultra Low Profile Inverted L Antenna for Wi-Fi Router" 785
Mitsuo Taguchi and Keisuke Kozaki

04:20-04:40 "Efficient Iterative Algorithm for Design of Probe Fed Rectangular Microstrip Patch Antennas Using Software for Electromagnetic" 789
Branko Kolundzija and Slobodan Savic

04:40-05:00 "Multi-Channel Combiner Design Using WIPL-D" 794
James Alford and Milos S. Pavlovic

05:00-05:20 "Simulation of Enhanced Circular Polarization Antenna Measurements in an Anechoic Chamber with Multipath" 800
Ronald H. Johnston

05:20-05:40 "On Calculating Resonant Frequencies Using General-Purpose Method-Of-Moments Code" 804
Dragan Olcan, Aleksandra J. Krneta, and Dawn H. Trout

Thursday, March 28

08:00-05:00 **Conference Registration (Pre-Convene Area)**

08:00-12:00 **Exhibitors (Laguna D)**

Room: **Laguna A** **Session 23**
08:00-09:20 **Hardware Accelerated EM**
Session Organizer: Ozlem Kilic
Session Chairs: Ozlem Kilic and Amedeo Capozzoli

08:00-08:20 "Implementation of an Explicit Time Domain Volume Integral Equation Solver on Gpus Using Openacc" 810
Ahmed Al-Jarro, Alain Clo, and Hakan Bagci

08:20-08:40 "Fast Multipole Method for Large-Scale Electromagnetic Scattering Problems Using High Performance Computers" 815
Vinh Dang, Quang Nguyen, Ozlem Kilic, and Esam El-Araby

08:40-09:00 "Graphics Processing Units Implementation for Fast Algorithms Solving Electromagnetic Integral Equations" 821
Sidi Fu, Shaojing Li, Ruinan Chang, and Vitaliy Lomakin

09:00-09:20 "GPU-Accelerated Fast and Fast Factorized SAR Backprojections" 827
Amedeo Capozzoli, Alfonso Breglia, Claudio Curcio, and Angelo Liseno

Room: **Laguna B** **Session 24**
08:00-10:00 **EM Simulation Using Wireless InSite**
Session Organizer: Jamie Infantolino
Session Chairs: Jamie Infantolino and Kyle Labowski

08:00-08:20 "Radio Inversion Using the Wireless Insite API" 833
Henry S. Owen

08:20-08:40 "Modeling RF Propagation in Mines Using Wireless Insite" 839
Jamie Knapil Infantolino, Adam J. Kuhlman, Manoja D. Weiss, and Randy L. Haupt

08:40-09:00 "High Fidelity Modeling of Spatio-Temporally Dense Multi-Radio Scenarios" 845
Mendel D. Schmiedekamp, Adam J. Kuhlman, Ryan Ohs, and Scott Buscemi

09:00-09:20 "Complex 3D Modeling of Sea to Land Scenario" 851
Jamie Knapil Infantolino and Kyle Labowski

09:20-9:40 "Empirical / Ray-Tracing Hybrid Approach for COST 231 Unknown Building Layouts" 857
Mendel D. Schmiedekamp, Kimberly Labowski, and Ruth Belmonte

09:40-10:00 "3D SBR Simulation of Different Mobile Channel Propagation Scenarios Over IEEE 802.11n" 863
Fernando Salazar Qui, Y. A. S. Dama, and R. A. Abd-Alhameed

Room: **Laguna EFG** **Session 25**
08:00-09:40 **EMC in Complex Systems and Reverberant Environments**
Session Organizers: Paul Bremner and Robin Langley
Session Chairs: Paul Bremner and Robin Langley

08:00-08:20 "Effect of Radiated Electromagnetic Interference on Colpitt's Oscillators" 869
Nisha Gupta and Bibha Kumari

08:20-08:40 "Model to Test Electric Field Comparisons in a Composite Fairing Cavity" 875
Dawn Trout and Janessa Burford

08:40-09:00 "An Examination of the Accuracy of Integral Equation Based Modeling of the Fields Within a Reverberation Chamber" 881
James C. West, Vignesh Rajamani, and Charles F. Bunting

09:00-09:20 "Consideration on the Parasitic Coupling Between Packages and Microwave Circuits" 887
Adalbert Beyer and Thomas Bolz

09:20-09:40 "Statistical Analysis of an Electrical System Within a Reverberant Cavity" 893
Robin S. Langley and Paul G. Bremner

Room: **Laguna A** **Session 26**
10:20-12:00 **CEM for Complex Systems and Direct Solution Methods**
Session Organizers: Lijun Jiang, Zhen Peng, and Robert J. Adams
Session Chairs: Lijun Jiang and Ping Li

10:20-10:40 "An Efficient Discontinuous Galerkin Method with Domain Decomposition for Simulations of Micro-Resistivity Logging-While-Drilling" 899
Jiefu Chen

10:40-11:00 "Modal Relationships Between PEC/PMC Shielded Interconnect and Grounded Dielectric Slab Loaded with Periodic Metal Strips" 904
Kun Chen, Jiming Song, and Telesphor Kamgaing

11:00-11:20 "A Direct Finite-Element Solver of Linear Complexity for Electromagnetics-Based Analysis of 3-D Circuits" 910
Bangda Zhou and Dan Jiao

11:20-11:40 "A Field-Circuit Simulator Hybridizing Discontinuous Galerkin Finite Element Time Domain Method and Modified Nodal Analysis" 916
Ping Li, Li Jun Jiang, and Hakan Bagci

11:40-12:00 "A Hybrid Method for Simulation of Mixed Circuit and Electromagnetic Problems in Frequency Domain" 922
Sohrab Safavi and Jonas Ekman

Room: Laguna B **Session 27**
10:20-11:40 **Wireless Powering of Devices and Energy Harvesting**
Session Organizer: Stavros Georgakopoulos
Session Chairs: Nathan Ida and Hao Hu

10:20-10:40 "A High Q Coaxial Loop Resonator for Wireless Power Transfer" 928
Marco Dionigi, Mauro Mongiardo, and Paolo Mezzanotte

10:40-11:00 "An Ultra-Low Power Sensing Node for Use with Harvested Power" 934
Nathan Ida and Divya Murali

11:00-11:20 "Miniaturized Strongly Coupled Magnetic Resonance Design Based on Dielectric Split-ring Resonator for Wireless Power Transmission" 940
Hao Hu and Stavros V. Georgakopoulos

11:20-11:40 "Strongly Coupled Wireless Power Transfer with Conformal Structures" 945
Olutola Jonah, Stavros Georgakopoulos, and Manos M. Tentzeris

Room: Laguna EFG **Session 28**
10:20-11:20 **Application of CEM for Magnetic Resonance Imaging Safety Analysis and Design**
Session Organizer: Ananda Kumar
Session Chairs: C. J. Reddy and Shumin Wang

10:20-10:40 "Application of Hybrid FEM/MoM Technique for MRI Applications" 951
C. J. Reddy and Peter Futter

10:40-11:00 "Application of Time-Frequency Domain Spectral Decomposition Based on Least-Square Matching Pursuit to Improve Subsurface Imaging" 957
Jiefu Chen, Yueqin Huang, and Jianzhong Zhang

11:00-11:20 "Non-Destructive Testing of Composite Materials Through Non-Linear Microwave Tomography" 963
Can Suer, Guray Ali Canli, and Ibrahim Akduman

Room: Laguna A **Session 29**
01:00-03:00 **Antenna Measurement Post Processing**
Session Organizers: Lars Jacob Foged and Daniel Rensburg
Session Chairs: Lars Jacob Foged and Daniel Rensburg

01:00-01:20 "Cylindrical Near-Field Acquisition Using an Efficient Sampling Representation Along with Direct Near-Field Far-Field Transformation" 967
M. Ayyaz Qureshi, Carsten H. Schmidt, and Thomas F. Eibert

01:20-01:40 "Echo Reduction Techniques and Applications in Advanced NF Antenna Measurement Scenarios" 971
Lars Jacob Foged, Lucia Scialacqua, Francesca Mioc, Francesco Saccardi,
P. O. Iversen, Lior Shmidov, Roni Braun, J. L. Araque Quijano, and Giuseppe Vecchi

01:40-02:00 "Non-Uniform FFTs (NUFFTs) in Complex and Phaseless Plane-Polar Near-Field/Far-Field Transformations" 977
Amedeo Capozzoli, Claudio Curcio, and Angelo Liseno

02:00-02:20 "Post Processing Techniques in Far Field Antenna Measurement Ranges" 983
Manuel Sierra-Castañer, Francesco Saccardi, John Aubin, Lars Jacob Foged, Francisco Cano-Fácila, Guilherme Nader Kawassaki, Lucas Dos Reis Raimundi, and Stefano Albino Vilela Rezende

02:20-02:40 "Mutual Coupling Calibration Method of Virtual Antenna Array" 989
Yanan Han, Wenxing Li, and Wenhua Yu

02:40-03:00 "A Novel Method for Fourth-Order Cumulants Based Adaptive Beam Forming of Virtual Antenna Array" 996
Yu Zhao, Wenxing Li, and Wenhua Yu

Room: **Laguna B** **Session 30**
01:00-02:40 **Projects in Sonnet**
Session Organizer: Serhend Arvas
Session Chairs: Serhend Arvas and Greg Alton

01:00-01:20 "Reliable Design Closure of Sonnet-Simulated Structures Using Co-Kriging" 1002
Slawomir Koziel, Ivo Couckuyt, and Tom Dhaene

01:20-01:40 "Automatic Modeling of Passive Components for RFIC Circuit Design Using Sonnetlab" 1008
Peter Aaen and Lei Zhang

01:40-02:00 "T-Shaped Broadband Dual Polarized Microstrip Patch Antenna" 1013
Lokman Kuzu, Mesut Gokten, Ahmet F. Yagli, Senol Gulgonul, and Erdem Demircioglu

02:00-02:20 "Folded Marchand Balun with Isolation Circuit Validation Using Sonnet" 1018
Claudio M. Montiel

02:20-02:40 "Modeling and Design Optimization of Filters Using Sonnet Simulation, Decomposition and Response Surface Approximations" 1025
Slawomir Koziel and Stanislav Ogurtsov

Room: **Laguna EFG** **Session 31**
01:00-02:20 **Mathematical Aspects of CEM**
Session Organizers: Aihua Wood and Peijun Li
Session Chairs: Aihua Wood and Peijun Li

01:00-01:20 "Coupling Finite and Boundary Element Methods Using a Localized Adaptive Radiation Condition for Maxwell's Equations" 1031
Yassine Boubendir, A. Bendali, and N. Zerbib

01:20-1:40 "Local Diagonalization of Maxwell's Equations for Inhomogeneous Bi-anisotropic Materials in General Curvilinear Coordinates" 1037
Alireza Baghai Wadji

01:40-2:00 "Zooming into the Near-fields: Embedding Generalized- and Pseudo-functions in the Solution Space of Maxwell's Equations" 1043
Alireza Baghai Wadji

02:00-02:20 "A Multi-Level Method for Transmission Eigenvalues of Anisotropic Media" 1049
Jiguang Sun and Xia Ji