### Historical Overview of Development of Wireless

**Co-Chairs:** R. Mailloux, USA and T. Sarkar, USA

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<tr>
<th>Time</th>
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<th>Authors</th>
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<tbody>
<tr>
<td>8:00</td>
<td>A Chronology of Developments of Wireless Communication and Electronics from 1831-1920</td>
<td>T. Sarkar*, Syracuse University, M. Salazar-Palma, Universidad Politecnica de Madrid, D. Sengupta, University of Detroit at Mercy</td>
</tr>
<tr>
<td>8:20</td>
<td>A Chronology of Developments of Wireless Communication and Electronics from 1921-1940</td>
<td>M. Salazar-Palma*, Universidad Politecnica de Madrid, T. Sarkar, Syracuse University, D. Sengupta, University of Detroit at Mercy</td>
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</table>

#### FDTD Theory I

**Co-chairs:** A. Taflove, USA and S. Hagness, USA

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:00</td>
<td>A Multilevel Subgridding Scheme for Two-Dimensional Finite-Difference Time-Domain Method</td>
<td>C. Chang*, S. Jeng, National Taiwan University</td>
</tr>
<tr>
<td>8:20</td>
<td>Modeling of Near-Field Sources in the Finite-Difference Time-Domain (FDTD)</td>
<td>M. Potter*, M. Stuchly, University of Victoria, M. Okoniewski, University of Calgary</td>
</tr>
<tr>
<td>8:40</td>
<td>Modeling Chiral Media Using a New Dispersive FDTD Technique</td>
<td>A. Akyurtlu*, D. H. Werner, Pennsylvania State University</td>
</tr>
<tr>
<td>9:00</td>
<td>FDTD Computation of Dispersive Effects for a Body of Revolution</td>
<td>J. Grando*, ONERA</td>
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<tr>
<td>9:20</td>
<td>FDTD Formulation for Bi-Anisotropic Medium</td>
<td>X. Bao, W. Zhang*, Southeast University, L. Li, The National University of Singapore,</td>
</tr>
<tr>
<td>9:40</td>
<td>Accuracy Improvement Technique Applied to Non-Uniform FDTD Cells Using High-Order Implicit Scheme</td>
<td>T. Namiki, Fujitsu Limited, K. Ito*, Chiba University</td>
</tr>
<tr>
<td>10:00</td>
<td>Efficient Non-Uniform Orthogonal Mesh Generation Algorithm for Cylindrical FDTD Applications</td>
<td>G. Zhou*, Hefei University of Technology, Y. Chen, University of South Carolina, G. Shen, Hong Kong Polytechnic Institute</td>
</tr>
<tr>
<td>10:20</td>
<td>A Linear Bicharacteristic FDTD Method</td>
<td>J. Beggs*, NASA/Langley Research Center</td>
</tr>
<tr>
<td>10:40</td>
<td>An Implicit LU/AF FDTD Method</td>
<td>J. Beggs*, W. Briley, NASA/Langley Research Center</td>
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</tbody>
</table>
11:20 On the Convergence of Simple FDTD Feed Models for Antennas
T.W. Hertel*, G. Smith, Georgia Institute of Technology

11:40 FDTD Analysis of Leaky-Wave Vertical-Cavity Surface-Emitting Lasers
T. W. Lee*, S. Hagnes s, D. Zhou, L. Mawst, University of Wisconsin-Madison

Monday Morning
Back Bay B
Session 3

Broadband Microstrip Antennas I
Co-chairs: N. Herscovici, USA, and R. Chair, USA

8:00 Simulation of Bandwidth Enhancement on the Quarter-Wave Shorted Patch by Adding A Shorting Pin
R. Chair*, K. Luk, City University of Hong Kong, K. Lee, University of Mississippi

8:20 Small-Size Wide-Bandwidth Microstrip Patch Antennas
A. Shackelford*, University of Missouri-Columbia, K. Lee, University of Mississippi, D. Chatterjee, University of Missouri-Columbia, Y. Guo, K. Luk, R. Chair, City University of Hong

8:40 Design and Analysis of a Novel Wideband Microstrip Antenna
S.C. Gao,* L.W. Li, M.S. Leong, T.S. Yeo, The National University of Singapore

9:00 A Broadband Eccentric Annular Slot Antenna
Y. H. Suh*, I. Park, Ajou University

9:20 Analysis of Bandwidth and Radiation in Non-Centered Stacked Patches
E. Rajo-Iglesias*, G. Villaseca-Sanchez, C. Martin-Pascual, Universidad Carlos III de Madrid

9:40 Broadband Dual-Polarized Patch Antennas with Hybrid Feeds for 1800-MHz Band Operation
H. T. Chen*, Chinese Military Academy, T. W. Chiou, K.L. Wong, National Sun Yat-Sen University

10:00 Compact Broadband Gap-Coupled Shorted L-Shaped Microstrip Antennas
A. Deshmukh, G. Kumar*, I.I.T. Bombay

10:20 Band Broadening of Patch Antenna by Elementary Sub Tuners of Transmission Line
Y. L. Chow*, K.L. Wan, City University of Hong Kong

10:40 Design Considerations of Broadband Circular Microstrip Antennas with Embedded Reactive Loading
J. Y. Jan*, National Kaohsiung University of Applied Science

11:00 Harmonic Tuning Antennas Using Slots and Short-Pins
S. Kwon*, H.K. Yoon, Y.J. Yoon, Yonsei University

11:20 Improvement of the Three-Meter Ka-Band Inflatable Reflectarray Antenna
J. Huang*, V.A. Feria, H. Fang, Jet Propulsion Laboratory

Monday Morning
Commonwealth
Session 4

Antenna Applications for Mobile Communications
Chair: H. Aumann, USA

8:00 Output Power Maximization Algorithm Performance of Dual-Antenna for Personal Communication Handset Applications
D. McNeil*, Laval University, T. Denidni, INRS-Telecommunications, G. Delisle, Laval University

8:20 GPS Antenna Selection and Placement for Optimum Automotive Performance
Y. Dai*, T. Talty, L. Lanctot, Ford Motor Company

8:40 Up-Link Characterisation of Multi-Beam LMDS System with Perturbed Cell Plan
U. Engstrom*, M. Johansson, A. Derneryd, B. Johannisson, Ericsson Microwave Systems AB

9:00 Realization of a Printed-On-Display Antenna for Mobile Terminals
C. F. Huang*, L. Chen, Tatung University

9:20 An Improved Transmit Antenna Diversity Scheme for IS-2000 Systems
H.G. Yoon*, J. G. Yook, H.K. Park, Yonsei University

9:40 Performance Improvement for Very High-Speed DWDM Optical Metropolitan-Area Networks Using a Passive Star Topology
H. Hussin*, F. El-Halafawy, N. El-Fishawy, A. Aboul-Enein, Faculty of Electronic Engineering - Manouf
### Reconfigurable Antennas

**Chair:** M. Van Blaricum, USA

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<th>Time</th>
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<tbody>
<tr>
<td>10:00</td>
<td>A Planar VHF Reconfigurable Slot Antenna</td>
<td>D. Peroulis*, K. Sarabandi, L. Katehi, University of Michigan</td>
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<tr>
<td>10:20</td>
<td>Stacked Reconfigurable Antenna Elements for Space-Based Radar Applications</td>
<td>J. Bernhard*, R. Wang, R. Clark, P. Mayes, University of Illinois at Urbana-Champaign</td>
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<tr>
<td>11:00</td>
<td>Tunable Antenna System for 1.9-GHz PCS Handsets</td>
<td>H. Okabe*, K. Takei, Hitachi, Ltd</td>
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<tr>
<td>11:20</td>
<td>A Wideband Monopole for Reconfigurable Multiband Radio Terminals</td>
<td>M. Ammann*, Dublin Institute of Technology</td>
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<tr>
<td>11:40</td>
<td>Electronic Beam Steering Using a Varactor-Tuned Impedance Surface</td>
<td>D. Sievenpiper*, J. Schaffner, B. Loo, G. Tangonan, R. Harold, J. Pikulski, R. Garcia, HRL Laboratories, LLC</td>
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### Future Research Directions in Finite Element Methods

**Co-chairs:** J. Volakis, USA and J. Lee, USA

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<tr>
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<tbody>
<tr>
<td>8:00</td>
<td>A Hierarchical Design Environmental for Coupled Electromagnetic, Thermal, Circuit and System Simulation</td>
<td>Z. Cendes*, Ansoft Corp</td>
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<tr>
<td>8:40</td>
<td>Hybridization of Finite Methods with Other Techniques to Solve Complex Problems</td>
<td>R. Lee*, J.F. Lee, P. Pathak, The Ohio State University</td>
</tr>
<tr>
<td>9:00</td>
<td>Antenna Design Using Rigorous Hybrid Finite Element Computational Toolsets</td>
<td>J. Volakis*, Z. Li, Y. Erdemli, G. Kiziltas, University of Michigan</td>
</tr>
<tr>
<td>9:40</td>
<td>Wavelet Based Finite Element Method</td>
<td>G. Pan*, K. Wang, Z. Zhang, B. Techentin, B. Gilbert, Arizona State University</td>
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<tr>
<td>10:00</td>
<td>Adaptive Mesh Refinement for Vector Finite Element Methods</td>
<td>J. F. Lee*, R. Lee, The Ohio State University</td>
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### High-Frequency Techniques

**Co-chairs:** R. Burkholder, USA and R. Tiberio, Italy

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<td>8:00</td>
<td>Radiation of a Line Source Located at the Focal Line on the Convex Side of A Hyperbolic Cylinder</td>
<td>P.L.E. Uslenghi*, University of Illinois at Chicago</td>
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<td>8:20</td>
<td>Formal and Computational Aspects of the Creeping-Ray Problem On a Singly Coated Doubly Curved Convex Surface</td>
<td>P. Hussar*, E. Smith-Rowland, IIT Research Institute</td>
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<td>8:40</td>
<td>Physical Optics Scattering from a Plane Plate Illuminated by a Gaussian Beam in Terms of a Contour Integral</td>
<td>P. Bolli, E. Martini, G. Pelosi, S. Selleri*, University of Florence</td>
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<tr>
<td>9:00</td>
<td>An Efficient Hybrid Technique for Analyzing Scattering from Large Open-Ended Cavities with Complex Cylindrically Periodic Terminations</td>
<td>T. W. Ang*, T. T. Chia, DSO National Laboratories, R. Burkholder, The Ohio State University</td>
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<td>9:20</td>
<td>Calculation of the RCS from the Double Reflection Between Plane Facets and Curved Surfaces</td>
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Monday Morning  

EM Theory  

Co-chairs: L. Li, Singapore and F. Bilotti, Italy

8:00  The Observation of Broadband Co-Seismic Electromagnetic Waves in VHF Band
T. Yoshida*, M. Nishi, Hiroshima City University

8:20  A Simplified 3D Plane Wave Time Domain (PWTD) Algorithm
M. Lu*, University of Illinois at Urbana-Champaign, J. Sarvas, University of Helsinki, E. Michielssen, University of Illinois at Urbana-Champaign

8:40  Spectral Green's Functions for Multilayered Biaxial Media
L. Vegni*, F. Bilotti, A. Toscano, University of “Roma Tre”

9:00  An Asymptotic Technique for the Far Field Pattern of a Dipole in an Infinite Stratified Medium
J. Rockway*, R. Marhefka, The Ohio State University, N. Champagne, University of California

9:20  Interaction of EM Waves with Biaxial Objects: Clarification of Magnetic Symmetry Groups
W. Y. Yin*, L.W. Li, O.B. Ooi, P.S. Kooi, M.S. Leong, The National University of Singapore

9:40  A New Method for Computational Electromagnetics, The Theory and Numerical Method of Rotational Operator
S. Wen-Miao*, Z. Xiao-Juan, X. Cheng, X. Feng, Chinese Academy of Science

10:00  Modifications of the Lorentz Force Law Invariant Under Galilean Transformations
C. C. Su*, National Tsinghua University

10:20  Modifications of Maxwell's Equations Invariant Under Galilean Transformations
C. C. Su*, National Tsinghua University

10:40  A Local-Ether Wave Equation and the Galilean-Invariant Electromagnetic Force Law
C. C. Su*, National Tsinghua University

11:00  Electromagnetic Field Calculation Inside the Dielectric Sphere with Inhomogeneous Insertion
A.V. Alpatov*, N.N. Kisel', Taganrog State University of Radio Engineering

11:20  Non-Linear Phenomena in Catastrophe Focusings
A.S. Kryukovsky, Y. Saren*, , MIPT Institute of Physics, 9, Dolgorudnyn

11:40  Electromagnetic Scattering by an Array of Conducting Spheres Each Coated with a Dielectric Layer
A-K Hamid*, University of Sharjah, M. Hamid, University of South Alabama
### Monday Morning Fairfax B

**Measurements for Material and Field Characterization**
Co-chairs: S. Riad, USA and W. Davis, USA

8:00 Investigation of Different Metallisation Alloys For Planar Antennas on Glass Substrate
M. Bourry*, M. Drissi, National Institute of Applied Sciences, M. Sarret, University of Rennes

8:20 Measurements of Thin Radar Absorbing Materials
T. Williams*, M.A. Stuchly, University of Victoria, P. Saville, Defence Research Establishment Atlanta

8:40 Fundamental Study of Wave Absorber Using Resistive-Film at 700GHz Band
M. Hanazawa*, Aoyama Gakuin University, Y. Abe, National Defense Academy, O. Hashimoto, Aoyama Gakuin University, Y. Yasuoka, National Defense Academy, K. Wada, Aoyama Gakuin University

9:00 Imbedded Antennas for Measurement of the Electrical Properties of Materials
N. Madan*, C. Furse, Utah State University

9:20 New Phase Shifter Designs Based on Multilayer Ferro-electric Materials Technology
Z. Zhang*, Y. Muralidhar, M.F. Iskander, Z. Yun, University of Utah

9:40 Optimized Resistive Dipoles for Field Strength Measurements
J. Waldmann*, J. Kantz, F. Landstorfer, University of Stuttgart

10:00 Test Zone Field Compensation Using Planar Data
P. Rousseau*, The Aerospace Corporation

10:20 Prediction of Shielding Degradation Arising from Variation in Contact Impedance of Inter-Metallic Junctions
L. Li*, O. Ramahi, University of Maryland – James Clark School of Engineering

10:40 Detection of Chafed Insulation in Aging Aircraft Wiring
B. Waddoups*, C. Furse, Utah State University

11:00 Passive Intermodulation on Large Reflector Antennas
P. Bolli*, P. Pelacchi, G. Pelosi, S. Selleri, University of Florence

---

**Novel EM Applications**
Chair: J. Wiltse, USA
Monday Morning

URSI A/B

Session 12

Dielectric and Lens Antennas

Co-chairs: A. Neto, USA and S. Maci, Italy

8:00 Green's Function for EM Field in a Microstrip Environment with Imperfectly Conducting Walls Using a Hertzian-Potential Impedance Boundary Condition
M. Havrilla*, D. Nyquist, Michigan State University

8:20 Gain Enhancement of a Dielectric Resonator Antenna Using A Finite Size Superstrate
A. Ittipiboon*, A. Petosa, R. Siushansian, Communications Research Centre

8:40 Analytical Solution for Gap-Excited, Leaky Slot Antenna Printed at the Interface Between Two Semi-Infinite Dielectrics
A. Neto*, California Institute of Technology/JPL, S. Maci, University of Siena

9:00 A 3-Beam, MEMS-Actuated, Leaky Wave Antenna
A. Zaman*, R. Lee, NASA Glenn Research Center

9:20 Radiation from an Arbitrarily Oriented Hertzian Dipole Over Two-Layered Anisotropic Medium with a Tilted Optic Axis
A. Eroglu*, J.K. Lee, Syracuse University

9:40 An Approximate Green's Function for a Finite Grounded Dielectric Slab
L. Alatan*, O. A. Civl, Middle East Technical University, G. Ogucu, University of Gaziantep,

10:00 Using Scattering Data to Estimate the Radiation Characteristics of Spherically Symmetrical Lenses
A. Parfitt*, N. Nikolic, CSIRO Telecommunications & Industrial Physics

10:20 An Improved Evaluation of Radiation Pattern for Dielectric Lens Antennas
D. Pasqualini*, F. Capolino, A. Toccafondi, S. Maci, University of Siena

10:40 The Dome-Like Fresnel-Zone Antennas
H. Hristov*, R. Feick, Universidad Tecnica Federico Santa Maria

11:00 Analysis of Performance of a Class of Broadband Geodesic Lens with Steering Capabilities
L. Sampaio*, L. Costa da Silva, Catholic University of Rio de Janeiro

11:20 2-D Model of an Arbitrary-Shaped Dielectric Rod Antenna
A. Boriskin*, A.I. Nosich, The A. Usikov Institute of Radio-Physics and Electronics, A. Altintas, Bilkent University
**Elements and Electronics**
Co-chairs: S. Targonski, USA and A. Kishk, USA

8:00  Numerical Analysis of Stacked Cylindrical Dielectric Resonator Antennas Excited by Coaxial Probes
A. Kishk*, X. Zhang, A. Glisson, University of Mississippi

8:20  Analysis of a Hemispherical Dielectric Resonator Antenna with Very High Permittivity
S. M. Jang, Syracuse University, B. Kolundzija*, University of Belgrade, T. Sarkar, Syracuse University

8:40  An Integrated Broadband Bowtie Antenna for THz Detection with a Double Quantum Well
M. Khodier*, C. Christodoulou, University of New Mexico, J. Simmons, Sandia National Laboratories

9:00  Characterization of Multiple-Via Interconnections for Multilayer Chip and Module Designs
C. W. P. Huang*, S. Hammadi, J. Lott, S. Al-Kuran, Anadigics Inc.

9:20  Radiation by Cavity-Backed Antennas on an Elliptic Cylinder
C. W. Wu*, L. Kempel, E.J. Rothwell, Michigan State University

9:40  Dielectric Slab Based Leaky-Wave Antennas for Millimeter-Wave Applications
T. Teshirogi*, Y. Kawahara, A. Yamamoto, Y. Sekine, N. Baba, M. Kobayashi, Anritsu Corporation

10:00 A RF Mass-Sensitive SAW Sensor with U-Groove Structure
D. Zhu*, Zhejiang University, J. Zhu, Motorola Inc

10:20 A CMOS IC for RF Programmable Surface Acoustic Wave Filter
D. Zhu*, Zhejiang University, J. Zhu, Motorola Inc

11:00 Optimisation of UHF Ferroelectric antenna Parameters by Means of Genetic Algorithm: A Broad Based Tutorial Paper
C. Das Gupta, Indian Institute of Technology

11:20 Experimental Study of Cassegrarian antenna Unit of Fan-Beam Structure With Planar Metal-Dielectric Feeder
C. Das Gupta, Indian Institute of Technology

**RF Coil Design and Simulation for High Field Magnetic Resonance Imaging**
Co-chairs: R. Lee, USA and O. Gandhi, USA

8:00 RF Coil Modeling and Analysis in High Field MRI: Lessons Learned
R. Lee*, T. Ibrahim, The Ohio State University

8:20 A Numerical Study of the Field Dependence of Signal-to-Noise Ratio in High Field MRI
M. Kowalski*, J. M. Jin, University of Illinois at Urbana-Champaign

8:40 Design of Radiofrequency Coils for Magnetic Resonance Imaging Applications at High Fields: Technological and Physical Feasibility Issues
T. Ibrahim*, R. Lee, B. Baertlein, P. M. Robitaille, The Ohio State University

9:00 SAR and Induced Current Densities for RF and Gradient Magnetic Fields Used for MRI
O.P. Gandhi*, The University of Utah

9:20 Measuring RF Field Distributions in MR Coils with IR Sensors
T. Ibrahim*, R. Gilbert, A. Abjuljalil, R. Lee, B. Baertlein, P. M. Robitaille, The Ohio State University

9:40 Volume Coils for Highest Field MRI
T. Vaughan*, M. Garwood, K. Ugurbil, University of Minnesota

10:00 A Model for MR Image Shading in Multi-Mode Resonators
J. Tropp*, GE Medical Systems

10:20 Using Electromagnetic Field Calculations to Understand the Complexity of Magnetic Resonance Imaging (MRI) at High Magnetic Field Strength
EM Education
Chair: E. Kucharski, Poland

8:00 Virtual Laboratory Instruments and Simulations Remotely Controlled via the Internet
M. Joler*, C. Christodoulou, University Of New Mexico

8:20 Computer-Aided Simulation of Guided Waves in Dielectric and Optical Waveguides
R.M. Shubair*, E.M. Alardi, Etisalat College of Engineering - Emirates Telecom

8:40 A Special "Missing" Singularity Integral and its Applications in Electromagnetic Education
A. Inan*, P. Osterberg, University of Portland

9:00 A Dirac-Like Inference of Maxwell's Equations
D. Sterc*, University of Osijek, Z. Sipus, University of Zagreb

9:20 On The Correct Way of Taking the Surface Limit in the Integral Equation Formulations of Electromagnetics
A. Kucharski*, Wroclaw University of Technology, K. Michalski, Texas A&M University
Mobile Antenna Systems
Co-chairs: S. Zeilinger, USA, T. Hori, Japan

1:00  A Wide-Band Electromagnetic Coupler for Thru-Glass Applications
S. Zeilinger*, J. Mockus, Andrew Corporation, W. Darden, Molex Corporation

1:20  A Thin Broadband Cavity-Backed Slot Spiral Antenna for Automotive Applications
D.S. Filipovic*, E.S. Siah, K. Sertel, V.V. Liepa, J. Volakis, The University of Michigan

1:40  Multiple-Input Multiple-Output (MIMO) Radio Channel Measurements
C. Martin*, J. Winters, N. Sollenberger, AT&T Research Labs

2:00  A Space Division Multiple Access Receiver
C. Ung*, TR Labs, R. Johnston, University of Calgary

2:20  Mobile Antennas for Reception of S-SARS
N. Haller*, Sirius Satellite Radio, Inc

2:40  Automotive Antennas Trends and Future Requirements
T. Talty*, Y. Dai, L. Lacotot, Ford Motor Company

3:00  Artificial Dielectrics for Mobile Antenna Design
T. Ozdemir*, K.F. Sabet, P. Frantzis, T. Chan, EMAG Technologies, K. Sarabandi, L. Katehi, University of Michigan, J.F. Harvey, Army Research Office

3:20  Propagation and Capacities of Multi-element Transmit and Receive Antennas
D. Chizhik*, G. Foschini, M. Gans, R. Valenzuela, Bell Labs - Lucent Technologies

Numerical Benchmarking, Strategies, and Applications
Co-chairs: G. Fikioris, Greece and J. Kotulski, USA

1:00  Electromagnetic Code Consortium Benchmark Development
A. Greenwood*, Air Force Research Laboratory - Kirtland AFB

1:20  What is Model Order Reduction?
R. D. Slone*, J. F. Lee, R. Lee, The Ohio State University

1:40  IS Semi-Inversion Always Advantageous?
G. Fikioris*, National Technical University of Athens

2:00  Strategy for Modeling Objects Obstructed by Foliage Above a Penetrable Ground: Spectral and Higher-Order Methods

2:20  Comparison of Slot Modeling Techniques in the Frequency and Time Domain
J. Kotulski*, W.A. Johnson, R.E. Jorgenson, L.K. Warne, D.J. Riley, Sandia National Laboratories

2:40  A Hybrid Technique for the Simulations of the Field Scattered by a Finite Dielectric Shield Around a Phased Microstrip Antenna Array
O. Rao*, H. Hashiguchi, S. Fukao, Kyoto University

3:00  The Application of SDA to Boxed Planar Structures with Complex Materials
F. Mesa*, F. Medina, G. Plaza, Universidad de Sevilla

3:20  Wave Scattering by Non Linear Ferromagnetic Materials
P. Joly*, INRIA Rocquencourt, O. Vacus, Cea/CESTA BP2

3:40  TDIE-MoM Solutions for Scattering by Thin-Wire Antenna Using Spatio-Temporal Wavelet-Packet Expansions
Y. Shifman*, Y. Leviatan, Technion - Israel Institute of Technology

4:00  Modeling Frequency Selective Surfaces by the Finite Element Method
I. Bardi*, R. Remski, D. Perry, Z. Cendes, Ansoft Corporation

4:20  Quasi-Static Analysis of Fringe Capacitances for Horizontal and Vertical Annular Frills
H. Y. Chao*, W. C. Chew, University of Illinois at Urbana-Champaign
### Wide Band Antennas

**Co-chairs: R. Haupt, USA**

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<tr>
<td>1:00</td>
<td>Wide Band Antenna Optimization CAD Tool</td>
<td>Y. C. Chung*, R. Haupt Utah State University</td>
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<tr>
<td>1:20</td>
<td>Two Novel, Ultra-Wide Bandwidth, Dual Linearly-Polarized Dielectric Antenna Designs</td>
<td>P. Diez*, C.C. Chen, W.D. Burnside, The Ohio State University</td>
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<tr>
<td>1:40</td>
<td>A New Microstrip Horn Antenna for Ultra-Wideband Applications</td>
<td>C. Nguyen*, J.S. Lee, J.S. Park, Texas A&amp;M University</td>
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<tr>
<td>2:00</td>
<td>Wide-Band Patch Antennas with Asymmetric Microstrip Excitation</td>
<td>A. Faraone*, Q. Balzano, Motorola Labs</td>
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<tr>
<td>2:20</td>
<td>Bandwidth Enhancement Techniques for Printed Cloverleaf Antennas</td>
<td>S. Silva*, H. Foltz, Virginia Polytechnic Institute and State University, C. Dietrich, R. Nealy, University of Texas - Pan American</td>
</tr>
<tr>
<td>2:40</td>
<td>Broadband Application of High Impedance Ground Planes</td>
<td>K.J. Golla*, P.J. Collins, S. Schneider, A.J. Terzuoli, Air Force Institute of Technology and Research</td>
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<tr>
<td>3:00</td>
<td>A Wideband U-Slot Patch Antenna with Photonic Bandgap Structure</td>
<td>R. Lee*, A. Zaman, NASA Glenn Research Center</td>
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<td>3:20</td>
<td>The Conical Spiral Antenna Probe for Underground Object Detection</td>
<td>H. Raemer*, C. Rappaport, Northeastern University</td>
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<tr>
<td>3:40</td>
<td>Gabor-Frame Phase-Space Beam Summation Formulation for Wideband Radiation from Apertures Sources</td>
<td>A. Shlivinski*, E. Heyman, A. Boag, Tel Aviv University, D. Lugara, C. Letrou, I.N.T.</td>
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<td>4:00</td>
<td>Broadband Printed Quadrifilar Helical Antenna with Variable Wire Width</td>
<td>J.C. Louvigne*, A. Sharaiha, D. Thouroude, Universite de Rennes I</td>
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<td>4:20</td>
<td>Impedance Matching of Microstrip Antennas with a Parallel Resonant Circuit</td>
<td>D.M. de Haaij*, J. Joubert, J. W. Odendaal, University of Pretoria</td>
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### Array Analysis and Design

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<th>Authors</th>
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<tbody>
<tr>
<td>1:00</td>
<td>Sparse Array Realization of Collimated Short Pulse Beam Fields</td>
<td>A. Shlivinski*, E. Heyman, Tel Aviv University</td>
</tr>
<tr>
<td>1:40</td>
<td>Array Pattern Synthesis in the Presence of a Mounting Tower Using the Genetic Algorithm</td>
<td>T. Su*, K. Dandekar, H. Ling, The University of Texas at Austin</td>
</tr>
<tr>
<td>2:00</td>
<td>The Selection of Starting Points for Array Synthesis Using the Method of Generalised Projections</td>
<td>E. Botha*, University of Pretoria, D. McNamara, University of Ottawa</td>
</tr>
<tr>
<td>2:40</td>
<td>Ultra Broadband Antenna Array for Mobile/Wireless Communications, Square-Kilometer-Array Telescope and Other Applications</td>
<td>T.B. Vu*, City University of Hong Kong</td>
</tr>
<tr>
<td>3:00</td>
<td>Comparison of Beamforming Techniques for W-CDMA Communication System</td>
<td>H. J. Li*, T. Y. Liu, National Taiwan University</td>
</tr>
<tr>
<td>3:20</td>
<td>A Two Dimensional Coupled Oscillator Array with MMIC Frequency Multipliers</td>
<td>J. Shen*, L.W. Pearson, Clemson University</td>
</tr>
<tr>
<td>3:40</td>
<td>Precise Analysis of Commercial Log-Periodic Dipole Arrays Using Wire-Antenna Algorithms</td>
<td>A. Djordjevic*, A. Zajic, B. Kolundzija, University of Belgrade, T. Sarkar, Syracuse University</td>
</tr>
<tr>
<td>4:00</td>
<td>Ray Analysis of the Radiation from a Large Finite Phased Array of Antennas on a Grounded Material Slab</td>
<td>P. Janpugdee*, P. Pathak, The Ohio State University, P. Nepa, University of Pisa, O. A. Civ; Middle East Technical University, H.T. Chou,</td>
</tr>
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</table>
### Monday Afternoon  
**URSI B**

#### Session 20

**Scattering**  
Co-chairs: R. MacPhie, Canada and D. Werner, USA

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<thead>
<tr>
<th>Time</th>
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<tr>
<td>1:00</td>
<td>Scattering of a Plane Wave by Two Perfectly Conducting Coalescing Spheres</td>
<td>R. MacPhie*, T. Lo, University of Waterloo</td>
</tr>
<tr>
<td>1:40</td>
<td>Plane Wave Diffraction by a Grounded Semi-Infinite Dielectric Slab</td>
<td>B. Polat*, Technical University of Denmark, L.W. Pearson, Clemson University</td>
</tr>
<tr>
<td>2:00</td>
<td>Floquet Wave Diffraction Theory for the Truncated Phased Dipole Array Green's Function on an Infinite Grounded Dielectric Slab</td>
<td>S. Maci*, A. Polemi, A. Toccafondi, University of Siena, L. Felsen, Boston University</td>
</tr>
<tr>
<td>2:20</td>
<td>Theoretical Model for the Backscatter Response of Roadside Pebbles at Millimeter-Wave Frequencies</td>
<td>E. Li*, National Chi Nan University, K. Sarabandi, University of Michigan</td>
</tr>
<tr>
<td>2:40</td>
<td>Backscatter From Inhomogeneities Illuminated by a Focused Beam</td>
<td>J. Schultz*, E. Hopkins, R. Moore, Georgia Tech Research Institute, M. Kessler, J. Maloney, Photonex Corporation</td>
</tr>
<tr>
<td>3:00</td>
<td>Near-Field Probe Study of Scattering from Simple Inhomogeneities</td>
<td>J. Schultz*, E. Hopkins, E. Kuster, Georgia Tech Research Institute</td>
</tr>
<tr>
<td>3:20</td>
<td>A Fast Method to Calculate The Radar Cross Section of Cavities</td>
<td>O. Gutierrez*, F. Saez de Adana, P. Lozano, E. Garcia, L. Lozano, I. Gonzalez, M. Catedra, Universidad de Alcala</td>
</tr>
<tr>
<td>3:40</td>
<td>Effect of Target Size on the Detection of Buried Objects Using Microwave Radiometry</td>
<td>B. U. Ungan*, J.T. Johnson, The Ohio State University</td>
</tr>
<tr>
<td>4:00</td>
<td>Investigation of the Scattering Characteristics of Subsurface UXO for Classification</td>
<td>K. H. Lee*, C.C. Chen, R. Lee, The Ohio State University</td>
</tr>
<tr>
<td>4:20</td>
<td>Use of PCA and Quadratic TFR Techniques in Electromagnetic Target Classification from Scattered Data</td>
<td>G. Turhan-Sayan*, M. Karaduman, Middle East Technical University</td>
</tr>
</tbody>
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### Monday Afternoon  
**URSI G**

#### Special Session  
**Session 21

**Space Weather: System Effects**  
Co-chairs: J. Foster, USA and S. Basu, USA

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tr>
<td>1:00</td>
<td>On Effects of Ionospheric Weather on Communication and Navigation System</td>
<td>J. S. Guo*, Chinese Academy of Sciences, J. Wu, Beijing Center of China Institute of Radiowave</td>
</tr>
<tr>
<td>1:20</td>
<td>Stormtime Ionospheric Perturbations at Sub-Auroral Latitude: GPS Effects</td>
<td>J.C. Foster*, MIT Haystack Observatory, A. Coster, MIT Lincoln Laboratory, F.J. Rich, Air Force Research Laboratory, Hanscom AFB</td>
</tr>
<tr>
<td>1:40</td>
<td>Effects of Ionospheric Irregularities on GPS-Based Navigation Systems</td>
<td>X. Pi*, Jet Propulsion Laboratory, A. Iijima, A. Mannucci, JPL/California Institute of Technology</td>
</tr>
<tr>
<td>2:00</td>
<td>Equatorial Ionospheric Scintillations and Their Effect on GPS Signals</td>
<td>P. Kintner*, Cornell University</td>
</tr>
<tr>
<td>2:20</td>
<td>The Impact of Solar Maximum on GPS Performance in the Equatorial Region</td>
<td>S. Skone*, University of Calgary</td>
</tr>
</tbody>
</table>
3:20 Operational Effects at ALTAIR Due to Ionospheric Disturbances  
S. Close*, A. Coster, S. Hunt, MIT Lincoln Laboratory

3:40 VLF Remote Sensing of Lower Ionospheric Variability  
U.S. Inan*, Stanford University

4:00 Recent Validation Results for Selected HF Propagation Prediction Programs Using Space Weather Data  
R. Hunsucker*, RP Consultants

4:20 OpSEND: Tailored Space Weather Impact Maps for Specific Radio-Based Systems  

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**Gardner Session 22**

**Electromagnetic Theory**

Co-chairs: I. Besieris, USA and I. Lindell, Finland

1:00 Time-Domain Analysis of the Evanescent Fields Associated with Ultrafast X-Wave Tunneling through a Planar Slab  
A. Shaarawi, The American University in Cairo, I. Besieris*, Virginia Polytechnic Institute and State University, B. Tawfik, Cairo University, Fayoum Campus

1:20 Ultra-Fast Transmission of a Transverse-Electric X-Wave Tunneling Through a Multilayered Structure  
A. Shaarawi, The American University in Cairo, I. Besieris*, Virginia Polytechnic Institute and State University, B. Tawfik, Cairo University, Fayoum Campus

1:40 Analytical and Numerical Evaluation of the Explicit Form of the Electromagnetic Field Propagator  
R.D. Nevels*, C. Shin, Texas A&M University

2:00 Image Theory for the Prolate Spheroid  
I. Lindell, K.I. Nikoskinen, Helsinki University of Technology, G. Dassios*, University of Patras

2:20 Spiral as an Electronically Controlled Polarization Transformer  
K. Karkkainen*, M.A. Stuchly, University of Victoria

2:40 Scattering by Truncated Periodic Arrays of Narrow Strips: A Wiener-Hopf Formulation  
F. Capolino*, M. Albani, Universita di Seina

3:00 Construction and Properties of Scattering Expansions for Magnetic and Electric Cavity Green's Functions  
F. Gronwald*, J. Nitsch, S. Tkachenko, Otto-von-Guericke-University Magdeburg

3:20 The Homogenization Method and Its Application to Designing Frequency Selective Structures  
G. Kiziltas*, H. Syed, Z. Li, J. Volakis, N. Kikuchi, The University of Michigan

3:40 Finite-Element-Method Computation of Zero-Sequence Impedance of Three-Phase Underground Pipe-Type Cables  
X.B. Xu*, Clemson University, G. Liu, Comtech Communication Inc.

4:00 Theoretical Study of a Model Scatter-Probe Optical Microscope  
C.I. Valencia*, E.R. Mendez, Centro de Investigacion Cientifica y de Educacion, A.A. Maradudin, T.A. Leskova, University of California-Irvine

4:20 Singularities of Space-Time Focusings in Non-Stationary Media  
D.N. Chystyakov, A.S. Kryukovsky, D.S. Lukin*, MIPT, Institutsky per., 9, Dolgoprudny

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**Hampton Session 23**

**Propagation Theory**

Co-chairs: F. Bardati, Italy and Z. Zhang, USA

1:00 Application of the Reciprocity Theorem to Complex Propagation Problems  
C. Coleman*, Adelaide University

1:20 Stochastic Modeling of Correlation Radiometer Signals  
B. Davis*, University of Arizona, E. Kim, J. Piepmeier, NASA Goddard Space Flight Center

1:40 Scattering From a Land/Sea Transition  
M. Casciato*, K. Sarabandi, University of Michigan

2:00 Three Dimensional Simulation of Wave Propagation into a Comet Nucleus in the Frame of the CONSERT Experiment  
M. Benna*, Observatoire Midi-Pyrenees, A. Piot, Laboratoire de Planetologie de Grenoble, J. P. Barriot, W. Kofman, Laboratoire de
Monday Afternoon  Fairfax B  Session 24

**Microstrip Antenna Analysis**
Chair: J. Mosig, Switzerland

1:00  Effect of Feeding Symmetry on Resonances in Patch and Capacitor Structures  

1:20  Investigation on Phase Properties of Circular Microstrip Antenna  
M. Daneshmand*, L. Shafai, P. Mousavi, The University of Manitoba

1:40  FDTD Analysis of a Compact, H-Shaped Microstrip Patch Antenna  
S.C. Gao*, L.W. Li, M.S. Leongand, T.S. Yeo, The National University of Singapore

2:00  Temperature Effects in Multilayered (An)isotropic Superstrate-Substrates on the Characteristics of Packaged Multiconductor Microstrip Devices  
W.Y. Yin*, M. Miao, L.W. Li, B.L. Ooi, P.S. Kooi, M.S. Leong, T.S. Yeo, The National University of Singapore

2:20  Analysis of a Square Microstrip Antenna with an Eccentric Slot  
M. Hurtado*, H.E. Lorente, C.H. Muravchik, Universidad Nacional de La Plata

2:40  Irregularly Shaped Patch as Perturbation of Regularly Shaped Patch  
Y. Sun*, Y. L. Chow, D.G. Fang, City University of Hong Kong

Monday Afternoon  Fairfax B  Session 25

**Methods for Layered & Stratified Media**
Chair: L. Carin, USA

3:00  Application of the Locally Corrected Nystrom Method to Planar Layered Problems in Packaging  
F. Caliskan*, A. Peterson, Georgia Institute of Technology

3:20  Lattice Sum Approach to Scattering by Periodic Layered Structures  
J. Thomas*, A. Ishimaru, University of Washington

3:40  Study of the Scalar Potentials Arising in Stratified Media  
T. Grzegorczyk*, Research Laboratory of Electronics, MIT, J.R. Mosig, Ecole Polytechnique Federale de Lausanne

4:00  Multilayered Media MPIE Green's Functions  
J. Sarvas*, P. Yla-Oijala, M. Taskinen, University of Helsinki

Z. Liu*, L. Carin, Duke University

4:40  Dielectric Resonator Antenna on a Slotted Ground Plane  
C. Y. Huang*, Yung-Ta Institute of Technology K. L. Wong, T.W. Chiou, National Sun Yat-Sen University,
Antenna Design Optimization

Chair: L. Desclos, USA

1:00 Shape Optimization of Microstrip Antennas Using Genetic Algorithm
H. Choo*, A. Hutani, H. Ling, University of Texas at Austin

1:20 Patch Antenna Size Reduction by Combining Inductive Loading and Short Points Technique

1:40 Mutual Coupling Between Microstrip Line Fed Printed Antennas on Large Coated Cylinder
V.B. Erturk, Bilkent University, K.W. Lee, R.G. Rojas*, The Ohio State University

2:00 Analysis of Microstrip Patch Antenna Elements Using Several Software Packages
C. Peixeiro, C. Fernandes*, Technical University of Lisbon

2:20 Improved Electrically Small Planar Microstrip Antenna
C.S. Lee*, A. Mahmood, Southern Methodist University

Random Media and Rough Surfaces

Chair: J. West, USA

3:00 Resistive Treatment of Edges in Numerical LGA Scattering from Rough Surfaces
J. West*, Oklahoma State University

3:20 Effective Permittivity Calculation for 2-D Pseudo-Random Composite Media
F. Wu*, K. Whites, University of Kentucky

3:40 Modeling Shadow Region Due to Propagation Through Discrete Random Media
R. Guinvarc'h*, B. Uguen, G. Chassay, LCST/FRE CNRS-URER – INSA Rennes

4:00 Scattering of the Radiation with Continuous Spectrum on Irregularities of a Plane Plasma Layer

4:20 Statistical Characteristics of Alfvén and Hydromagnetic Gradient Waves in a Randomly Inhomogeneous Plasma

Reflector Analysis and Synthesis

Co-chairs: O. Kilic, USA and A. Prata, USA

1:00 The Geometrical Theory of Aberrations of Classical Offset Dual-Reflector Antennas
S. Chang*, A. Prata, University of Southern California

1:20 A Design Procedure for Classical Offset Inverse Cassegrain Antennas with Circular Apertures
S. Chang*, A. Prata, University of Southern California

1:40 Analysis of Large Reflector Antenna Systems Using Iterative Hybrid Techniques
D.H. Han*, A.C. Polycarpou, C.A. Balanis, Arizona State University

2:00 Offset Parabolic Cylindrical Antennas: Effects of Random Surface Errors on Gain and Sidelobes
Y. Rahmat-Samii*, S. Sinton, University of California, Los Angeles

2:20 Transient Far-Fields of Offset Reflector Antenna
S. Skulkin*, Vrije Universiteit Brussel, V. Turchin, Institute of Applied Physics Russian Academy of Science

2:40 A Proposed Definition of Antenna Efficiency for Contoured Coverages
A. Keith*, Boeing Space Systems, A. Prata, University of Southern California

3:00 Radiation Pattern of a Satellite Antenna Located in a Clutter Environment
M. Migliozzi*, C. Parini, M. Rayner, University of London

3:20 On the Use of FFT in Surface Shaping of Contoured Beam Antennas
S. Sorensen*, M. Lumholt, H.H. Viskum, TICRA
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<tr>
<td>3:40</td>
<td>Synthesis of Reflector Antennas with Near-Field Constraints</td>
<td>O.M. Bucci*, A. Capozzoli, G. D'Elia, Universita di Napoli &quot;Federico II&quot;</td>
</tr>
<tr>
<td>4:20</td>
<td>Gabor-Based Narrow-Waisted Gaussian Beam Algorithm for Transmission Through a Spherically Layered Radome</td>
<td>J. Maciel*, Radiant Technologies, L. Felsen, Boston University</td>
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**Monday Afternoon Clarendon Session 29**

**Diverse Waveguiding Structures**
Co-chairs: K. Mei, Hong Kong and H. Bertoni, USA

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<tr>
<th>Time</th>
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<tr>
<td>1:00</td>
<td>Analysis of Impedance Characteristics of a Probe Fed Rectangular Cavity-Backed Slot Antenna</td>
<td>T. Lertwiriaprapa*, C. Phongcharoenpanich, S. Kosuivit, M. Kairiksh, King Mongkut's Institute of Technology</td>
</tr>
<tr>
<td>1:20</td>
<td>Radiation Extraction for Transmission-Line Interconnects</td>
<td>Y.W. Liu*, K.K. Mei, J.S. Hong, City University of Hong Kong</td>
</tr>
<tr>
<td>1:40</td>
<td>Influence of Depleted Layers on the Propagation Characteristics and on the Couplings in Multilayer Silicon ICs with Buried Diffusions</td>
<td>S. Wane*, ENSEEIHT, D. Bajon, SUPAERO, H. Baudrand, ENSEEIHT, P. Gamand, Philips Semiconductors</td>
</tr>
<tr>
<td>2:40</td>
<td>Simulation of Cutoff Frequencies in TEM Cells by Boundary Scaling Functions</td>
<td>M. Tanigaki*, H. Echigo, Tohoku Gakuin University, M. Kamiyama, Sendai National College of Technology</td>
</tr>
<tr>
<td>3:00</td>
<td>Beam Array Scattering by Wedges and Rectangular Cylinders</td>
<td>H. Cheung*, E. Jull, University of British Columbia</td>
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<tr>
<td>3:20</td>
<td>Coupling at Cross, T and L Junctions in Tunnels</td>
<td>J. Lee*, Advanced Telecom Research Lab-LG Electronics, H. Bertoni, Polytechnic University</td>
</tr>
<tr>
<td>3:40</td>
<td>Berenger and Leaky Modes in Lossy Microstrip Substrates Terminated by a Perfectly Matched Layer</td>
<td>H. Rogier*, D. De Zutter, INTEC-University of Gent</td>
</tr>
<tr>
<td>4:00</td>
<td>The Complete Set of Electromagnetic Dyadic Green's Functions of the Cylindrical Chrowaveguide</td>
<td>H.T. Hui*, E.K.N. Yung, City University of Hong Kong</td>
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**Monday Afternoon Beacon B Session 30**

**Antenna Measurements and Calibration**
Chair: R. Rotman, Israel

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<tr>
<td>1:00</td>
<td>Calibration of Large Phased Arrays Including Monopulse Ratios</td>
<td>R. Rotman*, Y. Oz, A. Benaish Elta Electronics Industries IAI</td>
</tr>
<tr>
<td>1:20</td>
<td>Design of An L-Band Test Range Validation Antenna</td>
<td>L. Foged*, L. Duchesne, P.O. Iversen, SATIMO, J. Lemanczyk, European Space Agency, ESTEC</td>
</tr>
<tr>
<td>2:00</td>
<td>Precision Dipoles for Antenna Test Range Validation</td>
<td>L. Duchesne*, M. Le Goff, P.O. Iversen, SATIMO</td>
</tr>
<tr>
<td>2:20</td>
<td>Active Measurements of Wireless Devices in a Spherical Near Field Test Range</td>
<td>A. Gandois*, P. Garreau, G. Barone, SATIMO</td>
</tr>
</tbody>
</table>
Microwave Measurements of the Complex Permittivity of the Construction Materials Using Fresnel Reflection Coefficients and Reflection Ellipsometry

F. Sagnard*, C. Vignat, V. Montcourtois, É. Rolland, Université de Marne-la-Vallee
**Microstrip Antennas for Wireless**

Co-chairs: N. Herscovici, USA and S. Raman, USA

8:00 A Dual Polarized Aperture Coupled Microstrip Patch Antenna with High Isolation for RFID Applications
S.K. Padhi*, N.C. Karmakar, C.L. Law, Nanyang Technological University, S. Aditya, ITT Delhi

8:20 Design of "Chip-Scale" Patch Antennas for 5-6GHz Wireless Microsystems
J. Zhao*, S. Raman, Virginia Tech

8:40 Low-Cost Design of Stacked Microstrip Array Antenna for DBS Application
Y.B. Jung*, S.O. Park, Information and Communications University

9:00 Dual Linear Polarization Patch Antenna Array with High Isolation
K.L. Lau*, K.M. Luk, City University of Hong Kong

9:20 A Low-Cost L-Probe Patch Antenna Array
H. Wong*, H.W. Lai, K.M. Luk, City University of Hong Kong

9:40 A Dielectric-Resonator-On-Patch (DROP) Antenna for Broadband Wireless Applications: Concept and Results
K. Esselle*, Macquarie University

10:00 Progressive Development of Portable VSAT Antennas for ST1 and Intelsat
N.C. Karmaker*, S.K. Padhi, C.T. Han, S. Sivakumar, Nanyang Technological University, S. Aditya, ITT Delhi

10:40 Development of Broadband Circular Polarized Planar Antenna for "EROS“ Leo Satellite
V. Rojansky*, M. Winebrand, Israel Aircraft Industries Ltd.

11:00 Compact Size IMT-2000 Microstrip Antenna for Repeater and Base Stations
S Kwon*, B. Lee, Kyunghee University, J. Choi, Sunwoo Communication Co., Ltd.

**Grand Challenges in CEM**

Co-Chairs: T. Cwik, USA and R. Mittra, USA

8:00 Opening Remarks
K. Hill, Wright Laboratory-Dayton OH

8:10 Some Grand Challenges in Computational Electromagnetics
R. Mittra*, The Pennsylvania State University

8:20 Future Directions in Electromagnetic Modeling of Antennas and Scatterers
D.R. Wilton*, University of Houston, R. Adams, Virginia Tech, R.D. Graglia, Dip. Elettronica C. Duca Abruzzi, A. Peterson, Georgia Institute of Technology

8:40 MacroBasis Functions and MultiLevel Algorithms for Printed Antennas
J.R. Mosig*, Ecole Polytechnique Federale de Lausanne, J. Rius, Universitat Politecnica de Catalunya

9:00 Monte Carlo Simulation of Random Rough Surfaces: A Grand-Challenge Class Electromagnetic Scattering Problem
S.Q. Li, City University of Hong Kong, M. Xia, Chinese Academy of Sciences, C.H. Chan*, City University of Hong Kong

9:20 Developments and Research Challenges in Frequency Domain Computational Electromagnetics
J. Volakis*, K. Sertel, University of Michigan, T.F. Eibert, T-Nova Deutsche Telekom

9:40 Large-Scale Design and Optimization Using Cluster Computers
T. Cwik*, G. Klimeck, F. Villegas, California Institute of Technology / JPL

10:00 Fast Time Domain Integral Equation Solvers: Trends and Challenges
E. Michielssen*, K. Agyun, M. Lu, K. Yegin, University of Illinois at Urbana-Champaign, B. Shanker, Iowa State University, D. Weile, University of Delaware

10:20 Grand Challenges in Analyzing EM Band-Gap Structures: An FDTD/Prony Technique Based on the Split-Field
**Tuesday Morning**

### EM Health Effects of Cellular Phone Radiation

**Co-Chairs:** C. Rappaport, USA

- **8:00** Estimation of an Error of the SAR Caused by Inaccurate Electric Constants of the Biological Tissue-Equivalent Phantom  
  H. Kawai*, H. Yoshimura, K. Ito, Chiba University

- **8:20** SAR Simulations for Compliance and Trend Analysis  
  J. Svigelj*, N. Buris, Motorola Inc.

- **8:40** Statistical Analysis and Characterization of Spatial Distribution of Absorbed Power of GSM Mobile Phones  
  N. BenDjebbara*, J. Wiart, France Telecom-FTR&D DMR/IIM, W. Tabbara, Supelec, C. Dale, France Telecom-FTR&D DMR/IIM

- **9:00** A Practical Method for Compliance Testing of Base Stations for Mobile Communications with Exposure Limits  
  C. Olivier*, L. Martens, Ghent University

- **9:20** A High-Precision Real Human Phantom for EM Evaluation of Handheld Terminals in a Talk Situation  

- **9:40** Simulated Temperature Increase in a Head/Eye Model Containing an Intraocular Retinal Prosthesis  
  G. Lazzi*, S. DeMarco, W. Liu, NC State University, M. Humayun, Wilmer Eye Institute-Johns Hopkins University

- **10:00** FDTD Calculation of SAR for the Monopole Antenna on the Conducting Box in Terms of the Structure Near by Feed  
  J. Byun*, J. Lee, Samsung Electronics Co., Ltd.

- **10:20** FDTD Calculation of SAR for the Monopole Antenna on the Conducting Box with the Metallic Folder  
  J. Lee*, J. Byun, Samsung Electronics Co., Ltd., S. Nam, Seoul National University

- **10:40** EMF Effects in Human Eye Exposed to High Frequency Electromagnetic Fields  
  S. Loskovska*, L. Ololoska-Gagoska, L. Janev, University "Sts. Kiril and Metodij"

### Array Design Including Mutual Coupling

**Co-chairs:** R. Pogorzelski, USA and P. Niemand, South Africa

- **8:00** DOA Estimation for Nonuniformly Spaced Arrays Incorporating Mutual Coupling  
  K. Kim*, T. Sarkar, Syracuse University

- **8:20** Analysis and Design of a Open Ended Waveguide Array Considering the External Mutual Coupling  
  E. Arnold, M. Boeck, F. Holtzhaussen, P. Ruetzel*, EADS Deutschland GmbH

- **8:40** Mutual Coupling in Dual-Polarized Microstrip Patch Arrays for 2D Synthetic Aperture Microwave Radiometry at L-Band  
  K. Carver*, S. Kadambala, H. Zhu, J. Bertram, University of Massachusetts at Amherst

- **9:00** Mutual Coupling Effects and Compensation for Cylindrical Null-Steering Microstrip Patch Arrays  
  P. Niemand*, J.W. Odendaal, J. Joubert, University of Pretoria

- **9:20** Analysis of a Phased Array of Rectangular Waveguides Feeding a Parallel Plate Waveguide  
  S. Rengarajan*, California State University

- **9:40** Post-Wall Waveguide Slot Array with a 4-Way Planar Butler Matrix for Base Station Antennas in Wireless
Communications
J. Hirokawa*, S. Yamamoto, M. Ando, Toyko Institute of Technology

10:00 Full Scan Coverage Spherical Conformal Spiral Antenna Array
A. Vallecchi*, University of Salerno, A. Mazzei, G. Gentili, University of Florence

10:20 A Five by Five Element S-Band Coupled Oscillator Array with Diagnostic System
R. Pogorzelski*, California Institute of Technology / JPL

10:40 Novel Techniques for Analysis of Array Antennas
K. Takamizawa*, W. Davis, W. Stutzman, Virginia Polytechnic Institute and State University

11:00 Spectral Containment Using Integer Wavelength Time Delays in Phased Arrays
J.D. Kramer*, E. Ostroff, S. Parisi, MITRE Corporation

11:20 Field Analysis Of A Ultra Broadband Wide Scan Dual Polarized Array Of Ridge Elements

Tuesday Morning

Multi-Band Antennas
Co-chairs: L. Parad, USA and K. Lee, USA

8:00 Multi-Band and Broadband Coaxial CTS Array Design
R. Isom, M. Iskander*, Z. Zhang, Z. Yun, University of Utah

8:20 The Compact Patch
L. Parad*, MIT Lincoln Laboratory

8:40 Branch Number and Height Effects on the Multi-Branch Tri-Band Monopole Antenna Resonance
D. Lu*, T.J. Watson Research Center

9:00 Volume Considerations in the Design of Dual-Band Handset Antennas
M. Martinez-Vazquez*, M. Geissler, D. Heberling, IMST GmbH

9:20 Dual-Band and Wide-Band PIFA with U- and Meanderline-Shaped Slots
P. Salonen*, M. Keskilammi, M. Kivikoski, Tampere University of Technology

9:40 A Compact Multiband Terminal Antenna
P. Kabacik*, Wroclaw University of Technology

10:00 A Compact Dual-Band Microstrip-Fed Monopole Antenna
H.M. Chen*, Y. F. Lin, C.C. Kuo, K.C. Huang, National Kaohsiung University of Applied Sciences

10:20 A Wideband Monopolar Plate-Patch Antenna
J. S. Row*, Chien Kuo Institute of Technology, S.H. Yeh, K.L. Wong, National Sun Yat-Sen University

10:40 Waveguide-Excited Dielectric Resonator Antenna
K. W. Leung*, K. K. So, City University of Hong Kong

11:00 A Planar Triple-Band Antenna for GSM/DCS/GPS Operations
S.T. Fang*, J. W. Sheen, Industrial Technology Research Institute

11:20 A Coplanar Waveguide-Fed Printed Slot Antenna for Dual-Frequency Operation
W. S. Chen*, Chien Kuo Institute of Technology, K. L. Wong, National Sun Yat-Sen University

Tuesday Morning

Propagation in a Multipath Environment
Co-chairs: M. Iskander, USA and L. Pierce, USA

8:00 Multipath Scattering Model for LMDS
I. Jouny*, Lafayette College

8:20 Outdoor/Indoor Propagation Modeling for Wireless Communications Systems
M. Iskander*, Z. Yun, Z. Zhang, University of Utah

8:40 A Hierarchical Time-Domain Modulation Scheme for Widband Communications in a Dispersive Multipath Channel
K. Sarabandi*, I. S. Koh, University of Michigan
9:00 Improving Indoor Signal Coverage by Use of Through-Wall Passive Repeaters  
H. Hristov*, R. Feick, W. Grote, Universidad Tecnica Federico Santa Maria

9:20 The Impact of Multipath Propagation on the Performance of Smart Antennas in Micro-and Pico-Cellular CDMA Environments  
A. Khajehnasiri, S. Safavi-Naeini*, University of Waterloo, Y. Wang, Com Dev Ltd

9:40 A Plane Wave Model Approach to Understanding Propagation in an Intra-Chip Communication System  
K. Kim, W. Bomstad*, K.O. Kenneth, University of Florida

10:00 Loss Characteristics in Urban Environment with Different Buildings' Overlay Profiles: Option 2  
N. Blaunstein*, D. Katz, D. Censor, University of the Negev

10:20 Microwave Propagation Characteristics Depending on Base-Station Antenna Height in an Urban Area  

10:40 Effects of Road Traffic on Portability Distributions of Path Loss in an Urban Microcellular Environment  
K. Sakawa*, H. Masui, M. Ishii, K. Sakawa, T. Kobayashi, YRP Mobile Telecommunications Key Technology

11:00 Joint Angle and Delay Spread Statistics for 1920 MHz Peer-to-Peer Wireless Channels  
G. Durgin*, V. Kukhshya, T. Rappaport, Virginia Polytechnic Institute and State University

11:20 Comparison Between Path-Loss Prediction Models for Wireless Telecommunication System Design  
M. Jeong*, B. Lee, Kyunghee University

Tuesday Morning  Gardner Session 37

EM Scattering  
Co-chairs: C. Tai, USA and R. Adams, USA

8:00 The Dual Surface Combined Field Integral Equation for Scattering From Three-Dimensional Objects  
V.V.S.Prakash*, R. Mittra, Pennsylvania State University

8:20 A New Theory of Receiving Antennas  
C.T.Tai*, University of Michigan

8:40 Impulsive Pyramid-Vertex and Double-Wedge Diffraction Coefficients  
F. Capolino*, M. Albani, University of Siena

9:00 Diffraction by a Curved Impedance Wedge of Arbitrary Angle  
J.M.L. Bernard*, C.E.A / Bruyeres le Chatel

9:20 Diffraction by a Planar Junction Between a Perfectly Conducting Half Plane and a Resistive Sheet Illuminated by a Dipole Close to its Edge  
A. Vallecchi*, University of Salerno

9:40 Electromagnetic Scattering by A Multilayer Gyrotropic Biaxialissotropic Cylinder  
M. Zhang*, L.W. Li, T. S. Yeo, M. S. Leong, National University of Singapore

10:00 Contribution of the Triple Effects to the Monostatic RCS of Arbitrary Targets Modeled by Plane Facets  
F. Saez de Adana*, S. Nieves, P. Lozano, I. Gonzalez, O. Gutierrez, M.F. Catedra, Universidad de Alcala

10:20 A Direct Spatial-Domain Representation for the Fields Excited by an Arbitrary Incident Field at a Planar Dielectric Interface  
R. Adams, B. Davis*, Virginia Tech

10:40 Scattering From Spherical Objects Loaded With Conducting Strips Using Asymptotic Boundary Conditions  
A. Kishk*, A. Elsherbeni, University of Mississippi

11:00 A Time-Domain Uniform Asymptotic Solution for Scattered Field by a Thin Cylindrically Curved Conducting Strip  

11:20 Sidelobe Apodization for High Resolution of Scattering Centres in ISAR Images  
G. Thomas*, J. Lo Vetri, University of Manitoba, W. Chamma, S. Kashyap, A. Louie, Defence Research Establishment Ottawa
**Calibration Techniques & Package Structures**
Chair: W. Davis, USA

- **8:00**  
  Calibration of the C-Probe for NDE of Concrete Structures  
  A. Al-Derbas, Kuwait University, Y. Khalaf, S. Riad*, Virginia Polytechnic Institute and State University

- **8:20**  
  Antenna Gain Measurement Using TRL Calibration Method  
  H. C. Lu*, T. H. Chu, National Taiwan University

- **8:40**  
  Cluster Computing in Printed Circuit Board Simulation  
  F. Liu*, J.E. Schutt-Aine, University of Illinois at Urbana-Champaign, J. Chen, Motorola, Inc.

- **9:00**  
  Analysis of Electromagnetic Emissions from IC Package Lead-Frames in Automotive Applications  
  U. Navsariwala*, N. Buris, J. Meyerhoff, Motorola Inc.

- **9:20**  
  Design of Narrow-Band Filters Based on Photonic Waveguides  
  A. Boag*, B. Steinberg, R. Licitsin, Tel Aviv University

- **9:40**  
  Electromagnetic Coupling to a Wire Residing Inside a Rectangular Cavity with Apertures Due to External Radiating Sources  
  M. Deshpande*, NASA Langley Research Center

**Transient & Ultra-Wideband Measurements**
Chair: S. Riad, USA

- **10:00**  
  Time-Domain Measurements for Path-Loss Prediction on a Scaled Model of an Urban Environment  
  D. Erricolo*, P.L.E. Uslenghi, University of Illinois at Chicago

- **10:20**  
  Impulsive Field Computation and Measurement  
  M. Morgan*, Naval Post Graduate School

- **10:40**  
  Progress of Ultra-Wideband Fully-Polarimetric GPR Classification of Subsurface Unexploded Ordnance  
  M. Higgins*, C.C. Chen, Ohio State University, K. O'Neill, US Army Corps of Engineers Research & Development Center

- **11:00**  
  A New Subnano-Second Pulsed Oscillator for Ultra-Wideband Applications  
  J. S. Lee*, C. Nguyen, T. Scullion, Texas A&M University

- **11:20**  
  E-Pulse Diagnostics for Layered Materials  

**Waveguiding Structures**
Co-chairs: J. Rebollar, Spain and T. Bird, Australia

- **8:00**  
  Rigorous Analysis of the Temperature Characteristics for Ferrite Phase Shifter in Grooved Waveguide  
  W. Che*, E.K. Yung, City University of Hong Kong, J. Ma, Xidian University

- **8:20**  
  A Modified E-Plane Tri-Furcation and its Application to Broadband Triplexers  
  J.M. Rebollar*, J. Esteban, Universidad Politecnica de Madrid

- **8:40**  
  Space-Qualifying a Lightweight Corrugated Horn with Low Sidelobes for Global-Earth Coverage  
  C. Granet, T. Bird*, CSIRO Telecommunications and Industrial Physics

- **9:00**  
  Analysis of the Internal Scattering Field Distribution in an Oversized Rectangular Slotted Waveguide  
  H. Kai*, J. Hirokawa, M. Ando, Toyko Institute of Technology

- **9:20**  
  A Millimeter-Wave Radial Line Slot Antenna Fed by a Rectangular Waveguide Through a Ring Slot  
  K. Sudo*, A. Akiyama, J. Hirokawa, M. Ando, Toyko Institute of Technology

- **9:40**  
  Analysis of a Waveguide Matching Crossed Slot by the Method of Moments Using Numerical Eigenmode Basis Functions  
  T. Hirano*, J. Hirokawa, M. Ando, Toyko Institute of Technology
10:00 Millimeter Wave Antennas Fed by High Permittivity LSE-NRD Guide
F. Kuroki*, M. Yamaguchi, Kure National College of Technology, T. Yoneyama, Tohoku Institute of Technology

10:20 Multipaction Analysis and Power Handling Evaluation in Waveguide Components for Satellite Antenna Applications
M. Ludovico*, G. Zarba, L. Accatino, CSELT, D. Raboso, ESA-ESTEC, Noordwijk

10:40 A Simple and Effective Method to Analyze Field Distribution in Curved Dielectric Waveguides
M. Kaiyu*, X. Shanjia, University of Science & Technology of China

11:00 Loss Characteristics of Flexible Cylindrical Dielectric Waveguides in Millimeter Wave Band

11:20 Improved Waveguide Filters For Applications Involving Circular Polarization
J. Bornemann*, University of Victoria, S. Amari, Royal Military College of Canada

Tuesday Morning
URSI B

Applications of Numerical Methods
Co-chairs: C. Furse, USA and D. Sullivan, USA

8:00 Broadband Dispersion Compensation Scheme for FDTD in Anisotropic, Layered Media
C. Moss*, MIT, F.L. Texeira, The Ohio State University, A. Kong, MIT

8:20 FDTD Analysis of Microstrip Antennas Immersed in Anisotropic Space Plasma
J. Ward*, C. Furse, C. Swenson, Utah State University

8:40 Thin Wire Hybrid FETD/FDTD Broadband Antenna Prediction
N. Montgomery*, R. Hutchins, TRW S&ITG, D.J. Riley, Sandia National Laboratories

9:00 Analysis of Scattering from a Large Arbitrary-Shaped Conducting Cylinder by Iterative FEM with Fast Multipole Updates
J. Park*, J. Lee, H. Chae, S. Nam, Seoul National University

9:20 Pulsed Radiation by Periodic Structures via a Combined (Time Domain-Floquet Wave) - (FDTD) Algorithm
F. Capolino*, Universita di Seina, G. Marrocco, D.I.S.P. Universita di Roma,

9:40 ALPEN - A Versatile FDTD Tool for Analyzing Microstrip PCB Circuits
F. Rivas*, Universidad de Jaen, I. Gonzalez, Universidad de Alcala, W. Yu, N. Farahat, R. Mitra, Pennsylvania State University, F.Saez de Adana, O. Gutierrez, Universidad de Alcala, J.P. Roa, Universidad de Jaen, M.F. Categra, Universidad de Alcala

10:00 Numerical Modeling of Electromagnetic Wave Scattering by Multi Parametrical Structures
A. Perov*, Institute of Radiophysics & Electronics, M. Monod, R. Rouveure, M. Chanet, CEMAGREF

10:20 Highly Efficient Numerical Analysis of an Open Hemispherical Resonator
M. Rewierski*, MIT, M. Mrozowski, Technical University of Gdansk

10:40 Low Complexity Model Order Reduction for FDTD/FIT Systems
T. Wittig*, I. Munteanu, R. Schuhmann, T. Weiland, Darmstadt University of Technology

11:00 FDTD Simulation of Subsurface Water Conductivity Mapping
D. Sullivan*, M. Kerschbaum, University of Idaho, J. Morrison, Bechtel BBWI

11:20 Macromodeling of Transmission Line Networks in the FDTD Technique Using the Equivalent Source Method
I. Rumsey*, M. Piket-May, University of Colorado at Boulder

Tuesday Morning
AP

Reflector and Feed Designs
Co-chairs: A. Zaghloul, USA and S. Duffy, USA

8:00 Reflector Antenna Solutions for Multisatellite DBS Reception
A. G. Pino*, E.T.S.I. Telecomunicacion. Campus Universitario, F. Ares, Universidade de Santiago de Compostela,

8:20 Comparison of Two Flat Reflector-Type Designs for Dual-Polarization, Dual-Band Operation
S. Duffy*, S. Targonski, MIT Lincoln Laboratory

8:40 Design of Terrestrial Sector-Beam antennas Using Advanced Spacecraft Contoured Beam Synthesis Software
H.H. Viskum*, TICRA
9:00 A Dual-Band Feed System for the Parkes Radio Telescope  

9:20 Multibeam Earth Station Antenna for a European Teleport Application  

9:40 Design and Experimental Validations of a New FSS Conformal Subreflector Structure for Cassegrain Systems  

10:00 Simple Design Method of Feed Cluster for Array-Fed Reflector Type Multi-Spot Beam Antennas  
I. Naito*, S. Makino, N. Miyahara, Mitsubishi Electric Corporation

10:20 Multi-Modeled Horns in Reflector Antenna Systems Exemplified by the Planck Telescope  
T. Bondo*, S. Sorensen, P. Nielsen, K. Pontoppidan, TICRA

10:40 Ultra-Wide Band Corrugated Gaussian Profiled Horn Antenna Design  
J. Teniente-Vallinas*, R. Gonzalez-Garcia, C. del-Rio-Bocio, Public University of Navarre

11:00 A Compact Low-Cross-Polarization Horn Antenna with Serpentine-Shaped Taper  
H. Deguchi*, M. Tsuji, H. Shigesawa, Doshisha University, S. Matsumoto, Mitsubishi Electric Corporation

11:20 85 - 115 GHz Corrugated Conical Horn Antenna for the Radio Telescope System  
T. Son*, Soochunghyang University, S.T. Han, Korea Astronomy Observatory, B. Lee, Soochunghyang University

11:40 Genetic Algorithm Synthesis of a Shaped Dual-Reflector Antenna  
A. Armogida, G. Manarri, A. Monorchio, P.L. Nepa, G. Rossi, University Of Pisa, E. Pagana, Antenna Consultant

Tuesday Morning AP Special Session  Conformal Antennas  Session 43

Conformal Antennas  
Co-chairs: W. Weisback, Germany, L. Kempel, USA and R. Mittra, USA

8:00 Modeling Conformal Antennas on Prolate Spheroids Using the Finite Element-Boundary Integral Method  
C. Macon*, L. Kempel, Michigan State University, S. Schneider, Air Force Research Laboratory-Wright-Patterson

8:20 Reconfigurable Conformal Slot Arrays on Artificial Substrates  
Y. Erdemli*, J. Volakis, University of Michigan, D. Wright, R. Gilbert, Sanders, A Lockheed Martin Company

8:40 An Analysis of Mutual Coupling on Doubly Curved Convex Surfaces  
L. Josefsson, P. Persson*, Royal Institute Of Technology

9:00 Cylindrical Waveguide Array Covered by Dielectric Layers  
K. Idal*

9:20 Reduced Complexity Analysis of Microstrip Patch Arrays, Conformally Mounted to a Cylindrical Conducting Surface  
H. Anastassiu, A. Kostaridis, C. Binaris*, D. Kaklamani, National Technical University of Athens

9:40 Low Cost Conformal Phased Array Antenna Using High Integrated SiGe-Technology  
D. Loffler*, W. Wiesbeck, Universitat of Karlsruhe, M. Eube, IMST GmbH, K.B. Schad, University of Ulm, E. Ohnmacht, STN-Atlas Electronic

10:00 Analysis of a Conformal Cavity-Backed Patch Antenna Using a Hybrid MoM/FEM Technique  

10:20 Enabling Technologies for Future Structurally Integrated Conformal Apertures  
S. Schneider*, C. Bozada, R. Dettmner, J. Tenbarge, Air Force Research Laboratory – Wright-Patterson Air Force Base Air Force Base

10:40 Application of FDTD Method to Conformal Patch Antennas  
W. Yu*, N. Farahat, R. Mittra, Pennsylvania State University

11:00 A Radiation Pattern Synthesis Technique for Conformal Antenna Arrays on PEC Circular Cylinders of Finite Length  

11:20 Moment Method Analysis of Circular-Cylindrical Array of Waveguide Elements Covered with a Radome  
Z. Sipus*, University of Zagreb, M. Lanne, Ericsson Microwave Systems, S. Rupcic, University J.J. Strossmayer of Osijek, L. Josefsson, Ericsson Microwave Systems

11:40 A Synthesis Technique for Radiation Patterns Due to Conformal Antenna Arrays on PEC Circular Cylinders of
**Time Domain Antennas**

Co-chairs: F. Capolino, Italy and D. Lamensdorf, USA

8:00  Narrow-Waisted Gaussian Beam Discretization for Pulsed Radiation from 2D Large Apertures  
V. Galdi*, L. Felsen, D. Castanon, Boston University

8:20  Time Domain Analysis of Pulse-Excited Reflector Antennas - UAT Approach  
C. Rego*, DELT UFMG, F. Hasselmann, CETUC - PUC RJ

8:40  Time-Domain Green's Functions for the Source of HMD in Multi-layered Structures  
S.Q. Li*, C.H. Chan, M.Y. Xia, Y. Xu, City University of Hong Kong

9:00  Transient Analysis of a Canted Sector Antenna with the Modeling of Fine Feed Features  
N.W. Chen*, K. Aygun, E. Michielssen, University of Illinois at Urbana-Champaign

9:20  Estimation of the Waveform of Voltage Exciting a Monopole Antenna to Confirm Magnetic Field Measurement  
L. Hamada*, N. Otonari, T. Iwasaki, University of Electro-Communications

9:40  A New Time Domain Field Computation Due to Vertical Magnetic Dipole in the Vicinity of a Planar Dielectric Interface Based on Approximation Method  
G. Rafi*, Zanjan University, R. Moini, Amirkabir University of Technology, R. Faraji-Dana, University of Tehran

10:00 Transient Response of a Thin Wire Buried in a Real Ground  
D. Poljak*, V. Roje, University of Split

10:20 Pulsed Communications Between Dipoles  
C. Bantin*, C.C. Bantin & Associates Ltd

10:40 The Development of Electromagnetic Pulse Well Logging System and Its Experiment Studies  
P. Jin*, Y. Yongfu, N. Zaiping, Y. Deqiang, University of Electronic Science and Technology of China

11:00 Pulsed Radiation by a Phased Semi-Infinite Periodic Planar Array of Dipoles  
F. Capolino*, Universita di Siena, L. Felsen, Boston University

11:20 DOA Finding of a Single Short Pulse by the Waveform Reconstruction Using Three Dipole Antennas  
M. Ishii*, T. Iwasaki, University of Electro-Communications
Tribute to Professor R.W.P. King
Co-chairs: S. Long, USA and G. Smith, USA

1:00  Sixty Years at Harvard: The Career of Professor Ronald W.P. King
S. Long*, University of Houston

1:20  Scattering of a Plane Wave by a Conducting Grounded Half-Cylinder and by a Periodic Surface
C.T. Tai*, University of Michigan

1:40  A Review of Genetic Antennas
E. Altshuler*, Air Force Research Laboratory

2:00  Some Thoughts on Teaching Antenna Analysis at the Introductory Level
G. Smith*, Georgia Institute of Technology

2:20  Inductance of a Practical Shielded Coil
C. Butler*, Clemson University

2:40  Break

3:00  A Novel Microwave Beacon For Coastal Navigation
R. King*, Harvard University

3:20  Comment on Professor King's Microwave Beacon for Coastal Navigation
T.T. Wu*, Harvard University

3:40  Wideband Subarray Systems: Evolution of a Research Area
R. Mailloux*, Air Force Research Laboratory – Hanscom AFB

4:00  Simulation of Electromagnetic Well Logging Tools
L. Shen*, University of Houston

4:20  Submarine Towed Communication Antennas: Past, Present and Future
D. Rivera, Naval Undersea Warfare Center, R. Bansal*, University of Connecticut

Wireless Antennas & Base Station Design
Co-chairs: J. Bernhard, USA and C. Furse, USA

1:00  Switched-Beam Antennas Performance Evaluation in UMTS Vehicular Environments
R. Martinez, D. Martinez, L. de Haro*, M. Calvo, Universidad Politecnica de Madrid

1:20  Characterization of Conductor-Backed CPW-Fed Slot Antenna with Two-Layered Dielectric Substrate
J.P. Jacobs*, J. Joubert, J.W. Odendaal, University of Pretoria

1:40  Multiple Spot Beam Spherical Antenna for High Capacity Fixed Wireless Local Loop
S. Guerouni*, Radiophysics Measurement Institute, A. Cardiasmenos, L-3 Communications ESSCO

2:00  A Biocompatible Antenna for Communication with Implantable Medical Devices
C. Furse*, R. Mohan, A. Jakayar S. Kharidehal, B. McCleod, S. Going, Utah State University

2:20  Methods for Optimizing the Location of a Base Station for Indoor Wireless Communications
Z. Ji*, T. Sarkar, Syracuse University, B.H. Li, Shanghai Jiao Tong University

2:40  Effects of the Human Head and Handset on Antenna Radiation Patterns: A Simplified Model and Fast Algorithm
Y. Huang*, R. Narayanan, University of Nebraska, G. Kadambi, Centurion Wireless Technologies, Inc.

3:00  Application of Characteristic Modes to Antenna Placement on Portable Wireless Devices
D. Strohschein*, K. Sivaprasad, University of New Hampshire, J. Bernhard, University of Illinois at Urbana-Champaign

3:20  Analysis and Measurements of Compact-Size DRA with CPW-Feed
M.S. Al Salameh*, Hashemite University, Y.M.M. Antar, Royal Military College of Canada, G. Seguin, Canadian Space Agency, A. Petosa, Communication Research Center

3:40  NRD Guide Compatible Pyramidal Horn Antenna for Multiple Access Wireless LAN at 60GHz
F. Kuroki*, A. Takada, M. Eguchi, Kure National College of Technology, T. Yoneyama, Tohoku Institute of Technology

4:00  A GSM Fully-Adaptive Antenna System Test-Bed: Unlink Trials
G.F. Cazzatello*, M. Crozzoli, D. Disco, L. Ferrero, CSELT
## Tuesday Afternoon

### Wideband Array Antennas

**Co-chairs:** H. Southall, USA and J. Herd, USA

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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>1:00</td>
<td>Integrated Multi-Frequency Phased Array Antenna</td>
<td>R.S. Tahim*, RST Scientific Research, Inc., J. Foshee, USAF/AFRL Wright-Patterson AFB, K. Chang, Texas A&amp;M University</td>
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<tr>
<td>1:20</td>
<td>Single-Polarized, Dielectric-Free, Vivaldi Tapered Slot Phased Array: Performance Prediction</td>
<td>A. Boryssenko*, D. Schaubert, University of Massachusetts</td>
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<td>1:40</td>
<td>Element for Wide-Band and Very Wide-Angle Phased Arrays</td>
<td>H. Holter*, Royal Institute of Technology</td>
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<td>2:00</td>
<td>4.5:1 Bandwidth Microstrip Notch Array Measured Performance</td>
<td>W. Mohuchy, ITT Industries, P. Beyerle*, A. MacFarland, Mission Research Corporation</td>
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<td>2:20</td>
<td>Wideband Double-Slot Cross-Notch Antenna</td>
<td>Y. Choung*, TRW Space &amp; Electronics Group</td>
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<td>2:40</td>
<td>Broadband TEM Horn Array for FOPEN Radar</td>
<td>J.S. Herd*, P.S. Kao, MIT Lincoln Laboratory</td>
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<td>3:00</td>
<td>A New Design of Frequency Invariant Beamformers</td>
<td>Q. Zeng*, D. O’Shaughnessy, INRS-Telecommunications-University of Quebec</td>
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<td>3:40</td>
<td>A Dual-Polarised Wideband Planar Array for X-Band Synthetic Aperture Radar</td>
<td>A. Parfitt*, N. Nikolic, CSIRO Telecommunications &amp; Industrial Physics</td>
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<td>4:00</td>
<td>Broadband Printed High Gain Antenna with Wide Angle Radiation in Azimuth</td>
<td>D. Nesci*, IMTEL, IHTM-CMTM, V. Brankovic, D. Krupezevic, M. Ratni, GmbH, Stuttgart, Sony International</td>
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<td>4:20</td>
<td>Ultra-Wideband Antenna Arrays</td>
<td>K. Heidary*, Alabama A&amp;M University</td>
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## Tuesday Afternoon

### PBG Structures, Photonic Control

**Co-chairs:** M. Shields, USA and F. Yang, USA

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<th>Time</th>
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<tr>
<td>1:00</td>
<td>Mutual Coupling Reduction of Microstrip Antennas Using Electromagnetic Band-Gap Structure</td>
<td>F. Yang*, Y. Rahmat-Samii, University of California, Los Angeles</td>
</tr>
<tr>
<td>1:20</td>
<td>Step-Like Structure and EBG Structure to Improve the Performance of Patch Antennas on High Dielectric Substrate</td>
<td>F. Yang*, C.S. Kee Y. Rahmat-Samii, University of California, Los Angeles</td>
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<td>1:40</td>
<td>Wide-Band Microstrip Patch Antenna with Planar PBG Structure</td>
<td>M. Rahman*, M. Stuchly, University of Victoria</td>
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<td>2:00</td>
<td>A New PBG Diplexer for a Multi-Band Transceiver Antenna System</td>
<td>T.Y. Yun*, K. Chang, Texas A&amp;M University</td>
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<td>2:20</td>
<td>Planar PBG Structures and Their Applications to Antennas</td>
<td>M. Mollah*, N. Karmakar, Nanyang Technological University</td>
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<td>2:40</td>
<td>Enhanced Performance of an Aperture-Coupled Rectangular Microstrip Antenna on a Simplified Unipolar Compact Photonic Bandgap (UC-PBG) Structure</td>
<td>S. Sharma*, L. Shafai, University of Manitoba</td>
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<td>3:00</td>
<td>A Novel Multilayer Photonic Band-Gap (PBG) Structure for Microstrip Circuits and Antennas</td>
<td>C. Caloz*, C.C. Chang, Y. Qian, T. Itoh, University of California Los Angeles</td>
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<td>3:20</td>
<td>Photonic Band-Gap for a Rectangular Array of Metallic Rods</td>
<td>M.A. Alvarez-Cabanillas*, Instituto Politecnico Nacional</td>
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<td>3:40</td>
<td>A Novel Microstrip Bandpass Filter With Two Cascaded PBG Structures</td>
<td>R. Qiang*, Y. Wang, D. Chen, Southeast University</td>
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4:00 Optically CW-Mode Controlled Microwave Switches with Carrier-Confinement on a Coplanar Waveguide
S.I. Lee*, S.W. Lee, U. Ketprom, Y. Kuga, University of Washington

4:20 Optical Control on HEMT Devices
H. Lim*, A. Alphones, National University of Singapore

Tuesday Afternoon
URSI F
Session 49

Propagation Effects in Satellite & Urban Environments
Co-chairs: C. Spillard, UK and M. Jensen, USA

1:00 On the Spectral Properties of Rain Attenuation Dynamics
A.D. Panagopoulos*, G. Fikioris J.D. Kanellopoulos, National Technical University of Athens

1:20 A Comparison of Empirical and Physical Models for Attenuation and Depolarization Due to Rain
N. Terri*, F. Hastings, ITT Industries

1:40 Calculation of Interface Levels Due to Rain Scatter on a High-Altitude Platform Link

2:00 Propagation Effects in a Low Altitude Radio Link for Interactive Services at 2.4GHZ
M. Ozdemir*, F. Retnasothie, C. Lumbreras, Philips Broadband Networks, E. Arvas, Syracuse University

2:20 Spatio-Temporal Fade Characteristics on a Millimetre-Wave Terrestrial Path
M. Evans*, Radio Science & Propagation Group

2:40 Infrared Satellite Communication Comparisons
P. Christopher*, PFC Associates

3:00 Direction-of-Arrival Statistics of Rain Attenuation Dynamics at 1.9 GHz Based on Measurement and Ray Tracing
T. Su*, H. Ling, The University of Texas at Austin, H. Foltz, The University of Texas At Pan American

3:20 Loss Characteristics in Urban Environment with Different Buildings' Overlay Profiles
N. Blaunstein*, D. Censor, D. Katz, University of the Negev

3:40 Design of Microcells for Mobile Communications Using Genetic Algorithms
I. Gonzalez*, J.A. de Prado, F. Saez de Adana, O. Gutierrez, M.F. Catedra, Universidad de Alcala

4:00 Performance of the V-BLAST Space-Time Coding Algorithm Using Measured Wireless Channel Characteristics
M. Morris, J. Wallace, M. Jensen*, Brigham Young University

Tuesday Afternoon
Fairfax A
Session 50

Multi-Resolution and Higher Order Basis Function Methods
Co-chairs: F. Shubitidze, USA and R. Burkholder, USA

1:00 The Method of Auxiliary Sources for Analysis Low Frequency EM Field Scattering From Composite Object
F. Shubitidze*, K. O'Neill, K. Paulsen, Dartmouth College

1:20 Galerkin-MoM Analysis for Dielectric Scatters by Using Sinusoidal Reaction Technique
D. Koizumi*, Q. Chen, K. Sawaya, Tohoku University

1:40 Interpolatory Basis for Two-Dimensional Scattering Problems
V.V.S. Prakash*, R. Mittra, Pennsylvania State University

2:00 High-Order Method of Moment Method with Point-Based Discretization
S. Gedney*, University of Kentucky

2:20 Point-Based High-Order Moment Method for Thin Wire Scattering and Antenna Analysis
A. Zhu*, S. Gedney, K. Whites, University of Kentucky

3:00 Numerical Integrations in Higher Order Loop-Star Method of Moments for Computational Electromagnetics
J.F. Lee*, R. Burkholder, P. Pathak, R. Lee, Ohio State University

3:20 The Condition Number Issue for EFIE-MoM: Spectral and MR Considerations
P. Pirinoli*, G. Vecchi, Politecnico di Torino

3:40 Analysis of Arrays of Printed Antennas with A 2D Multiresolution Method of Moment

4:00 Fast, High-Order Solution of Surface Scattering Problems
O. Bruno*, L. Kunyansky, California Institute Of Technology
**Applications of Integral Equation Techniques**

Co-chairs: B. Notaros, Korea and B. Kolundzija, Yugoslavia

1:00 Two Numerical Techniques for Analysis of Pyramidal Horn Antennas with Continuous Metallic Ridges
B. Notaros, C. McCarrick*, D. Kasilingam, University of Massachusetts Dartmouth

1:20 Adaptation Capabilities of a Wire Bow-Tie Antenna for Ground Penetrating Radar
A.A. Lestari*, A. Yarovoy, L.P. Ligthart, Delft University of Technology

1:40 Synthetic Function Analysis of Large Printed Structures: The Solution Space Sampling Approach
L. Matekovits*, G. Vecchi, G. Dassano, M. Orefice, Politecnico di Torino

2:00 Using Numerical Techniques in Solving Electromagnetic Problems on Complex Structures
G. Migliozzi, G. Sabba*, D. Tarducci

2:20 A Fast Full-Wave Spatial Domain Analysis of Multi-Port Microstrip Structures Using Closed-Form Green's Function
J.Y. Li*, L.W. Li, B.L. Ooi, P.S. Kooi, M.S. Leong, National University of Singapore

2:40 Analysis of Leakage in Multilayered Microstrip Lines Using Complex Images
J. Bernal*, F. Mesa, F. Medina, Facultad de Fisica, Universidad de Sevilla

3:00 An Efficient Fringe Integral Equation Method for Optimizing the Antenna Location on Complex Bodies
E. Jorgensen* P. Meincke, O. Breinbjerg, Technical University of Denmark

3:20 Iterative Solvers in Frequency Analysis of Complex Structures Based on MoM Solution of Surface Integral Equations
B. Kolundzija*, University of Belgrade, T. Sarkar, Syracuse University

3:40 Optimal Wire-Grid Modeling Based on Conversion of Solid Surface Model
B. Kolundzija*, T. Miodrag, A. Djordjevic, University of Belgrade

4:00 Accuracy Enhancement in the Analysis of Microstrip Patch Antenna Using Integral Equation Moment Method
E. Abdallah*, Electronics Research Institute, H. Elsadek, University of California, E. Hashish, Cairo University

4:20 Numerical Modelling of Whispering Gallery Modes in Parallel-Plates Type Cylindrical Anisotropic Dielectric Resonators
F. Akay*, Cukurova University, Y. Prokopenko, S. Kharkovsky, Usikov Institute for Radiophysics & Electronics National Academy of Sciences

**Antenna Measurement Techniques**

Co-chairs: O.ucci, Italy and S. Costanzo, Italy

1:00 Large Active Phased Array Antenna Calibration Using MCM
T. Gao*, Y. Guo, J. Wang, X. Chen, Nanjing Research Institute of Electronics

1:20 Initial Calibration and Beamforming Results from the Thousand Element Phased-Array
G.A. Hampson*, J.G. bij de Vaate, ASTRON Technical Laboratory

1:40 An Integrated Probe for Planar Near-Field Only Intensity Measurements
S. Costanzo*, G. Di Massa, Universita’ della Calabria

2:00 Planar NF-FF With Direct Optimization-Source Reconstruction Using Amplitude Only Data
F. Las-Heras*, Ciudad Universitaria, T. Sarkar, Syracuse University

2:20 Measurement of a Large Deployable Antenna for Radio Astronomy in Space
T. Takano*, S. Kuroda, Institute of Space and Astronomical Science, N. Kawaguch, National Astronomical Observatory, E. Hanayama, Polytechnic University

2:40 SAMS: Antenna Radiation Pattern Acquisition
J. Korsakissok*, SILCOM, D. Belot, CNES

3:00 A New and Efficient NF-FF Transformation with Spherical Spiral Scanning
O.M.ucci, University of Naples Federico II, C. Gennarelli, F. D’Agostino*, University of Salerno, C. Savarese, Instituto Universitario Navale

3:20 Resolution Enhancement in Antenna Pattern Measurements Using Pulse Modulated Averaging Technique
O. Kilic*, A. Zaghloul, M. Thai, LMGT COMSTAT Laboratories

3:40 A Robust Test Apparatus for Electromagnetic Compatibility Testing and Improvement Utilizing a Network Analyzer
C.W. Paul Huang, Anadigics Inc, C. E. Smith*, University of Mississippi

4:00 A Study of Existing Bistatic Calibration Techniques
A New Measurement Method for Four-Port Scattering Matrix of a Dual-Polarization Antenna
Y.J. Hwang*, T.H. Chu, National Taiwan University

**Inverse Scattering: Techniques**
Co-chairs: Z. Zhang, USA and R. Bloemenkamp, The Netherlands

1:00 Reconstruction of Electrical Conductivity by EBA Enhanced CSI Method
Z.G. Zhang*, Q.H. Liu, Duke University

1:20 Time-Domain Gradient-Type Methods for Inversion of the Subsurface
R. F. Bloemenkamp*, TNO Physics and Electronics Laboratory, P. M. van den Berg, Delft University of Technology

1:40 Full Three-Dimensional Multi-Frequency Electromagnetic Inversion
A. Abubakar, P.M. van den Berg, R.F. Bloemenkamp*, Delft University of Technology

2:00 2.5-D Far-Field Diffraction Tomography Inversion Scheme for GPR That Takes into Account the Planar Air-Soil Interface
P. Meincke*, Technical University of Denmark

2:20 A New Reconstruction Algorithm for Dielectric Cylinders Using FDTD and Design Sensitivity Analysis
Y.S. Chung*, University of Seoul, N.W. Kang, Seoul National University, C. Cheon, University of Seoul

2:40 Estimation of Inhomogeneous Permittivity Profiles of Spherical Objects from Noisy Scattering Measurement Data
M.J. Akhtar*, A.S. Omar, University of Magdeburg

3:00 An Effective Approach for Determining the Convex Envelope of Radiating or Scattering Systems
O.M. Bucci*, A. Capozzoli, G. D’Elia, University of Naples Federico II

3:20 Microwave Cylindrical Reflection Imaging Array for Structural Damage Detection
Y. J. Kim*, University of California-Irvine L. Jofre, Tech University of Catalonia, F. DeFlaviis, M. Feng, University of California-Irvine

3:40 Time-Domain Reconstruction of Moderately Rough Dielectric Interfaces via Quasi-Ray Gaussian Beams
J. Pavlovich*, V. Galdi, W. Karl, D. Castanon, L.Felsen, Boston University

4:00 Image Reconstruction of Impenetrable Cylinders Using Cubic B-Splines and Genetic Algorithms
K. Barkeshli*, M. Mokhtari, N. Mahdavi Amiri, Sharif University of Technology

4:20 A Generalized Regression Neural Network (GRNN) Scheme for Robust Estimation of Target Orientation Using Back-Scattered Data
N. Sarshar*, A. Kabiri, K. Barkeshli, Sharif University of Technology

**Novel Designs for Compact Microstrip Antennas**
Co-chairs: A. Shackelford, USA and M. Deshpande, USA

1:00 Compact Single-Arm Square Spiral Microstrip Antenna with Tuning Arms
J. Bernhard*, University of Illinois at Urbana-Champaign

1:20 Resonance Behavior of Single U-Slot and Dual U-Slot Antenna
R. Bhalla*, L. Shafai, University of Manitoba

1:40 Analysis of Quarter-Wave Shorted Patch Antenna
M. Deshpande*, NASA Langley Research Center

2:00 Simulation of a Probe-Fed Notched Patch Antenna with a Shorting Post
A. Shackelford*, S.Y. Leong, K. F. Lee, University of Missouri-Columbia

2:20 The Folded Patch Omnidirectional Antenna
A. Faraoe*, D. McCoy, Motorola Labs

2:40 Experimental Investigation into an Electrically Small Printed Chakra (Wheel) Antenna
N.C. Karmakar*, S.K. Padhi, Nanyang Technological University

3:00 A Novel H-Shaped Patch Antenna
A. Sheha*, Cairo University, S. Mahmoud, Kuwait University

3:20 Compact Meander-Type Slot Antennas
J.M Kim*, J.G. Yook, Yonsei University, W.Y. Song, Y.J. Yoon, Chongjiu University, J.Y. Park, H.K. Park, LG Electronics Institute of Technology

3:40 A Compact Patch Antenna with an Inverted U-Shaped Radiating Patch
K.L. Wong*, H.C. Tung, National Sun Yat-Sen University
4:00 Designs of Compact Microstrip Antennas with a Slotted Ground Plane  
T.W. Chiou*, K.L. Wong, National Sun Yat-Sen University

4:20 The Koch Island Fractal Microstrip Patch Antenna  
I. Kim*, Yonsei University, T. Yoo, Dongyang Technical College, J.G. Yook, H. Park, Yonsei University

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**Tuesday Afternoon**

**Session 55**

**Adaptive Reflector and Lens Antennas**

Co-chairs: A. Zaghlou, USA and P. Mousavi, Canada

1:00 An Antenna Concept Integrated with Future Solar Sails  
B. Khayatian*, Y. Rahmat-Samii, UCLA, R. Pogorzelski, Jet Propulsion Laboratory

1:20 A Directional Borehole Radar: Numerical and Experimental Verification  
K.W.A. van Dongen*, T&A RADAR, P. M. van den Berg, J. T. Fokkema, Delft University of Technology

1:40 Application of Gaussian Beam in Analysis of Large Adaptive Reflector Cassegrain Configuration  
P. Mousavi*, L. Shafai, The University of Manitoba

2:00 Performance of Offset Large Adaptive Reflector Cassegrain Configuration  
P. Mousavi*, L. Shafai, The University of Manitoba

2:20 Partially Adaptive Phased Array Fed Cylindrical Reflector Technique for High Performance Synthetic Aperture Radar System  
Z. Hussein*, J. Hilland, California Institute of Technology/JPL

2:40 A Hemispheric Coverage Spherical Reflector Scanning Antenna System  
A. Moni*, A. Cardiasmenos, L-3 Communications-ESSCO

3:00 A Zoom Reflector Antenna  
H. Luh*, Space Systems/Loral

3:20 Analysis of Arbitrarily Shaped Dielectric Lens Antenna  
M. Taguchi, M. Masuda*, Nagasaki University, H. Shimoda, TDK Co., K. Tanaka, Nagasaki University

4:00 Scaling and Focusing of the Rotman Lens  
J. Kim*, F. Barnes, University of Colorado at Boulder

4:20 Layered Lens Antennas  
S. Datthanasombat*, A. Prata, University of Southern California, L.R. Amaro, J.A. Harrell, S. Spitz, J. Perret, Jet Propulsion Laboratory

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**Tuesday Afternoon**

**Session 56**

**Analysis of Microstrip Structures**

Co-chairs: R. Shubair, UAE and S. Hammadi, USA

1:00 A Marching-on-in-Time Based Transient Electric Field Integral Equation Solver for Microstrip Structures  
M. Lu*, E. Michielssen, University of Illinois at Urbana-Champaign

1:20 An Integrated Electromagnetic/Lumped Modeling Approach for the Simulation of Large Mutli-Layer MCM Designs  
S. Hammadi*, C.W.P. Huang, S. Ali-Kuran, Anadigics Inc.

1:40 Hybrid MOM-High Frequency Analysis of Large Arrays of Printed Dipoles  
A. Polemi*, A. Cucini, S. Maci, University of Siena

2:00 A Fast Method of Moments Based on A New Closed-Form Green's Function for Microstrip Structures  
Y. Ge, K. Esselle*, Macquarie University

2:20 A Semi-Analytical Formulation for Investigating the Radiation Characteristics of Traveling Wave Slot Antennas  
N. Hojjat*, University of Tehran, S. Safavi-Naeini, University of Waterloo

2:40 A Generalized Method for the Computation of the Outgoing-to-Local Multipole Translators  
Y. Pan*, W. C. Chew, University of Illinois at Urbana-Champaign

3:00 A Hybrid UTD-MoM Approach for the Efficient Analysis of Radiation/Scattering from Large, Printed Finite Phased Arrays  
O. Aydin Civi*, Middle East Technical University, V.B. Erturk, Bilkent University, P. Pathak, P. Janpugdee, Ohio State University, H.T. Chou, Yuan Ze University

3:20 Parallel Computation in Microstrip Reflectarray  
K.W. Lam*, C.H. Chan, City University of Hong Kong
Tuesday Afternoon
URSI B
Session 57

Rough Surfaces and Random Media
Co-chairs: A. Ishimaru, USA and G. Whitman, USA

1:00 Applications of the Unified Full Wave Approach to Backscatter Cross Sections of Two-Scale Pierson-Moskowitz Type Random Rough Surfaces
P. Crittenden*, E. Bahar, University of Nebraska

1:20 An Improved Small-Contrast Perturbation Theory for the Coherent and Incoherent Scattering of X-Rays from a Randomly Rough Metal Surface
T.A. Leskova*, A.A. Maradudin, University of California - Irvine

1:40 2nd Order Statistical EFIE ("S"-EFIE) for Object in the Presence of a "Smooth" Rough Surface
A. Ishimaru*, Y. Kuga, S-W Lee, J.D. Rockway, University of Washington

2:00 Small-Slope Approximation and a Two-Scale Model
A. Voronovich*, NOAA/Environmental Technology Laboratory

2:20 Fast and Accurate Prediction of Scattering from Randomly Rough Ocean-Like Dielectric Surfaces via the Multi-Grid Method
H. Ku*, R. Awadallah, The Johns Hopkins University

2:40 Validity of Asymptotic Models to Simulate L-Band Scattering Over Sea Surface
N. Floury, G. Crone, G. Toso* European Space Agency-ESA ESTEC

3:00 An Improved Method for Determination of Rough Surface Impittance at Very Low Grazing Angles at Microwave Frequencies
R.M. Jha*, R. Janaswamy, Naval Postgraduate School

3:20 Beam-Wave Propagation and Scattering in a Random Medium Half-Space for an Incident Diverging Beam-Wave Using Radiative Transfer Theory

3:40 MLFMA Analysis of Scattering from a Three-Dimensional Rough Dielectric Surface Embedded in an Infinite Dielectric Half Space
Z. Liu*, L. Carin, Duke University

4:00 Reference-Wave Solutions for the High-Frequency Fields in Random Media
R. Mazar* A. Bronshtein, Ben-Gurion, University of Negev

4:20 A Time Domain Signature Investigation for the GPR Detection of Plastic Land Mines Buried in Soils
A. J. Dumanian*, C. M. Rappaport, A. Morgenthaler, Northeastern University
**Wednesday Morning**

**URSI B**

### FDTD and Multi-Resolution Methods

**Co-chairs:** A. Cangellaris, USA and L. Carin, USA

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<td>8:00</td>
<td>Construction of Fast 3D FDTD Boundary Kernels Using 1D Spectral Schemes</td>
<td>K. Yegin*, University of Illinois at Urbana-Champaign; B. Shanker, Iowa State University; E. Michielssen, University of Illinois at Urbana-Champaign</td>
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<td>8:20</td>
<td>Numerical Boundary Conditions at Material Interfaces for High-Order FDTD Schemes</td>
<td>K.P. Hwang*, A. Cangellaris, University of Illinois at Urbana-Champaign</td>
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<td>8:40</td>
<td>Design of Perfectly Matched Absorbers for Low Frequency Scattering Problems</td>
<td>M. Kuzuoglu*, Middle East Technical University; R. Mittra, Pennsylvania State University, H. Jordan, J. Sauer, University of Colorado at Boulder</td>
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<td>9:00</td>
<td>Definition and Conservation of Energy in FDTD Schemes</td>
<td>R. Schuhmann*, T. Weiland, Darmstadt University of Technology</td>
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<td>9:20</td>
<td>Comparison with the Algorithms for Near Zone to Far Zone Transformation in FDTD Computation</td>
<td>Y. He*, Osaka Electro-Communication University</td>
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<td>9:40</td>
<td>Algorithm Study of ADI-FDTD</td>
<td>S. Staker*, M. Piket-May, University of Colorado at Boulder, C. Holloway, Nat'l Institute of Science &amp; Technology-US Dept. of Commerce</td>
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<td>10:00</td>
<td>Experience with ADI-FDTD Techniques on the Cray MTA Supercomputer</td>
<td>M. ElHelbawy*, S. Staker, M. Piket-May, S. Bokhari, H. Jordan, J. Sauer, University of Colorado at Boulder</td>
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<td>10:40</td>
<td>The Finite Difference Multi-Resolution Time Domain (MRTD) in View of the Multi-Resolution Homogenization Theory (MRH)</td>
<td>V. Lomakin*, B. Steinberg, E. Heyman, Tel Aviv University</td>
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<td>11:00</td>
<td>Multiresolution Time-Domain Modeling Using CDF Biothogonal Wavelet Expansion</td>
<td>T. Dogaru, L. Carin*, Duke University</td>
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**Wednesday Morning**

**Commonwealth**

**AP**

### Fast Numerical Techniques for Integral Equations

**Co-chairs:** R. Mittra, USA and K. Mei, Hong Kong

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<td>8:00</td>
<td>Analyzing the Waveguide Problems with a Relaxed Iterative Domain Decomposition Method</td>
<td>H.Q. Zhu*, Y. Long, Z.D. Wu, University of Electronic Science and Technology</td>
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<td>8:20</td>
<td>Multi-Frontal Preconditioners for Iterative Solvers</td>
<td>V.V.S. Prakash*, R. Mittra, Pennsylvania State University</td>
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<td>8:40</td>
<td>New Iterative OSMEI Technique to Decompose MoM Matrix of 3D Acoustic Scattering Problem</td>
<td>J. Ma*, Xidian University, W. Che, K.K. Mei, Y.W. Liu, City University of Hong Kong</td>
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<td>9:00</td>
<td>A Fast Evanescent Wave Algorithm</td>
<td>W. Chew, J.L. Jiang*, S. Velamparambil, University of Illinois at Urbana-Champaign</td>
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<td>9:20</td>
<td>Fast Capacitance Computation Using Three-Dimensional Second-Kind Integral Equation and AIM</td>
<td>C.F. Wang*, L.W. Li, B.L. Ooi, P.S. Kool, M.S. Leong, National University of Singapore</td>
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<td>9:40</td>
<td>A Precorrected-EFT Approach for Capacitance Extraction of General Three-Dimensional Structures</td>
<td>X. Nie*, L. Li, N. Yuan, National University of Singapore</td>
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<td>10:20</td>
<td>Crosstalks Between Lossy Conducting Structures</td>
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Wednesday Morning
AP  Session 60

Environmental and Health Effects in Communication Antennas
Co-chairs: H. Aumann, USA and T. Moore, USA
8:00 Effect of Ground Plane Shape on Microstrip Antenna Performance for Cell-Phone Applications
V. Natarajan*, D. Chatterjee, K-F Lee, University of Missouri-Columbia at Kansas City, R.D. Swanson, Honeywell Federal Manufacturing & Technologies
8:20 The Effect of Conformality on the Electrical Properties of Small Antennas
P. Kabacik*, A. Kucharski, Wroclaw University of Technology
8:40 Investigations on Radiation Q of Integrated Handset Antennas
M. Geissler*, M. Gerhrt, D. Heberling, P. Waldow, I. Wolff, IMST GmbH
9:00 Material Reflector for Cellular/PCS Antenna Applications
R.G. Rojas*, K.W. Lee, The Ohio State University
9:40 Cylindrical Non-Homogeneous Anisotropic Lenses Using Artificial Media
M. Silveirinha*, C. Fernandes, Instituto Superior Tecnico
10:00 Antenna-Radome Interaction of 2GHz Band 120 Degrees Beam Antenna
H. Jiang*, H. Arai, Yokohama National University, Y. Ebine, NTT DoCoMo Inc.
10:20 Chassis Influence on the Input Impedance and SAR Characteristics of Handset Antennas
W. Dou*, M.Y.W. Chia, National University of Singapore
10:40 Experimental Study of the Interactions Between Terminal Antennas and Operators
A. Byndas*, A. Kucharski, P. Kabacik, Wroclaw University of Technology
11:00 Estimation of the Radiation and SAR Characteristics of the NHA at 150 MHz by Use of the Cylindroid Whole Body Phantom
Y. Koyanagi*, Matsushita Communication Industrial Co., Ltd, H. Kawai, Chiba University, K. Ogawa, Matsushita Electric Industrial Co., Ltd. H. Yoshimura, K. Ito, Chiba University
11:20 Numerical Analysis of Absorption Mechanisms for Mobile Phones with Integrated Multiband Antennas
D. Manteuffel*, A. Bahr, IMST GmBH, P. Waldow, I. Wolff, Gerhard Mercator University Duisburg
11:40 Electromagnetic Field Coupling Between Cellular Phones Using FDTD Analysis
A.K. Hamid*, University of Sharjah, M. AlSunaidi, King Fahd University of Petroleum & Minerals

Wednesday Morning
AP  Session 61

Characterization of Propagation Channels
Co-chairs: M. Jensen, USA and T. Hatsuda, Japan
8:00 Experimental Characterization of the MIMO Wireless Channel
J. Wallace*, M. Jensen, Brigham Young University
8:20 Characteristics of Measured 4x4 and 10x10 MIMO Wireless Channel Data at 2.4-GHZ
J. Wallace*, M. Jensen, Brigham Young University
8:40 Spatio-Temporal Analysis of Rainfall Rate for the Prediction of Slant Fade Duration Statistics
A.D. Panagopoulos*, J.D. Kanellopoulos, National Technical University at Athens
9:00 Influence of Rain Attenuation Models on the Link Availability of Ka-Band Non-GSO FSS System
9:20 Moderate Rain Rate Characterisation for Small Fade Margin Systems
A. Rocha* J. Neves, University of Aveiro
9:40 Seasonal and Diurnal Effects on Ku-Band Site-Diversity Performance Measured in a Rainy Tropical Region
Q.W. Pan*, Manukau Institute of Technology, J.E. Allnutt, George Mason University
### Wednesday Morning

#### Hampton

**AP Session 62**

**Fractal Antennas**

Co-chairs: D. Werner, USA and Y. Rahmat-Samii, USA

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<td>8:00</td>
<td>Modified Sierpinski Gasket Patch Antenna for Multiband Applications</td>
<td>J. Yeo, R. Mittra*, Pennsylvania State University</td>
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<td>8:20</td>
<td>Shorted Fractal Sierpinski Monopole Antenna</td>
<td>P. Song, P.S. Hall*, H. Ghafoori-Shiraz, University of Birmingham, I. Henning, Nanyang Technological University</td>
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<td>8:40</td>
<td>A Modification of Small Loop Approximation for Fractal and Bent Wire Loop Antennas</td>
<td>S. Best*, Cushcraft Corporation</td>
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<td>9:00</td>
<td>The Fractal Loop Antenna: A Comparison of Fractal and Non-Fractal Geometries</td>
<td>S. Best*, Cushcraft Corporation</td>
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<td>Scaling Property of the Koch Fractal Dipole</td>
<td>P. Tang*, National Aeronautics and Space Administration, P. Wahid, University of Central Florida</td>
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<td>A Modified Quasi-Yagi Planar Antenna with Wideband Characteristics in C-Band</td>
<td>C. Ha*, Kumoh National University of Technology, Y. Qian, T. Itoh, University of California, Los Angeles</td>
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<td>10:00</td>
<td>Analysis of Fractal-Shaped Antennas Using the Multiperiodic Traveling Wave Vee Model</td>
<td>C. Puente, J. Soler*, FRACTUS, S.A.</td>
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<td>10:40</td>
<td>A Rectangular Cavity Backed Slot Antenna with Parasitic Slots</td>
<td>T. Kotani*, K. Hirasawa, S. Shi, University of Tsukuba, Y. Chang, Union College</td>
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#### Fairfax B

**AP Session 63**

**Finite Element Methods**

Co-chairs: J. Volakis, USA and M. Davidovits, USA

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<td>8:00</td>
<td>Input Impedance Characteristics of Tapered Slot Antennas</td>
<td>E. Topsakal*, R. Kindt, K. Sertel, J. Volakis, University of Michigan</td>
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<td>8:20</td>
<td>Optimal Coil Design for Well-Logging Applications</td>
<td>J. Goswami*, B. Underwood, D. Omeragic, J. Tabanou, Schlumberger Oilfield Services</td>
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<td>8:40</td>
<td>Time-Domain Finite Element Modeling of Dispersive Media</td>
<td>D. Jiao*, J. M. Jin, University of Illinois at Urbana-Champaign</td>
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<td>9:00</td>
<td>Systematic Method for Finding a Hierarchical Vector Finite Element of any Order Using the Nedelec Criteria and a Webb Basis</td>
<td>R. D. Stone*, J.F. Lee, R. Lee, Ohio State University</td>
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<td>9:20</td>
<td>SSOR Preconditioned Conjugate Gradient Method for Solution of Large Sparse Linear Equations from Vector FEM</td>
<td>R.S. Chen*, Nanjing University of Science and Technology, E. Yung, University of Hong Kong.</td>
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<tr>
<td>9:40</td>
<td>Trilinear Hexahedral Finite Elements with Higher-Order Polynomial Field Expansions for Hybrid SIE/FE Large-Domain Electromagnetic Modeling</td>
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</table>
Wednesday Morning  
URSI B  
Session 64  
Guiding Structures and Circuits I  
Co-chairs: A. Mathis, USA and A. Neto, USA  
8:00  The Nature of the Current Excited by a Source on Microstrip Line  
F. Mesa*, University of Seville, D.R. Jackson, University of Houston  
8:20  Hertz Potential Green's Function Representing a Volume Current Source in A Generalized Stripline Structure  
D. Infante*, The Aerospace Corporation, D. Nyquist, Michigan State University  
8:40  Difficulties of the Quasi-TEM Extraction Model and Definition of a General Representation of Longitudinal and Transversal Couplings  
S. Wane*, ENSEEIHT, D. Bajon, SUPAERO, H. Baudrand, ENSEEIHT, P. Gamand, Philips Semiconductors  
9:00  The Electromagnetic Theory of Wave Propagation in Microstrip Structures  
T.A. Leskova*, D.L. Mills, University of California, Irvine  
9:20  Extrapolation Methods for a Class of Inverse Fourier Integraals  
A. Mathis*, Ansoft Corporation  
9:40  Field Distribution in Metal-Insulator-Semiconductor (MIS) Transmission Lines  
N. Wongkasem*, T.C.K. Rao, University of Massachusetts, Lowell  
10:00  Mode Coupling and Cutoff Behavior in Planar Anisotropic Dielectric Waveguides  
A. Yakovlev*, University of Mississippi, G. Hanson, University of Wisconsin-Milwaukee  
10:20  Steepest Descents Evaluation of Asymmetric Planar Dielectric Waveguide Field  
J. Lee*, D. Nyquist, Michigan State University  
10:40  Ultra Low Loss Ceramic Ribbon Waveguides for Millimeter/Submillimter Wave  
C. Yeh*, F. Shimabukuro, P. Stanton, V. Jannejad, W. Imbriale, F. Manshadi, California Institute of Technology/JPL  
11:00  Characteristic Impedance Calculation of Microstrip Line on Ferrite-Dielectric Substrate Using the Method of Lines  
I. Barseem*, E. Abdallah, Electronics Research Institute, E. Hashish, M. EL-Said, Cairo University, H. Taher, Electronics Research Institute  
11:20  An Analytic Approach for the Linvill Method  
W.N. Amaral Pereira*, M. Silveira, INATEL  

Wednesday Morning  
AP  
Session 65  
Array Systems and Applications  
Chair: S. Duffy, USA  
8:00  Full Wave CAD Oriented Technique for the Analysis of Airborne Flat Plate Arrays  
S. Chiarandini*, Elettronica Aster S.p.A., A. Morini, Universita di Ancona  
8:20  Graphical Representations of Radiation Patterns of Phased Arrays Using Digital Phase Shifters  
M. Clenet*, G.A. Morin, Defence Research Establishment Ottawa  
8:40  Optical SCM Transmission Multiplexing IF and Local Signals for Adaptive Array  
O. Shibata*, I. Seto, S. Obayashi, H. Shoki, Toshiba Corporation  
9:00  DBF Array Antenna Systems at 8.45 GHz  
K. Mori*, Y. Inoue, M.Kim, K. Ichige, H. Arai, Yokohama National University  
9:20  Collocated-Antenna Arrays: Application to Digital Communications in HF  
A. Bisiaux*, D. Lemur, L. Bertel, University of Rennes
Wednesday Morning
URSI B
Rough Surface Scattering I
Co-chairs: J. Johnson, USA and M. El-Shenawee, USA

10:00 Diffuse Intensities of Electromagnetic Waves in a Layer of Randomly Inhomogeneous Medium Bounded by Randomly Rough Surfaces
S. Mudalier*, Arcon Corp.

10:20 Non Local Small Slope Approximation Technique TE and TM Solutions Including The Grazing Angles
G. Berginc*, Thales Optronique, Y. Beniguel, IEEA, France

10:40 Backscattering Enhancement Study with the Non Local Small Slope Approximation Method for Scattering of Vector Waves from Randomly Rough
A. Soubret*, G. Berginc, Thomson-CSF Optronique, C. Bourrely, Centre de Physique, CNRS-Luminy

11:00 Scattering by Two-Dimensional Rough Surfaces: Comparison Between Moment Method and Small Slope Approximation
G. Soriano*, C.-A. Guerin, M. Saillard, Institut Fresnal

11:20 Iterative PE Techniques for Rough Surface Scattering
M.F. Levy*, Rutherford Appleton Laboratory, UK

11:40 An Improved FB/NSA Algorithm for the Computation of Scattering from Two-Dimensional Extremely Large-Scale Perfectly Conducting Rough Surfaces
D. Torrungrueng*, J.T. Johnson, Ohio State University

Wednesday Morning
AP
Mutual Coupling, Surface Waves, and Conformal Microstrip Antennas
Co-chairs: R. Ramirez, USA and M. Thiel, Germany

8:00 Electric Green's Dyadics for Modeling Resonance and Surface Wave Effects in a Waveguide-Based Aperture-Coupled Patch Array
A. Yakovlev*, University of Mississippi, S. Ortiz, M. Ozkar, A. Mortazawi, M. Steer, North Carolina State University

8:20 CPW Slot Antenna for TM Slab Mode Excitation
H.F. Hammad, A.P. Freundorfer Queen's University, Y.M.M. Antar*, Royal Military College of Canada

8:40 A Mutual Coupling Study of Circular Polarized Microstrip Antennas With Applications to Diversity Combining Mobile Communications
R. Ramirez*, F. De Flavis, University of California, Irvine

9:00 Mutual Coupling Between Reduced Surface Wave Antennas in an Array
R.L. Chen*, D.R. Jackson, J.T. Williams, S.A. Long, University of Houston

9:20 Efficient Technique for Mutual Coupling Calculations Between Apertures on a PEC Circular Cylinder Covered with a Dielectric Layer
P. Persson*, Royal Institute Of Technology, R.G. Rojas, Ohio State University

9:40 Paraxial Space-Domain Formulation for Surface Fields on Large Dielectric Coated Circular Cylinders
V.B. Erturk*, Bilkent University, R.G. Rojas, Ohio State University

10:00 Radiation Characteristics of a 2D Periodic Leaky-Wave Antenna Using Metal Patches or Slots
T. Zhao*, D.R. Jackson, J.T. Williams, University of Houston, H.Y. Yang, University of Illinois at Chicago

10:20 Microstrip Antennas on Multilayer Cylindrical and Quasi-Cylindrical Structures
M. Thiel*, A. Dreher, German Aerospace Center (DLR)

10:40 A Reduced Surface-Wave Twin Arc-Slot Antenna Element on Electrically Thick Substrates
M. Qiu*, G. Eleftheriades, M. Hickey, University of Toronto

11:00 Eigensolution Expansion of Dyadic Green's Function for the Analysis of Microstrip Antennas on Cylindrical Sector Multilayer Structures
M. Thiel*, A. Dreher, German Aerospace Center (DLR)

11:20 Theoretical and Experimental Study of Rectangle Patches Mounted on Multilayer Circular Cylinder
S. Raffaelli*, Chalmers University of Technology, Z. Sipus, University of Zagreb, P.-S. Kilidal, Chalmers University of Technology
**Broadband Microstrip Antennas II**

Chair: N. Herscovici, USA

8:00 Techniques for Bandwidth Optimization of Probe-Fed Microstrip Antennas on Small, Finite Ground Planes
D. Chatterjee*, V. Natarajan, University of Missouri-Columbia at Kansas City, K.F. Lee, University of Mississippi, X. Wang, University of Missouri-Columbia at Kansas City

8:20 Wide Band High Gain EMC Patch Active Array Elements with Low Mutual Coupling
U.K. Revankar*, Harischandra, K. Sreenivasulu, K.M. Veerabhadra, Electronics and Radar Development Establishment, India

8:40 Enhanced Radiation Performance of Broadband Suspended Plate Antenna
Z. N. Chen*, M.Y.W. Chia, National University of Singapore

9:00 Wideband Orthogonal Square Monopole Antennas with Semi-Circular Base

9:20 Frequency Tuning of Slot-Loaded Rectangular Patch Antenna with Tuning Stubs and Gaps

9:40 A Capacitor-Loaded Broadband Circular Patch Antenna
M.C. Liang*, W.C. Lai, Y.M. Yen, Y.L. Kuo, I-Shou University

**EM Properties of Materials**

Chair: M. Afsar, USA

10:00 Error Estimate for Free-Space Dielectric Measurement Systems
L.E. Rickard Petersson*, G.S. Smith, Georgia Institute of Technology

10:20 Design of an Absorbing Mounting Plate for a Low Reflection Level
J.E. Roy*, Communications Research Centre Canada

10:40 Permittivity Measurement Technique for a Dielectric Strip Using a Rectangular Waveguide
T. Chiu*, National Central University

11:00 Millimeter Wave Transmittance and Diffractive Scattering of Radome Membranes
M. Afsar*, I. Tkachov, Tufts University

11:20 Effective Constitutive Parameters of a Sparse Medium Containing Randomly Distributed Chiral Spheres
Y. Nanbu*, Sasebo National College of Technology, W. Ren, McMaster University, T. Matsuoka, M. Tateiba, Kyushu University

11:40 Calculating Radiation Force on Carbon Fiber Gossamer Space Sailcraft
K. Whites*, University of Kentucky, T. Knowles, Energy Science Laboratories, Inc.

**Inverse Scattering**

Co-chairs: H. Ling, USA and M. Morgan, USA

8:00 Comparison of Colton-Kirsch Linear Sampling with Linearized Tomographic Inverse Scattering
M. Brandfass*, Aero-Sensing Radar Systeme GmBh, K. Warnick, Brigham Young University

8:20 Shape Reconstruction of Metallic Objects with Strong Multiple Scattering Using Genetic Algorithm
Y. Zhou*, H. Ling, The University of Texas at Austin

8:40 Localization and Determination of an Optimal Sphere for 3D Objects
H. Tortel*, M. Saillard, Institut Fresnel

9:00 3-D Radar Image Formation from Undersampled Aspect Data Using Adaptive Feature Extraction
J. Li*, H. Ling, The University of Texas at Austin

9:20 Null Spaces for Near Field Imaging
M. Morgan*, D. Steenman, Naval Postgraduate School

9:40 Reconstruction of 3D Lossy Media by using Microwave Measurements
Z. Q. Zhang*, Q. H. Liu, Duke University
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Institution</th>
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<tbody>
<tr>
<td>10:00</td>
<td>Geophysical Analysis of Cross-Borehole Propagation and Reflection Using Triaxial Sources</td>
<td>C. Pendley*, C. Furse, A. Tripp, V. Rayala</td>
<td>Utah State University</td>
</tr>
<tr>
<td>10:40</td>
<td>An Electromagnetic Inversion Algorithm to Detect Neural Activity Using MEG</td>
<td>F. Borelli*, O.P. Gandhi</td>
<td>University of Utah, G. D'Inzeo, University of Rome</td>
</tr>
<tr>
<td>11:00</td>
<td>Microwave Imaging on an Arbitrary Tilted Plane by a Scalar Inverse Scattering</td>
<td>T. Hasegawa*, T. Iwasasaki</td>
<td>The University of Electro-Communications</td>
</tr>
<tr>
<td>11:20</td>
<td>FDTD Analysis of Spinal Cord Response to Plane Wave Incidence</td>
<td>S. Balaguru*, M. Hashemkhani, B.P. Kumar</td>
<td>California State University-Sacramento, G.R. Branner, University of California, Davis</td>
</tr>
<tr>
<td>11:40</td>
<td>The Use of Superresolution Methods for Inverse Scattering - Implications for Imaging Strongly Scattering Targets</td>
<td>M. Testorf, A. Morales-Porras, M. Fiddy</td>
<td>University of Massachusetts-Lowell</td>
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**Wednesday Morning Clarendon Session 71**

### PCS Antenna Characterization and Measurements

Chair: M. Shields, USA

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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tr>
<td>8:00</td>
<td>Measurements and Numerical Evaluation of the Electric Field in the Near-Zone of Radio Base Station Antennas</td>
<td>F. Davide, G. Paolo, S. Renato*, V. Roberto</td>
<td>CSELT</td>
</tr>
<tr>
<td>9:20</td>
<td>Effects of Antenna Radiation Pattern on the Performance of the Mobile Handset</td>
<td>K. Sulonen*, P. Vainkainen</td>
<td>Helsinki University of Technology</td>
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**Wednesday Morning Clarendon Session 72**

### Polarization Methods for PCS and Wireless

Chair: M. Kar, USA

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Institution</th>
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<tbody>
<tr>
<td>10:00</td>
<td>Two-Branch Space and Polarization Diversity Schemes for Dipoles</td>
<td>M. Kar, P. Wahid*, University of Central Florida</td>
<td></td>
</tr>
<tr>
<td>10:20</td>
<td>A Polarization Diversity Antenna by Printed Dipole and Patch with a Hole</td>
<td>N. Michishita*, H. Arai</td>
<td>Yokohama National University</td>
</tr>
<tr>
<td>10:40</td>
<td>Curl Antennas over Electromagnetic Band-Gap Surface: A Low Profiled Design for CP Applications</td>
<td>F. Yang*, Y. Rahmat-Samii</td>
<td>University of California, Los Angeles</td>
</tr>
<tr>
<td>11:00</td>
<td>Blockage/Shadowing and Polarization Measurements at 2.45 GHz for Interference Evaluation between Bluetooth and IEEE 802.11 WLAN</td>
<td>A. Kara*, Allim University, H. Bertoni, Polytechnic University,</td>
<td></td>
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<tr>
<td>11:20</td>
<td>Theory and Experiment of A Circularly Polarized Conical Beam Spherical Slot Array Antenna</td>
<td>C. Phongcharoopenanich*, M. Krairiksh</td>
<td>King Mongkut's Institute of Technology J-I. Takada, Tokyo Institute of Technology</td>
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**Wednesday Morning Beacon B Session 73**

### Microstrip Antennas with CPW Feeds

Chair: S. Targonski, USA

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<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>8:00</td>
<td>A New Type of Dual Frequency CPW-Coupled Patch Antenna Configurations</td>
<td></td>
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</tr>
</tbody>
</table>
K. Hettak*, Communications Research Centre, G. Delisle, Laval University, M.G. Stubbs, Communications Research Centre

8:20 Wideband U-Slot Microstrip Antenna Using CPW Feed
J. I. Lee*, Y. J. Yoon, Yonsei University

8:40 CAD Formulas and Their Inverses for Microstrip, CPW and Conductor-Backed CPW, by Successive Synthetic Asymptotes
W. Tang, Y. Chow, City University of Hong Kong

9:00 Analysis of CPW-Fed Triangle Patch Antennas
S. M. Deng*, H. H. Kan, Ta Hwa Institute of Technology

9:20 Coplanar Patch Antennas: Principle, Simulation and Experiment
K. Li*, C.H. Cheng, T. Matsu, M. Izutsu, Communications Research Laboratory

9:40 Wideband Coplanar Waveguide Fed Coplanar Patch Antenna
K.F. Tong*, K. Li, T. Matsu, M. Izutsu, Communications Research Laboratory

Wednesday Morning
Beacon B
Session 74

Circular Polarized Microstrip Antennas
Chair: J. Herd, USA

10:00 A Novel Planar Polarizer Feed Network for Dual Circular Polarization

10:20 A Multi-Layer Circularly Polarized Microstrip Patch Antenna with Proximity Coupling and Increased Gain
M. Zawadzki*, California Institute of Technology/JPL

10:40 Stacked Microstrip Antennas for Broadband Circular Polarization
K.T.V Reddy*, G. Kumar, I.I.T. Bombay

11:00 Compact Circularly Polarized Pentagon-Shaped Microstrip Antenna with Bent Slots
W-S. Chen*, H-D. Chen, Cheng Shiu Institute of Technology

11:20 Aluminum Planar Antennas Circularly Polarised on Glass Substrate
M. Bourry*, M. Drissi, L.C.S.T / I.N.S.A de Rennes
**Novel Antennas for Mobile Communications**  
Co-chairs: T. Moore, USA and H. Aumann, USA

1:00 An Unequally Spaced Array Antenna for Mobile Base Stations  

1:20 Dual Band Antenna Mounted On Chip Case  
G. Ma*, P. Gardner, P.S. Hall, University of Birmingham

1:40 A Folded Loop Antenna System for Handsets  
H. Morishita*, Y. Kim, National Defense Academy, K. Koyanagi, Matsushita Communication Industrial Co. Ltd, K. Fujimoto, University of Tsukuba, FAIS

2:00 Self-Diplexed Integrated Antenna Transceiver for Wireless Applications  
D-K. Park*, Korea Maritime University, R. Waterhouse, Royal Melbourne Institute of Technology, Q. Qian, T. Itoh, University of California, Los Angeles

2:20 Compact Surface-Wave Assisted Printed Endfire Antenna With Multiple System Compatibility  
K.M.K-H. Leong*, Y. Qian, T. Itoh, University of California, Los Angeles

2:40 GSM Fabric Antenna for Mobile Phones Integrated Within Clothing  
P.J. Massey*, Philips Research Laboratories

3:00 Enhancement of FB Ratio for Cellular Base Station Antenna by Optimizing Reflector Shape  

3:20 A Bi-Directional Pattern Antenna Using Short-Tapered Slot Antenna  
A. Moriya*, T. Okayama, Tokyo Institute of Polytechnics, H. Arai, Yokohama National University

3:40 SDA-A New Family of Small Antennas Used Since Long Time  
O. Edvardsson*, Allgon Mobile Communications AB

4:00 Rigorous Analysis of a Rectangular Dielectric Antenna on a Grounded Substrate  
S.-Y. Ke*, H.-T. Chen, Chinese Military Academy

4:20 Analyses of Voluminous Metallic Antenna Covered with Dielectric Layer  
R. Zaridze*, G. Bit-Babik, K. Tavzarashvili, A. Bjamov, G. Ghvedashvili, Tbilisi State University

**Aperture Coupled Microstrip Antennas**  
Co-chairs: S. Duffy, USA and S. Targonski, USA

1:00 Linearly and Circularly Polarized Slot Antennas Integrating Solar Cells  
S. Vaccaro*, J.R. Mosig, Ecole Polytechnique Federale P. de Maagt, ESTEC, European Space Agency

1:20 Dual Linearly Polarized Reflect Array Using Aperture Coupled Microstrip Patches  
M. Bialkowski*, University of Queensland, H. Song, HRL Laboratories

2:00 A Novel Concept for Slot Coupled Circularly Polarized Patch Antenna  
M. Fries*, R. Vahdieck, Swiss Federal Institute of Technology

2:20 A Broadband Microstrip Antenna Fed by A Coplanar Waveguide with Dogbone Slot  
A. Suzuki*, M. Haneishi, Saitama University

2:40 Fast Full-Wave Moment Method for the Analysis of Finite Aperture-Coupled Microstrip Patch Arrays  
A. Enneking*, F. Arndt, University of Bremen

3:00 Broadside Parallel-Plate Slot Antenna Without Dielectric  
M. V. Isasa*, A. Alvarez, Universidad de Vigo, M. Sierra-Castaner, M. Sierra-Perez, Universidad Politecnica de Madrid

3:20 Aperture-Coupled Coplanar Patch Antennas  
C.H. Cheng*, K. Li, K.F. Tong, T. Matsui, Communications Research Laboratory

3:40 Design of Compact Rectangular Microstrip Antenna with a CPW Feed  
M.-C. Pan*, Yung-Ta Institute of Technology and Commerce

4:00 Stacked Gap-Coupled Multi-Resonator Rectangular Microstrip Antennas  
G. Kumar*, I.I.T. Bombay, K.P. Ray, SAMEER

4:20 Electromagnetic Coupling in Aperture-Coupled and Proximity-Coupled Microstrip Antenna Structures
Applications of FDTD Modelling
Co-chairs: R. McGahan, USA and S. Hagness, USA

1:00 Analysis of a Corrugated Horn Using the BOR-FDTD Method
C. Johnson*, Harris Corporation, P. Wahid, University of Central Florida

1:20 Analysis of Multilayer Cylindrical Lines Containing Ferrite Media Using the FDTD Technique
N. Dib*, Jordan University of Science & Technology

1:40 HIRF Penetration into a Fuselage-Like Body: FDTD Predictions vs. Measurements
C. Birtcher*, S. Georgakopoulos, C.A. Balanis, Arizona State University

2:00 Dispersion Relation and Similarity Transform of Electromagnetic Waveguide
L. Liou*, Air Force Research Laboratory-Wright Patterson AFB

2:20 Isolating Target Returns Through Foliage

2:40 Elevated-CPW for High-Speed Digital Interconnects
S.H. Jeong*, Yonsei University, S-J. Yoon, Agency for Defense Development-Korea, S-G. Lee, Samsung Electronics, Y.J. Kim, Yonsei University

3:00 Slot Antenna Consisted of Two Conductive Plates and Thin Wires
M. Omiya*, Hokkaido University, T. Hikage, K. Murakami, K. Itoh, Hokkaido University-Grad School of Engineering

3:20 Cross-Shaped Dielectric Resonator Antenna Analysis Using the Conformal Finite Difference Time Domain Method
N. Farahat*, W. Yu, R. Mittra, The Pennsylvania State University, T. Koleck, CNES Laboratories

3:40 FDTD Simulation of the Angular Correlation Function of Objects Buried in Continuous Random Media
C.D. Moss*, Massachusetts Institute of Technology, F.L. Texeira, Ohio State University, J.A. Kong, Massachusetts Institute of Technology

4:00 Multiresolution Time Domain Modeling for Large Scale Wireless Communication Problems
C.D. Sarris, University of Michigan, K. Tomko, University of Cincinnati, P. Czarnul, D. Chun, E. Davidson, L. Katehi, University of Michigan

4:20 FDTD Analysis of Wire Antenna Used for Process Plasma
H. Sato*, K. Tamashiro, K. Sawaya, Tohoku University, T. Takagi, M. Ueda, Y. Watabe, ANELVA, Company

Fixed-Beam Microstrip Arrays
Co-chairs: M. Bialkowski, Australia and D. Nghiem, USA

1:00 A Higher-Order Microstrip Reflectarray at Ka-Band
K-C. Chen*, C-K. Tzuan, National Chiao Tung University, J. Huang, Jet Propulsion Laboratory

1:20 Planar Dielectric Image Line Antenna Arrays Using Y-Junctions
H. Tehrani*, M.-Y. Li, K. Chang, Texas A&M University

1:40 Design Method, Analysis and Prototypes of Radial Line Slot Antennas
M. Sierra Castaner*, M. Sierra Perez, Univ. Politecnica de Madrid, M. Vera Isasa, Universidad de Vigo, F. Jambrina, Univ. Politecnica de Madrid

2:00 A Dual-Frequency Microstrip-Fed Slot Ring Linear Antenna Array
H. Tehrani*, K. Chang, Texas A&M University

2:20 Proposal of Triangular Dielectric Phase-Shifter and Design Method Considering Loss Minimization for Offset Beam Planar Antenna
N. Honma*, T. Maruyama, T. Hori, Nippon Telegraph and Telephone Corporation

2:40 Multilayer Feeding of a Microstrip Patch Sub-Array Using Parallel-Plate Dielectric Waveguides (PPDW)
J. Hug, N. Das*, Polytechnic University

3:00 Design of Low Cost Cavity-Backed Microstrip Patch Arrays
M. Gonzalez*, J. Encinar, J. Zapata, Ciudad Universitaria

3:20 Performance of a Microstrip Planar Array Antenna At Millimeter Wave Frequencies Using a Series-Parallel Feed Network
**Wednesday Afternoon**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session 79: Fractal Antennas</th>
<th>Session 80: RF MEMS for Antenna Applications</th>
</tr>
</thead>
</table>
| 1:00  | Fractal Vibration Modes in the Sierpinski Microstrip Patch Antenna  
       | C. Borja, J. Romeu*  
       | Universitat Politecnica de Catalunya (UPC) |  
| 1:30  | Analysis of a Sierpinski for Fractal Patch Antenna Using the Concept of Macro Basis Functions  
       | J. Parron*, J.M. Rius, J. Romeu  
       | Universitat Politecnica de Catalunya (UPC) |  
| 1:45  | An Efficient Recursive Procedure for Calculating the Driving Point Impedance of Linear and Planar Fractal Arrays  
       | D. Baldacci*, D.H. Werner  
       | The Pennsylvania State University |  
| 2:00  | The Electrically Small Limit of Fractal Element Antennas  
       | R. Hohlfeld*  
       | Boston University, N. Cohen, Fractal Antenna Systems, Inc. |  
| 2:10  | Genetically Engineered Dual-Band Fractal Antennas  
       | D.H. Werner*, P.L. Werner  
| 2:45  | A Novel Design Approach for Small Dual-Band Sierpinski Gasket Monopole Antennas  
       | D.H. Werner*, J. Yeo  
       | The Pennsylvania State University |  
| 3:00  | UHF Fractal Antennas  
       | S.D. Eason*  
| 3:30  | Fractal Patch Antennas: Miniaturizing Resonant Patches  
       | J. Gianvittorio*, Y. Rahmat-Samii  
       | University of California, Los Angeles |  
| 3:45  | Fractal FSS: Various Self-Similar Geometries Used for Dual-Band and Dual-Polarized FSS  
       | J. Gianvittorio*, Y. Rahmat-Samii  
       | University of California, Los Angeles, J. Romeu, Universitat Politecnica de Catalunya (UPC) |  
| 4:00  | Observation of the Localized Modes in the Koch Waveguide  
       | J. Romeu, A. Aguasca, S. Blanch*  
       | Universitat Politecnica de Catalunya (UPC) |  
| 4:30  | Resonant Frequency of Hilbert Curve Fractal Antennas  
       | K.J. Vinoy*, K.A. Jose, V.K. Varadan, V.V. Varadan  
       | The Pennsylvania State University |  
| 1:00  | MEMS-Switched Reconfigurable Antennas  
       | W. Weedon*, W. Payne  
       | Applied Radar, Inc., G. Rebeiz, University of Michigan |  
| 1:20  | A Wideband Beam Switching Antenna Using RF MEMS Switches  
       | J. Schaffner*, D. Sievenpiper, R. Luo  
       | HRL Laboratories, J. Lee, S. Livingston, Raytheon |  
| 1:40  | MEMS True-Time Delay Circuit for Broadband Antennas  
       | M. Kim  
       | Korea University, J.B. Hacker, R.E. Mihailovich*, J.F. DeNatale, Rockwell Science Center |  
| 2:00  | Micromachined Waveguides and Horns for Submillimeter-Wave Components  
       | T. Crowe*  
       | University of Virginia |  
| 2:20  | A Hybrid-Statistical Approach for Accurate Characterization of MEMS on Complex Platforms  
       | T. Ozdemir*, K.F. Sabet, E. Yasan  
| 2:40  | Low Voltage Tunable Capacitors for RF MEM Filters and Antenna Applications |
### Wednesday Afternoon AP Session 81

**Antenna Arrays**

**Co-chairs:** O. Bucci, Italy and D. Davis, USA

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<th>Time</th>
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<tbody>
<tr>
<td>1:00</td>
<td>Bi-Mode Time-Space Multiplexing Antenna Array for Multi-Targets Detection in Automotive Application</td>
<td>L. Yang*, F. Zhenghe, Tsinghua University</td>
</tr>
<tr>
<td>1:40</td>
<td>Phase Conjugation Array Using Subharmonically Injection Locked Self-Oscillating Mixers</td>
<td>S.-C. Yen*, T.H. Chu, National Taiwan University</td>
</tr>
<tr>
<td>2:00</td>
<td>Space Based Lens Vs Corporate Antenna Distortion Comparison</td>
<td>D. Davis*, J. Moellers, Northrop Grumman Corporation</td>
</tr>
<tr>
<td>2:20</td>
<td>Resonant Frequency of Dipole Antennas with Crank Sections in Dual-Band Arrays</td>
<td>K. Nishizawa*, H. Okegawa, H. Ohmine, Mitsubishi Electric Corporation</td>
</tr>
<tr>
<td>2:40</td>
<td>Coaxial Cylinder Antenna Composed with Square Bracket Shaped Slots</td>
<td>K. Iigusa*, T. Ohiro, ATR Adaptive Communications Research, M. Tanaka, Kashima Space Research Center CRL</td>
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<tr>
<td>3:00</td>
<td>Compact Antenna Arrays for MIMO Applications</td>
<td>M. Stoytchev*, H. Safar, Agere Systems, A. Moustakas, S. Simon, Bell Laboratories</td>
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<td>3:40</td>
<td>Large-Area And Uniform Plasma Production by Rotating Mode Radial Line Slot Antennas with Densely Arrayed Slots</td>
<td>T. Yamamoto*, M. Ono, M. Takahashi, Yamagata University, M. Ando, Tokyo Institute of Technology, N. Goto, Takushoku University, Y. Yasaka, Kyoto University, N. Ishii, Tokyo Electron Ltd.</td>
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<td>3:20</td>
<td>Array Pattern Synthesis with Null Field Constraints in the Near-Field Region</td>
<td>O.M. Bucci, University of Naples, F. D’Agostino*, C. Gennarelli, C. Riccio, University of Salerno, C. Svarese, Instituto Universitario Navale</td>
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<td>3:40</td>
<td>On a Method of Formation of Surface Wave Structures Using for Strip Antennas</td>
<td>P. Anh*, Hanol National University. T.M. Tuan, Vietman Telecom International</td>
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<td>4:00</td>
<td>Spiral Microstrip Patch Element for Reflectarrays</td>
<td>S. Datthanasombat*, A. Prata, University of Southern California, P. Brown, O. Quintero, S. Spitz, E. Rodriguez, Jet Propulsion Laboratory</td>
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### Wednesday Afternoon Beacon A Session 82

**New Results in Space Based Sounding**

**Chair:** G. Sales, USA

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<tr>
<td>1:00</td>
<td>New Tools for Analysis of Space-Borne Sounding Data</td>
<td>I. Galkin*, G. Khmyrov, A. Kozlov, B. Reinisch, X. Huang, G. Sales, University of Massachusetts-Lowell</td>
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<td>Radio Sounding of the Plasmapause</td>
<td>M. Salvati*, D. Carpenter, U. Inan, T. Bell, Stanford University, B. Reinisch, University of Massachusetts-Lowell</td>
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<td>1:40</td>
<td>Observations of Ducts in the Plasmasphere by RPI</td>
<td>G. Sales*, X. Huang, B. Reinisch, P. Song, University of Massachusetts-Lowell, D. Carpenter, Stanford University, S. Fung, R. Benson, J. Green, NASA Goddard Space Flight Center</td>
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<td>2:00</td>
<td>Electron Density Distributions Along Magnetic Field Lines in the Magnetoosphere Deduced from RPI Plasmagrams</td>
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2:20 Ionospheric Occultation Measurement with Single Frequency GPS Onboard Receiver

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URSI H

Waves in the Ionosphere: Simulation and Modeling Techniques
Chair: L. Dyrud, USA

2:40 Plasma Simulations and Analysis of Meteor Trails
L.P. Dyrud*, M.M. Oppenheim, A.F. vom Endt, Boston University

3:00 Dynamic Processes of Ionosphere-Magnetosphere Coupling: A Three Fluid Treatment
P. Song*, B. Reinisch, University of Massachusetts-Lowell

3:20 Direct Measurements of the Ionospheric Current
A. Reinisch*, P. Song, V. Paznukhov, University of Massachusetts-Lowell

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URSI B

Rough Surface Scattering II
Co-chairs: M. El-Shenawee USA and J. Johnson, USA

1:00 On the Average Properties of Doppler Spectra at Moderate to Grazing Incidence Angles
B. Gotwols*, M. Keller, R. Chapman, Johns Hopkins University

1:20 Sea Spikes and Doppler Spectra at Moderate to Grazing Incidence Angles
M. Keller*, B. Gotwols, R. Chapman, Johns Hopkins University

1:40 Modeling of Multipath Scattering from Breaking Water Waves with Rough Faces
Z. Zhao*, J. West, Oklahoma State University

2:00 Polarization Ratios Anomalies of 3D Rough Surface Scattering as Second Order Effects
A. Sei*, M. Caponi, TRW, O. Bruno, California Institute of Technology

2:20 An Analytical Two-Scale Model for the Microwave Emissivity of the Ocean Surface
D. Lyzenga*, University of Michigan, J. Vesecky, University of California at Santa Cruz, N-Y. Wang, University of Michigan

2:40 FDFD Modeling of Plane Wave Interactions with Buried Objects Under Rough Surfaces
C. Rappaport, A. Morgenthaler, Northeastern University, M. Kilmer, Tufts University

3:00 EM Scattering from a 3D Target on a Rough Sea Surface Using Forward-Backward IPO
R. Burkholder*, Ohio State University

3:20 Electromagnetic Wave Scattering from Two Nearby Objects Buried Under Random Rough Surface Using the SDFMM: Subsurface Sensing Applications
M. El-Shenawee*, University of Arkansas at Fayetteville, C. Rappaport, Northeastern University

3:40 Numerical Computation of Scattering From a Penetrable Target Above a Slightly Rough Surface
J. Johnson*, Ohio State University

4:00 Dual Frequency Microwave-Enhanced Infrared Thermography
S. Shi*, G. Sauermann, C. Rappaport, C. DiMarzio, Northeastern University

4:20 High-Order High-Frequency Solvers for Rough Surface Scattering Problems
O. Bruno*, A. Sei, M. Caponi, California Institute Of Technology

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Remote Sensing
Co-chairs: L. Felsen, USA and U. Oguz, Turkey

1:00 A Numerical Study on the SVD-Based Retrieval of Radiometric Data
M. Sunda*, G. Mazzarella, M. Migliaccio, Universita di Cagliari

1:20 Environmental Influence on Microwave Radiometry for Buried Object Detection
D. Wiggins*, B. Ungan, J. Johnson, The Ohio State University
1:40 Modelling of Ultrawideband Echoes from Rough Dielectric Surfaces by Calculating Physical Optics Currents
Y. Lostanlen*, B. Uguen, G. Chassay, LCST/FRE CNRS - URER

2:00 Simulation of Wave Scattering from Rough Surfaces Using Single Integral Equation and Multilevel Sparse-Matrix Canonical-Grid Method
M. Xia*, Chinese Academy of Sciences, C. Chan, S.Q. Li, B. Zhang, City University of Hong Kong, L. Tsang, University of Washington

2:20 Time-Domain Two-Dimensional Scattering by Moderately Rough dielectric Interfaces via Narrow-Waisted Gaussian Beams
V. Galdi*, L. Felsen, D. Castanon, Boston University

2:40 Resonances of Coupled Objects Buried in a Dielectric Half-Space
M Afsar*, Y. Wang, Tufts University

3:00 Mine Detection Under Rough Ground Surfaces Using 2-D FDTD Modeling and Hypothesis Testing
H. Zhan*, C. Rappaport, M. El-Shenawee, E. Miler, Northeastern University

3:20 Simulation of TRT-Configured Ground-Penetrating Radars Over Heterogeneous Grounds
U. Oguz*, L. Gurel, Bilkent University

3:40 On The Frequency-Band Selection for Ground-Penetrating Radars Operating over Lossy and Heterogeneous Grounds
U. Oguz*, L. Gurel, Bilkent University

4:00 Millimeter-Wave Radar Detection of Partially Obscured Targets
A. Nashashibi*, F.T. Ulaby, University of Michigan

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**Wednesday Afternoon**

**TECC 4**

**AP Session 86**

**Fast Multipole Methods**

Chair: C. Lu, USA

1:00 Multilevel Fast Multipole Algorithm for Electromagnetic Scattering from Conducting Objects with Material Coating
C.C. Lu*, University of Kentucky

1:20 A Study of the Error Controllability of MLFMA
S. Ohnuki*, W. C. Chew, University of Illinois at Urbana-Champaign

1:40 The Application of the Generalized Conjugate Residual Algorithm to Accelerate the Fast Multipole Method
N. Yuan*, T.S. Yeo, L. Li, X. Nie, National University of Singapore

2:00 Fast Multipole Method and Microlocal Discretization for the 3-D Helmholtz Equation
E. Darrigrand*, Universite Bordeaux

K. Sertel*, J. Volakis, University of Michigan

2:40 Fast and Accurate Solution of 3-D Vector Electromagnetic Scattering by FMM with Curvilinear Triangular Patch
J. Hu*, Z. Nie, X. Gong, University of Electronic Science & Technology of China

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**Multigrid and Fast Multipole Applications**

Chair: W. Chew, USA

3:00 Multigrid Analysis of Scattering by Large Planar Structures
O. Livne*, A. Brandt, Weizmann Institute of Science, A. Boag, Tel Aviv University

3:20 Parallel Implementation of the MLFMA for Dielectric Targets
J. Pormann*, J. Board, J. He, E. Jones, L. Carin, Duke University

3:40 High Frequency Asymptotic Representation of the Fast Multipole Method Translation Operator
K. Warnick*, Brigham Young University W. C. Chew, University of Illinois at Urbana-Champaign

4:00 Comparison of Interpolation Methods in the Multilevel Fast Multipole Algorithm
N. Ozdemir*, Ohio State University, K. Sencer, Middle East Technical University

4:20 MLFMA Analysis of Multiple Conducting and Dielectric Targets in the Presence of a Half Space
J. He*, L. Carin, Duke University

4:40 MLFMA Analysis of Wideband Scattering from Single and Multiple Trees
J. He*, L. Carin, Duke University
### Phased Array Analysis and Design

**Co-chairs:** J. Herd, USA and B. Tomasic, USA

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<td>1:00</td>
<td>High-Frequency Green's Function for a Rectangular Array of Dipoles with Weakly Varying Tapered Excitation</td>
<td>F. Mariottini*, F. Capolino, S. Maci, University of Siena, L. Felsen, Boston University</td>
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<td>1:40</td>
<td>Mutual Coupling Compensation Accuracy</td>
<td>M. Leifer*, Ericsson Wireless Communications</td>
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<td>Azimuth Scanning, Ka-Band Phased Array Antenna</td>
<td>S. Chen*, C. du Toit, K. Hersey, D. Pao, V. Karasack, J. Patel, M. Ramesh, C. Sui, E. Ekelman, Paratek Microwave, Inc.</td>
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<td>2:20</td>
<td>Improvement of Gain of the Phased Array Antenna by the Parasitic Elements</td>
<td>K. Takuya, K. Yoshihiki*, Shizuoka University</td>
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<td>2:40</td>
<td>CAD of Multilayer Conformal Cylindrical Arrays</td>
<td>G. Gerini*, TNO-Physics and Electronics Laboratory, L. Zappelli, University of Ancona,</td>
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<td>3:00</td>
<td>A 1-D Circularly-Polarised Array Designed with Dual-Flared Microstrip Slot Antenna Element</td>
<td>K.Y. Liew*, T-H. Chio, DSO National Laboratories-Singapore</td>
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<td>3:40</td>
<td>A Design Method for Array Antennas Taking into Account of Mutual Coupling Between Elements</td>
<td>K. Sakaguchi*, N. Hasebe, Nihon University</td>
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<tr>
<td>4:00</td>
<td>A Design Method of Array Antennas Taking into Account of Mutual Coupling Between Elements</td>
<td>K. Nagasawa*, N. Hasebe, Nihon University</td>
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<td>4:20</td>
<td>Inductive Magnetic Currents and Radiation Characteristics of Planer and Linear Arrays: Analysis of Resembling Behaviours</td>
<td>J-Y. Li*, L-W. Li, B-L. Ooi, P-S. Kooi, M-S. Leong, The National University of Singapore</td>
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### Novel Time-Domain Methods & Related Issues

**Chair:** E. Michielssen, USA

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<td>An Application of the T-Matrix Method to Time-Domain Scattering</td>
<td>S.S. Koc*, O. Aydin Civi, O.M. Buyukdura, Middle East Technical University</td>
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<td>1:20</td>
<td>Multidomain Pseudospectral Time-Domain Method for 2.5-D Problems</td>
<td>G. Zhao, O.H. Liu, Duke University</td>
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<td>1:40</td>
<td>Some Preliminary Observations from a Simple Time-Domain Magnetic Field Integral Equation Implementation</td>
<td>R. Burkholder*, J.F. Lee, P. Pathak, Ohio State University</td>
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<td>2:00</td>
<td>D.O.R.T. Method as Applied to Wide-Band Signals for Detection of Buried Objects</td>
<td>G. Micolau*, M. Saillard, Institut Fresnel, P. Borderies, ONERA</td>
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<td>An FFT-Accelerated MOT Scheme for the Analysis of Scattering in Lossy Media</td>
<td>A. Yilmaz*, J.M Jin, E. Michielssen, University of Illinois at Urbana-Champaign</td>
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### Distributed & Filter Structures

**Chair:** A. Neto, USA

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<td>Microstrip Excited Double Slot Antennas as Elements for 2.5 THz Imaging Array Camera: Equivalent</td>
<td>A. Neto*, P. Siegel, California Institute of Technology/JPL</td>
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3:20  A Ka-Band Planar Type Dielectric Resonator Filter With Balanced Outputs  
C. Yuan*, Z. Chen, Dalhousie University

3:40  Distributed-Source-Excitation of Coplanar Waveguides: An Antenna Loaded Traveling-Wave Photomixer  
D. Pasqualini*, University of Siena, A. Neto, R. Wyss, California Institute of Technology/JPL

4:00  Low-Loss and Wide-Band NRD Guide Band-Pass Filter with Ceramic Resonators at 60GHz  
F. Kuroki*, S. Shinke, Kure National College of Technology, T. Yoneyama, Tohoku Institute of Technology

4:20  A Compact Design of Photonic Bandgap Structure for Microstrip Lines  
S.F. Yeh, C.L. Tai, H.H. Chen*, Huafan University

4:40  Parametric Analysis of Electrode Geometry for LiNbO3 Electro-Optic Modulators  
P. Savi*, Politecnico di Torino, I.L. Gheorma, Columbia University
Adaptive Arrays in Communications
Co-chairs: P. Wahid, USA and K. Cho, Japan

8:00 A Study of Transfer Function Estimation Error and A Practical Multi-Beam Antenna System with Pre-Coding Interference Cancellation
K. Tsunekawa*, NTT DoCoMo Inc.

8:20 Optimum Element Arrangement of Adaptive Arrays for SDMA Considering Angular Spread and Doppler Effect

8:40 A Novel Multitarget Adaptive Array Algorithm for Wireless CDMA Systems
A. R. de Matos*, L.M. de Mendonca, A.G. D'Assuncao, Universidade Federal do Rio Grande do Norte

9:00 Single-Port Electronically Steerable Passive Array Radiator Antenna Based Space-Time Adaptive Filtering
K. Yang*, T. Ohira, ATR Adaptive Communications Research

9:20 Improvement of Elevation Directivity for ESPAR Antennas with Finite Ground Plane

9:40 Smart Antenna System for Wideband CDMA Signals
M. Hefnawi*, Royal Military College of Canada, G. Delisle, Laval University

10:00 Smart Antennas for Wireless Communications
S. Bellafiore*, J. Foutz, C.A. Balanis, A. Spanias, Arizona State University

10:20 Computational Complexity Reduced MMSE Adaptive Array Antenna with Space-Temporal Joint Equalization
Y. Ichikawa*, K. Tomitsuka, S. Obote, K. Kagoshima, Ibaraki University

10:40 Minimization of a Rectangular Patch using Genetic Algorithms
N. Herscovici*, Spike Broadband Systems, M. Osorio, University of Valencia, C. Peixeiro, Technical University of Lisbon

History of Phased Array Development and Applications in the New Millennium
Co-chairs: L. Poles, USA and L. Hubbard, USA

8:00 Some Historical Phased Array Antennas
H. Schrank*, Consultant

8:20 A History of Scanned Impedance and Blind Angles
R.C. Hansen, Consultant

8:40 Radar Prehistory, Soviet Side: Three-Coordinated-Band Pulse Radar Developed in Ukraine in the Late 30s
A. A. Kostenko*, A.I. Nosich, I. A. Tishchenko, The A. Usikov Institute of Radio-Physics and Electronics

9:00 The Development of Smart Antennas
R. Haupt*, Utah State University

9:20 Multi-Function Interleaved Phased Arrays
L. Poles*, J. Turtle, E. Martin, R. Wang, Air Force Research Laboratory-Hanscom AFB

9:40 Sketching the Evolution of Array Antenna Pattern Synthesis
H. Stayskal*, Air Force Research Laboratory-Hanscom AFB, L. Josefsson, Ericsson Microwave Systems AB

10:00 Phased Arrays for New Millenium
E. Brookner*, Raytheon Systems Company

Efficient and Higher Order Methods
Co-chairs: W. Chew, USA and D. Wilton, USA
8:00  A Multilevel Direct Solver for the Method of Moments  
D. Gope, V. Jandhyala*, University of Washington  

8:20  New Boundary Integral Equations for Computer-Aided Design of 3-Dimensional Optical Waveguide  
M. Tanaka*, K. Tanaka, Gifu University  

8:40  Combined-Source Formulations for Electromagnetic Scattering from Convex Geometrics  
R. Adams*, Virginia Tech  

9:00  Iterative Preconditioned Solvers In Electromagnetic Computations  
V. Cable*, California Institute of Technology/JPL  

9:20  Experimental Results for Implementing a Combination of AP and RWG Basis Functions Using MoM to Solve the EFIE  
J. Gulick*, Michigan State University, M. Kowolski, University of Illinois, L. Kempel, Michigan State University, J. Jin, University of Illinois  

9:40  Higher Order Loop-Star Basis Functions for Method of Moment Computations  
J.F. Lee*, R.J. Burkholder, P.H. Pathak, R. Lee, The Ohio State University  

10:00  A Grid-Robust, Higher-Order Multilevel Fast Multipole Algorithm for 3-D Electromagnetic Scattering Analysis  
K.C. Donepudi*, J.M. Jin, W.C. Chew, University of Illinois  

10:20  Full-Wave Time-Domain Analysis of Conducting Surface Including the Singular Edge Behavior  
Y. Yu*, University of Illinois at Urbana-Champaign, D.S. Weile, University of Delaware, M. Lu, E. Michielssen, University of Illinois at Urbana-Champaign  

10:40  Topics in 3D Higher Order Modeling in the BEM/FEM Hybrid Formulation  
P. Fink*, NASA-JSC, D.R. Wilton, University of Houston, N. Champagne, R. Sharpe, D. White, LLNL  

11:00  Accurate Large-Scale CEM Modeling Using Hybrid FEM/MOM Technique  
S.S. Navale, Y.C. Ma., M. Sancer, Northrop Grumman Corporation, K.C. Hill*, Air Force Research Laboratory-Wright Patterson AFB  

11:20  Dissimilar Mesh Formulation for the Finite Element-Boundary Integral Method  
J. Meese*, L. Kempel, Michigan State University

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**Thursday Morning**  
**AP Session 94**  

**Dual Band Microstrip Antennas**  
Co-chairs: L. Li, Singapore and J. Sanchez, Spain  

8:00  A Quarter-Wave U-Shaped Patch Antenna with Two Unequal Arms for Wideband and Dual-Frequency Operation  
Y-X. Guo*, K-M. Luk, City University of Hong Kong, K-F. Lee, University of Mississippi, R. Chair, City University of Hong Kong  

8:20  Experiences on Multiband Fractal Antennas  
J. Sanchez, L. de Haro*, Ciudad Universitaria  

8:40  New Developments of the Wire-Patch Antenna for Ceramic Technology and Multifunction Applications  
F. Pasquet*, CREAP, Ingenierie, B. Jecko, CREATE-IRCOM  

9:00  A High-Performance Dual Frequency Microstrip Antenna for Global Positioning System  
L. Boccia*, G. Amendola, G. Di Massa, , Universita della Calabria  

9:20  Dual Band Dual Polarisation Slotted Microstrip Patch Antenna Element  
T. Condello, University of Pisa, C. Peixeiro*, Technical University of Lisbon  

9:40  Single-Frequency Rectangular Microstrip Antenna with a Pair of n-Shaped Slots  
Y-F. Lin*, H-M. Chen, C-C. Kuo, K-C. Huang, National Kaohsiung University of Applied Sciences  

10:00  A Novel Dual-Polarized, Wide-Band Microstrip Patch Antenna With Aperture Coupling  
S.C. Gao*, L. W. Li, M.S. Leong, T. S. Yeo, The National University of Singapore  

10:20  Experimental Study of Broadband Dual-Frequency Circular Patch Antennas  
J.H. Lu*, National Kaohsiung Institute of Marine Technology  

10:40  A Dual-Frequency Small Microstrip Antenna  
S.C. Gao*, L.W. Li, T.S. Yeo, M.S. Leong, The National University of Singapore  

11:00  Square Microstrip Slot Antenna with Chip Capacitor Loading for Dual Frequency Operation  
G.S. Binoy*, C.K. Aanandan, P. Mohanan, K. Vadudevan, Cochin University of Science & Technology  

11:20  Design of Dual-Band L-Probe Patch Antenna for Mobile Communications  
Y.H. Shum*, K.M. Luk, City University of Hong Kong

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**Thursday Morning**  
**Fairfax A Session 95**  

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### Wideband and Spiral Antennas
Co-chairs: H. Schantz, USA and H. Nakano, Japan

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<td>The Diamond Dipole: A Gaussian Impulse Antenna</td>
<td>H.G. Schantz*, L. Fullerton, Time Domain Corporation</td>
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<td>8:20</td>
<td>The COTAB UWB Magnetic Slot Antenna</td>
<td>H.G. Schantz*, M. Barnes, Time Domain Corporation</td>
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<td>A Miniature Broadband Antenna for Portable Communications Terminals</td>
<td>B. Cetiner*, L. Jofre, F. de Flaviis, N. Alexopoulos, G.P. Li, University of California, Irvine</td>
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<td>Increasing the Bandwidth of a Two-Strip Meander-Line Antenna Mounted on a Conducting Box</td>
<td>K. Noguchi*, Kanazawa Institute Of Technology, N. Yasui, Mitsubishi Electric Corporation, M. Mizusawa, Kanazawa Institute of Technology</td>
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<td>9:20</td>
<td>Multiple Linear Antenna Patterns with Single Prefixed Amplitude Distributions</td>
<td>A. Trastoy* F. Ares, M. Durr, E. Moreno, Universidade de Santiago de Compostela</td>
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<td>Design and Demonstration of a Novel Conformal Slot Spiral Antenna for VHF to L-Band Operation</td>
<td>D.S. Filipovic*, J. Volakis, The University of Michigan</td>
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<td>10:00</td>
<td>A New Wideband Cavity-Backed Spiral Antenna</td>
<td>M. Afsar*, Y. Wang, H. Ding, Tufts University</td>
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<td>10:20</td>
<td>A Two-Wire Spiral Antenna with Unbalanced Feed</td>
<td>K. Hirose, M. Miyamoto*, Tokyo Denki University, H. Nakano, Hosei University</td>
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### Thursday Morning Gardner AP Session 96

#### FDTD Theory II
Chair: M. Iskander, USA

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<td>8:00</td>
<td>Development of an Integrated Multi-Grid 3D FDTD and Finite-Difference Heat Transfer Code to Simulate Microwave Drying in Multimode Cavities</td>
<td>V. Pathak, Z. Yun, M. Iskander*, University of Utah</td>
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<td>8:20</td>
<td>Wave Source Conditions for the Unconditionally Stable ADI-FDTD Method</td>
<td>T.W. Lee*, S. Hagness, University of Wisconsin-Madison</td>
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<td>8:40</td>
<td>A Novel Perfectly Matched Layer Method for an Unconditionally Stable ADI-FDTD Method</td>
<td>A. Zhu,* S. Gedney, G. Liu, University of Kentucky, J. A. Roden, IBM Corporation</td>
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<td>9:00</td>
<td>Application of Signal-Processing Techniques to Reduce the Errors Related to the FDTD Excitations</td>
<td>L. Gurel, U. Oguz*, Bilkent University</td>
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<td>Analysis of Lossy Systems via 2D-FDTD and ESPRIT</td>
<td>F. Liu*, J.E. Schutt-Aine, University of Illinois, J. Chen, Motorola,</td>
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<td>9:40</td>
<td>Coarseness Error in FDTD Thin-Wire Models</td>
<td>R. Makinen*, Tampere University of Technology, J. Juntunen, Helsinki University of Technology, M. Kivikoski, Tampere University of Technology</td>
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### Thursday Morning Gardner AP Session 97

#### Time Domain Theory I
Chair: L. Ololoska-Gagoska, Macedonia

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<td>Time-Domain Analysis in Non-Harmonious Net of an Antenna With Two Parallel Elements Using Potential Function's Approximation</td>
<td>L. Ololoska-Gagoska*, L. Janev, University “Sts. Kiril and Metodij”</td>
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<td>10:20</td>
<td>Electric Field Distributions Inside A Parallel Plate NEMP Simulator by Time-Domain Moment Method</td>
<td>H.Y. Chen*, B.H. Chang, Yuan Ze University</td>
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<td>10:40</td>
<td>Novel Approach to Construct Temporal Bases Functions for Time-Domain Integral Equation Method</td>
<td>J.L. Hu*, C. Chan, City University of Hong Kong</td>
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<td>11:00</td>
<td>A New Fast Time Domain Integral Equation Solution Algorithm</td>
<td>E. Bleszynski*, M. Bleszynski, T. Jaroszewicz, Monopole Research</td>
</tr>
</tbody>
</table>
11:20 Staircase Approximation for Transients of Multisection Dispersive Transmission Lines with Nonlinear Loads
I.T. Chiang*, S. K. Jeng, National Taiwan University

Thursday Morning
AP
Hampton
Session 98

Antenna Theory
Co-chairs: M. Vouvakis, USA and I. Chiba, Japan

8:00 Cavity Backed Antennas with Multilayer Superstrates
M. Vouvakis*, C. Polycarpou, C.A. Balanis, Arizona State University

8:20 Analysis of Ferrite-Loaded Cavity-Backed Antennas Including Nonlinear and Nonuniform Magnetization Effects
M. Vouvakis*, C. Polycarpou, C.A. Balanis, Arizona State University

8:40 An Improved Low-Profile Cavity-Backed Slot Antenna Loaded with 2D UC-PBG Reflector
J.Y. Park*, C.C. Chang, Y. Qian, T. Itoh, University of California, Los Angeles

9:00 A Novel Low Profile Slot-Multi-Layer Patch Antenna
M. Fan*, X. Zhang, Z. Feng, Tsinghua University

9:20 Excitation of CP Aperture-Coupled Dielectric Resonator Antenna with a Parasitic Patch
H.K. Ng*, K.W. Leung, City University of Hong Kong

9:40 On the Conditions for the Approximate Formulas for the Problem of a Boundary-Penetrating Antenna
Y. Long*, Zhongshan University, E. Yung, City University of Hong Kong

10:00 Analysis of Antennas and Nearby Conducting Bodies with the Source Reconstruction Method
F. Las-Heras*, Ciudad Universitaria, T. Sarkar, Syracuse University

10:20 Balancing Magnetic and Electric Responses of Vector-Sensing Antenna
Y. Huang*, G. Friedman, A. Nehorai, , University of Illinois at Chicago

10:40 A 60 GHz Conical Horn Antenna with Polarizer Fed by Quasi-Yagi Antenna
T. Itoh, M. Sironen, Y. Qian, University of California, Los Angeles

11:00 Folded Loop C.P. Antenna
R.L. Li, V.F. Fusco*, Queens University Belfast

11:20 Beam-Space Circular Smart Antenna Fed by Hybrid Circuits
I. Chiba*, K. Kiwara, Y. Yonezawa, T. Numazaki, Mitsubishi Electric Corporation

Thursday Morning
URSI B
Fairfax B
Session 99

Guiding Structures and Circuits II
Chair: K. Webb, USA

8:00 Synthesis and Performance of Irregular Field Transformation Elements
K. Webb*, M-C. Yang, J-H. Li, Purdue University

8:20 Full-Vectorial Finite Element Modal Analysis of Dielectric Waveguides Considering Corner Field Singularities
D.U. Li, H. Chang*, National Taiwan University

8:40 Robust Complex Images Analysis of Multislot Transmission Lines
J. Bernal*, F. Medina, R. Boix, Universidad de Sevilla

9:00 Practical Characteristic Analysis of a Parallel-Plate EMP Simulator via the Interpretation of UTD Field Decompositions
H.T. Chou*, Yuan Ze University, J.J. Ju, Chung-Shan Institute of Science and Technology, H.Y. Chen, Yuan Ze University

9:20 Application of Chalcogenide-Based Materials For Use in Programmable Circuitry for a Microstrip Antenna
D. Vreeland*, C.G. Christodoulou, University of New Mexico, J.C. Lyke, Air Force Research Laboratory/VQSE

Thursday Morning
AP
Fairfax B
Session 100

Numerical Analysis for Antenna Design
Chair: C. Rappaport, USA

10:00 Full Wave Analysis and Experimental Verification of a Broadband Ridged Horn Antenna System with Parabolic Reflector
C. Bruns*, P. Leuchtmann, R. Vahldieck, Swiss Federal Institute of Technology
10:20 Numerical Modeling and Experimental Study of a Novel Leaky Wave Antenna  
E. Semouchkina*, W. Cao*, R. Mittra, The Pennsylvania State University, G. Semouchkina, N. Polenko, I. Ivanchenko, Institute of Radiophysics & Electronics

10:40 Ultra-Wideband Antenna Design Using the Green's Function Method (GFM) ABC with Genetic Algorithm  
R. Holtzman, R. Kastner*, E. Heyman, Tel-Aviv University, R.W. Ziolkowski, University of Arizona

11:00 A Combined FDTD-GAM Method for the Modeling of Rectangular Corrugated Horn Fed by Wide-Band Sources  
G. Marrocco*, D.I.S.P. Universita di Roma, A. Freni, L. Salghetti, University of Florence, S. Maci, University of Siena

11:20 Broadband Nearfield Beamforming Using a Simple Recursive Algorithm  
Q. Zeng*, D. O’Shaughnessy*, University of Quebec

11:40 Developing a Broadband Circuit Model for the Cutler VLF Antenna  
T. Simpson*, University of South Carolina, M. Roberts, E. Berg, Veridian Systems

Thursday Morning  Berkeley  
AP  Session 101

Radar Imaging & Inverse Scattering  
Chair: O. Bucci, Italy

8:00 Linearized Multi-Frequency Inversion of Ground Penetrating Radar Data  
N. Budko*, P. van den Berg, Delft University of Technology

8:20 Detection and Imaging of Buried Homogeneous Dielectric Objects  
O.M. Bucci, L. Crocco*, T. Isernia, Universita di Napoli “Federico II”

8:40 Ground Penetrating Radar Imaging of Buried Metallic Objects  
B. Polat, P. Meincke*, Technical University of Denmark

8:40 Investigation of Direct and Inverse Scattering Problems for Inhomogeneous Medium  
V. Turchin*, Institute of Applied Physics Russian Academy of Science, S. Skulkin, H. Sahli, Vrije Universiteit Brussel

9:00 Imaging Performance Analysis of a FOPEN UWB Random Noise Radar  
X. Xu*, R. Narayanan, University of Nebraska

9:20 Radar Images of Vehicles Based on SAR/ISAR Processing  
R. Giret*, S. Meric, G. Chassay, LCST/URER,INSA Rennes

9:40 Comparison of Monostatic and Bistatic Radar Images  
J. Johnson*, I. Gupta, R. Burkholder, The Ohio State University

10:00 Time-Domain Imaging of Radar Targets Using High Frequency Approximation Methods  

10:20 MMW-Radar Powerline Detection Simulator  
L. Pierce, Sarabandi, The University of Michigan

10:40 Artificial Neural Network Based Buried Land Mine Imaging  
K. Struckman* BAE Systems

Thursday Morning  Clarendon  
AP  Session 102

Hybrid Methods  
Co-chairs: J. Jin, USA and D. Kim, Japan

8:00 An Integrated Finite Element-Mode Matching-Plane Wave Expansion Code for Horn Antenna Analysis  
L. Conti, e. Martini, R. Nesti, G. Pelosi, S. Selleri*, University of Florence

8:20 A Hybrid FDTD-MoM Procedure for the Modeling of Electromagnetic Radiation from Cavity-Backed Apertures  

8:40 A Hybrid MoM Formulation for Scattering From Dielectrically Covered Arrays of Cylindrical Cavities in a Ground Plane  
F.J. Villegas*, Y. Rahmat-Samii, University of California, Los Angeles, D.R. Jackson, University of Houston

9:00 Electromagnetic Coupling to Thin-Wire Structures in Complex Cavities  
B. Lail*, S. Castillo, New Mexico State University

9:20 A Hybrid Discrete Fourier Transform-Moment Method for the Fast Analysis of Large Rectangular Phased Arrays  
H.T. Chou*, H.K. Ho, Yuan Ze University, P.H. Pathak, Ohio State University, P. Nepa, University of Pisa, O.A. Civi, Middle East Technical University
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
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<tbody>
<tr>
<td>9:40</td>
<td>Coupling of Finite Integration Technique and Ray Tracing</td>
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<tr>
<td>10:00</td>
<td>A Novel, Highly Effective Preconditioner for Solving the Finite Element-Boundary Integral Matrix Equation of 3-D Scattering</td>
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<tr>
<td>10:20</td>
<td>Efficient Hybrid Finite Elements - Modal Expansion Method for Microstrip-Waveguide Transitions Analysis</td>
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<tr>
<td>10:40</td>
<td>A Novel Hybridization of Higher Order Finite Element and Boundary Integral Methods for Electromagnetic Scattering and Radiation Problems</td>
</tr>
<tr>
<td>11:00</td>
<td>A Fast Higher-Order Time-Domain Finite Element-Boundary Integral Method for 3-D Electromagnetic Scattering Analysis</td>
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**Thursday Morning**

**URSI F**

**Propagation Modeling**

Chair: R. Janaswamy, USA

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>8:00</td>
<td>A 3D Parabolic Equation Method for Imperfectly Reflecting Vertical Obstacles on Flat Ground</td>
<td>R. Janaswamy*, Naval Postgraduate School</td>
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<td>8:20</td>
<td>Microwave Propagation Over Sea Surfaces at Low Grazing Levels</td>
<td>R.M. Jha*, R. Janaswamy, Naval Postgraduate School</td>
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<tr>
<td>9:00</td>
<td>An Accelerated Boundary Integral Equation Propagation Scheme</td>
<td>M. Lamar*, R. Awadallah, J. Kuttler, The Johns Hopkins University</td>
</tr>
<tr>
<td>9:40</td>
<td>Extremely Low Frequency (ELF) Mixed-Path Propagation Model</td>
<td>E. Wolkoff*, Science Applications International Corp, J. Casey, Naval Undersea Warfare Center</td>
</tr>
</tbody>
</table>

**Thursday Morning**

**AP**

**Session 104**

**Scattering: Complex Media and Materials**

Chair: R. Burkholder, USA

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>10:00</td>
<td>Phase Switched Radar Absorbers</td>
<td>A. Tennant*, B. Chambers, University of Sheffield</td>
</tr>
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<td>10:20</td>
<td>Investigation on the Potential Application of Conductor-Grounded Lossy Dielectric Periodic Structures as the Cover of Stealth</td>
<td>Y. Li*, X. Shanjia, University of Science and Technology of China</td>
</tr>
<tr>
<td>10:40</td>
<td>Electromagnetic Scattering from a Dielectric Cylinder Beneath a Slightly Rough Surface</td>
<td>D. Lawrence*, K. Sarabandi, University of Michigan</td>
</tr>
<tr>
<td>11:00</td>
<td>Monte Carlo Study and Statistical Description of the Radar Scattering from 2D Ships on Rough Sea Surfaces</td>
<td>M.R. Pino*, Univeridade de Vigo, R. Burkholder, The Ohio State University, J.L. Rodriguez, F. Obelleiro, Univeridade de Vigo</td>
</tr>
<tr>
<td>11:20</td>
<td>High-order Method of Moment Solution for Penetrable Scatterers</td>
<td>Gang Liu*, S. Gedney, University of Kentucky</td>
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**Thursday Morning**

**AP**

**Session 105**

**Frequency Selective Surfaces**
Co-chairs: R. Mittra, USA and P. Simon, USA

8:00  Bandwidth Enhancement of Multiband Antennas Using Frequency Selective Surfaces for Ground Planes
      J. Yeo, R. Mittra*, The Pennsylvania State University

8:20  Analysis of a Frequency Selective Surface (FSS) Radome Located in Closed Proximity of a Phased Array Antenna
      R. Mittra*, D. Lee, Pennsylvania State University

8:40  Efficient Green's Function Formulation for Analysis of Frequency Selective Surfaces in Stratified Media
      P. Simon*, Space Systems/Loral

9:00  Composite Materials with Negative Permittivity and Permeability Properties: Concept, Analysis, and Characterization
      H. Mosallaei*, Y. Rahmat-Samii, University of California, Los Angeles

9:20  Scattering Parameters of a Frequency Selective Surface Between Anisotropic Dielectric Layers for Incident Co-Polarized Plane Waves
      A. Campos*, Universidade Federal da Paraiba, A. D'Assuncao, Universidade Federal do Rio Grande do Norte

9:40  A Hybrid MoM/UAPO Approach for the Analysis of Truncated Penetrable Periodic Structures
      C. Pochini, G. Pelosi, University of Florence, G. Tos*, A. Roederer, European Space Agency, ESA ESTEC

10:00 Efficient Analysis of FSSs with Arbitrarily Shaped Patches by the MoM/BI-RME Method
      M. Bozzi*, L. Perregrini, University of Pavia

10:20 Deep Space Antenna for Rosetta Mission: Design of the S/X Band Dichroic Mirror and Analysis of the Beam Waveguide
      P Besso*, CSELT, M. Bozzi, University of Pavia, R. Madde, European Space Agency, L. Perregrini, University of Pavia, L. Srioli, University of Florence, S. Salvatori, European Space Agency

10:40 Scattering Analysis of Strip Gratings with Layered Periodical Substrate for TE Case
      C.H. Lee*, NationalChangua University of Education, C-I G. Hsu, Da-Yeh University, J-F. Kiang, National Taiwan University, C-C. Lee, National Changhua University of Education

11:00 Frequency-Selective Properties of the Slab with Multiscale Inhomogeneities

11:20 Frequency-Selective Surfaces with Dumbbell Shaped Elements
      V.N Apletalin, Yu. N. Kazantsev*, V.S. Solosin, Institute of Radio Engineering & Electronics of Russian Academy of Sciences

Thursday Morning
Beacon H
AP Special Session
Session 106

Electromagnetic Measurements and Associated Processing Techniques I

Co-chairs: W. Burnside, USA and I. Gupta, USA

8:00  Comparative Measurements of Precision Radar Cross Section (RCS) Calibration Targets
      B. Kent*, Air Force Research Laboratory-Wright Patterson Air Force Base

8:20  Progress in Phaseless Near-Field Antenna Measurement Research at the University of California, Los Angeles
      R. Yaccarino, Y. Rahmat-Samii*, University of California, Los Angeles

8:40  Current State-of-the-Art in Near Field Antenna Measurements
      A. Newell*, Newell Near-Field Consultants

9:00  Stray Signal Source Location in Antenna/RCS Ranges
      I. Gupta*, The Ohio State University

9:20  Electromagnetic Measurement System Requirements
      W.D. Burnside*, T-H Lee, The Ohio State University

9:40  Design of the GE Aircraft Engine Compact Range Facility
      R. Silz*, GE Aircraft Engines

10:00 A Brief History of the Compact Range and the Near-Field Range
      E. Gillespie*, California State University, Northridge

10:20 Microwave Holography for Antenna and Radome Diagnostics
      E. Joy*, Georgia Institute of Technology, M. Guler, EMS Technologies

10:40 To Be Determined
      D. Hess
### Patch Antennas for Communications

**Co-chairs:** A. Nashashibi, USA and L. Li, Singapore

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>1:00</td>
<td>Design of an Efficient Miniaturized UHF Planar Antenna</td>
<td>K. Saraband*, R. Azadegan, The University of Michigan</td>
</tr>
<tr>
<td>1:20</td>
<td>Reduced Size Single and Dual Band Linear Polarized Microstrip Antennas for Mobile Communications</td>
<td>R. Ramirez*, H. Elsadek, L. Jofre, F. De Flaviis, University of California, Irvine</td>
</tr>
<tr>
<td>2:00</td>
<td>A -45 Degree/+45 Degree Dual Polarized Microstrip Antenna for Wireless Communication</td>
<td>X. Yao, W. Hong*, Southeast University</td>
</tr>
<tr>
<td>2:20</td>
<td>A Double Folded, Capacitive-Fed, Cavity-Backed Microstrip Antenna</td>
<td>B.L. Ooi*, Q. Shen, M.S. Leong, National University of Singapore</td>
</tr>
<tr>
<td>3:00</td>
<td>Experimental Investigation of Microstrip Antenna Behavior Beside Lossy Dielectric Materials</td>
<td>K.H. Pan*, University of Illinois at Urbana-Champaign, T. Moore, Amphenol T&amp;M Antennas, J. Bernhard, University of Illinois at Urbana-Champaign</td>
</tr>
<tr>
<td>3:20</td>
<td>A Novel F-Probe Fed Broadband Patch Antenna</td>
<td>B.L. Ooi*, C.L. Lee, P.S. Kooi, S.T.Chow, National University of Singapore</td>
</tr>
<tr>
<td>3:40</td>
<td>A Novel Stacked E-Shaped Patch Antenna</td>
<td>B.L. Ooi*, Q. Shen, The National University of Singapore</td>
</tr>
<tr>
<td>4:00</td>
<td>A Novel Equivalent Circuit for E-Shaped Slot Patch Antenna</td>
<td>B.L. Ooi*, M.S. Leong, Q. Shen, The National University of Singapore</td>
</tr>
<tr>
<td>4:20</td>
<td>Miniaturized UHF Microstrip Antenna for a Mars Mission</td>
<td>J.Huang*, California Institute of Technology/JPL</td>
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</table>

### Complex Media

**Co-chairs:** R. Ziolkowski, USA and N. Engheta, USA

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<thead>
<tr>
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<tbody>
<tr>
<td>1:00</td>
<td>Negative Permittivity and Permeability Meta-Materials and Their Applications</td>
<td>R. Ziolkowski*, The University of Arizona</td>
</tr>
<tr>
<td>1:40</td>
<td>High Permittivity Dielectric Composite Materials</td>
<td>S-W Lee*, Y. Kuga, University of Washington, E. Savrun, Sienna Technology</td>
</tr>
<tr>
<td>2:00</td>
<td>Computation of Static Effective Permittivity for 2-D Anisotropic Composite Materials</td>
<td>F. Wu*, K. Whites, University of Kentucky</td>
</tr>
<tr>
<td>2:20</td>
<td>Semi-leaky Waves in Dielectric Pseudochiral Slabs</td>
<td>A. Topa*, C. Paiva, A. Barbosa, DEEC-IT - Technical University of Lisbon</td>
</tr>
<tr>
<td>2:40</td>
<td>Dipole Radiation Near a Wire-Medium Sheet Above a Ground Plane</td>
<td>N. Engheta*, University of Pennsylvania</td>
</tr>
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<td>3:00</td>
<td>Active High Impedance Ground Planes</td>
<td>G. Poilasne*, L. Desclos, Photonic RF Corp.</td>
</tr>
<tr>
<td>3:20</td>
<td>Lattices of Cubes as Phenomenological Maxwell/Maxwell Garnett Materials Containing Large Particle Interaction</td>
<td>K. Whites*, F. Wu, University of Kentucky</td>
</tr>
<tr>
<td>3:40</td>
<td>The Method of Auxiliary Sources (MAS) and Some EM Properties of Complex Material Objects</td>
<td>R. Zaridze*, F. Bogdanov, d. Karkashadze, K. Tavzarashvili, A. Bijamov, Tbilisi State University</td>
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Thursday Afternoon  
Back Bay D  
AP  Session 109

**Time Domain Theory II**

Co-chairs: Y. Shifman, Israel and A. de Hoop, The Netherlands

1:00  Transformed-Space Non-Uniform Pseudo-Spectral Time Domain (NU-PSTD) Algorithm without the Use of the Non-Uniform FFT  
W. K. Leung*, Hong Kong Polytechnic University, Y. Chen, University of South Carolina, R. Mittra, The Pennsylvania State University

1:20  Analytic Time-Domain Performance Analysis of Absorbing Boundary Conditions and Perfectly Matched Layers  
A. de Hoop, P. van den Berg, R. Remis*, Delft University of Technology

1:40  A General Approach for the Stability Analysis of Time-Domain Finite Element Method  
D. Jiao*, J.M. Jin, University of Illinois at Urbana-Champaign

2:00  A Hierarchical FFT Algorithm (HIL-FFT) for Accelerating Marching-on-in-Time Methods  
A. Yilmaz*, University of Illinois at Urbana-Champaign, D. Weile, University of Delaware, J-M. Jin, E. Michielssen, University of Illinois at Urbana-Champaign

2:20  Modification of the Maxwell's Equations for the Electromagnetic Analysis in the Time Domain Mode  
C. Klimov, Moscow State Institute of Electronics and Mathematics, B. Sestoretsky*, Lavochkin Association

2:40  An Accurate Scheme for the Numerical Solution of the Time Domain Electric Field Integral Equation  
D. Weile*, University of Delaware, B. Shanker, Iowa State University, E. Michielssen, University of Illinois at Urbana-Champaign

3:00  MRTD Application for Scattering Analysis  
G. Cao*, P.K.A. Wai, The Hong Kong Polytechnic University, Y. Chen, University of South Carolina

3:20  Suppression of EM Coupling Spikes By Line-Shaping in High-Speed Coupled Lines  
E.J. Park*, Kumoh National University of Technology

3:40  Fast Intergral Equation Based Analysis of Transient Electromagnetic Scattering from Three-Dimensional Inhomogeneous Lossy Dielectric Objects  
B. Shanker*, Iowa State University, K. Aygun, N. Gres, E. Michielssen, University of Illinois at Urbana-Champaign

4:00  Iterative Spectrum Analysis for Pre-Cleaning of Narrow-Band Interference from Radar Data  
K. Bibi*, G. Cheney, University of Massachusetts-Lowell

Thursday Afternoon  
Commonwealth  
AP  Session 110

**Helical and Slotted Antennas for Wireless Communications**

Co-chairs: H. Aumann, USA and M. Shields, USA

1:00  A Quad-Band Stubby Antenna for Portable Wireless Devices  
E. Borisov*, T. Moore, Amphenol T&M Antennas

1:20  Central-Fed Hemispherical Helical Antenna  
K.Y. Chan*, H. T. Hui, E.K.N. Yung, City University of Hong Kong

1:40  A Helical Antenna with a Self-Complementary Shape  
N. Takemura*, M. Ohtsuka, I. Chiba, S. Urasaki, Mitsubishi Electric Corporation

2:00  Recent Advances in Handset Antennas for Satellite Communication  
O. Edvardsson*, Allgon Mobile Communications AB

2:20  Characteristics of a Helical Array Antenna Radiating Circularly Polarized Conical Beam  
C. Phongcharoenpanich*, King Mongkut's Institute of Technology-Ladkrabang, T. Lertwiriyaprapa, King Mongkut’s Institute of Technology-North Bangkok, S. Lamultree, P. Wounchom, S. Kosulvit, M. Krairiksh, King Mongkut’s Institute of Technology-Ladkrabang

2:40  Conducting Ring Loaded Annular Slot Antennas  
S. Noghanian*, L. Shafai, The University of Manitoba

3:00  Design of Miniaturized Slot Antennas  
R. Azadegan*, K. Sarabandi, University of Michigan

3:20  "Folded" Quadrifilar Helix Antenna  
A. Petros, XM Satellite Radio, Inc., . Licul*, Virginia Polytechnic Institute and State University
### Electromagnetic Measurements and Associated Processing Techniques II

**Co-chairs:** W. Burnside, USA and E. Young, USA

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<tbody>
<tr>
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<td>Full Scale Aircraft Antenna Measurements at the Air Force Research Laboratory, Newport Measurement Facility</td>
<td>J. DeRosa*, Air Force Research Laboratory-Rome Research Site</td>
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<td>1:20</td>
<td>Automotive Conformal Antenna Research at the Ohio State University</td>
<td>E. Walton*, The Ohio State University, ElectroScience Lab</td>
</tr>
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<td>1:40</td>
<td>Design and Evaluation of a Self-Referencing UHF Ultrawideband Channel Sounder</td>
<td>S. Yano*, Time Domain Corp., S. Ellingson, The Ohio State University,</td>
</tr>
<tr>
<td>2:00</td>
<td>Measurement System for the Green Bank Telescope</td>
<td>D. Parker, S. Srikanth*, National Radio Astronomy Observatory</td>
</tr>
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<td>2:20</td>
<td>Advances in Time Domain Antenna Measurements</td>
<td>J. Marti-Canales*, European Space Research and Technology Centre, L.P. Ligthart, Technical University of Delft</td>
</tr>
<tr>
<td>2:40</td>
<td>Passive Microwave Imaging from Spacecraft</td>
<td>C. Swift*, University of Massachusetts at Amherst</td>
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<tr>
<td>3:00</td>
<td>Fully-Polarimetric Ground Penetrating Radar Application</td>
<td>C.C. Chen*, The Ohio State University</td>
</tr>
<tr>
<td>3:20</td>
<td>An Overview of Advanced Processing Techniques for RCS Measurements</td>
<td>I. LaHaie*, Veridian Systems Division</td>
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<td>3:40</td>
<td>Dynamic In-Flight Antenna Pattern Measurement Techniques</td>
<td>R. Hartenstien*, NAWCAD-Naval Air Warfare Center Aircraft Division</td>
</tr>
<tr>
<td>4:00</td>
<td>System Measurement of Antennas</td>
<td>R.B. Dybdal*, The Aerospace Corporation</td>
</tr>
<tr>
<td>4:20</td>
<td>Antenna PIM Measurements and Associated Test Facilities</td>
<td>Y. Patenaude*, J. Dallaire, F. Menard, S. Richard, EMS Technologies Canada</td>
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### Numerical Methods

**Co-chairs:** W. Chew, USA and B. Barrowes, USA

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<td>1:00</td>
<td>Simulation of 3D EM Fields by a Weak-Form Biconjugate Gradient FFT Method</td>
<td>Z. Q. Zhang*, Q.H. Liu, Duke University</td>
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<td>1:20</td>
<td>Fast Algorithm for Matrix-Vector Multiply of Asymmetric Multilevel Block-Toeplitz Matrices</td>
<td>B.E. Barrowes*, Massachusetts Institute of Technology, F.L. Teixeira, The Ohio State University, J.A. Kong, Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>1:40</td>
<td>Electromagnetics Optimization Using an Evolutionary Algorithm with a Mixed-Parameter Self-Adaptive Mutation Operator</td>
<td>A. Hoorfar*, S. Nelaturi, J. Zhu, Villanova University</td>
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<tr>
<td>2:00</td>
<td>A Sparse Data Fast Fourier Transform (SDFFT) - Algorithm and Implementation</td>
<td>A. Aydiner*, W.C. Chew, J. Song, University of Illinois at Urbana-Champaign</td>
</tr>
<tr>
<td>2:20</td>
<td>Application of Domain Decomposition and Finite Element Method to Electromagnetic Compatible Analysis</td>
<td>Z. Qian*, PLA University of Science and Technology L. Yin, Ultima Interconnect Technology Inc., W. Hong, Southeast University,</td>
</tr>
<tr>
<td>2:40</td>
<td>Higham-Cheng Algorithm for Solving the Generalized Eigenproblem Applied to the Computation of the Characteristic Modes</td>
<td>G. Angiulli*, Universita di Reggio Calabria, G. Amendola, G. Di Massa, Universita della Calabria,</td>
</tr>
<tr>
<td>3:00</td>
<td>Application of Intervallic Wavelets to the Problem of EM Scattering on Multiple Bodies</td>
<td>G. Pan*, M. Toupikov, Arizona State University, B. Gilbert, Mayo Foundation,</td>
</tr>
</tbody>
</table>
3:20 Computation of 2.5-Dimensional Static Fields in Uniaxial Anisotropic Media
R. Remis*, P. van den Berg, A. de Hoop, Delft University of Technology

3:40 An Improved Method for the Mesh Termination in the Finite-Difference Solution of Scattering Problems
Z. Lou, Y. S. Xu*, D. Fan, University of Science and Technology of China

4:00 Spectral Domain Analysis of 2-D Cylindrical Transmission Lines Composed of Iso/Anisotropic Substrates
A. Omar*, Hashemite University

4:20 Parallel Implementation of the Finite Difference Time Domain Method Using the ZPL Language

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Thursday Afternoon
Hampton
URSI F

Calibration and Remote Sensing of the Atmosphere and Objects
Chair: J. Hancock, USA

1:00 Numerical Simulations of Effects of Ionospheric Irregularities on SAR Imaging
J. Liu*, Y. Kuga, A. Ishimaru, University of Washington, Xi. Pi, T. Freeman, Jet Propulsion Laboratory

1:20 Diagnostics of Subauroral Ionosphere with HF Radar
D.V. Blagoveshchensky*, S.V. Nozdrachev, University of Aerospace Instrumentation

1:40 Retrieval of Water Vapor Profiles Using the 54-, 118-, and 183-GHz Bands
J. Hancock, W. Blackwell, R. Leslie, P. Rosenkranz, D. Staelin, Massachusetts Institute of Technology, J. Wang, NASA/Goddard Space Flight Center

2:00 Island Wake Impact on Evaporation Duct Height and Sea Clutter in the Lee of Kauai
S. Burk*, Naval Research Laboratory, L.J. Wagner, Space and Naval Warfare Systems Center, T. Haack, Naval Research Laboratory, L. T. Rogers, Space and Naval Warfare Systems Center, P. Whitman, Fleet Numerical Meteorology and Oceanography Center

2:20 Temperature Profile Retrievals with an Airborne Passive Microwave Radiometer NAST-M
R. Leslie*, W. Blackwell, J. Barrett, P. Rosenkranz, Massachusetts Institute of Technology

2:40 Precipitation Signatures Observed Near 54 and 118 GHz
F. Chen*, J. Barrett, W. Blackwell, R. Leslie, P. Rosenkranz, D. Staelin, Massachusetts Institute of Technology

3:00 Millimeter Cloud Radar System Upgrades and Calibration During the ARM Cloud IOP 2000/ARESE II Experiment
L. Li*, S. Sekelsky, M. Bergada, University of Massachusetts-Amherst

3:20 Corrosion Detection and Thickness Evaluation Using Microwave Nondestructive Testing Techniques
W. Saleh*, N. Qaddoumi, American University of Sharjah

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Thursday Afternoon
Fairfax B
URSI B

Frequency and Polarization Diversity
Co-chairs: D. McNamara, Canada and G. Kadambi, USA

1:00 The Effect of Slot Contour on the Polarization Characteristics of A Single Feed Dual Band PIFA
G. Kadambi*, K. Simmons, S. Yarasi, J. Sullivan, T. Hebron, Centurion Wireless Technologies

1:20 Comparison of Helmet and Vest Mounting Configurations for Switched Diversity Antennas

1:40 Multi-Frequency Printed Dipole with Built-In Filter
R.B. Hermida*, Santander University, L. Desc lose, Y. Mahe, S. Toutain, Ecole polytechnique universite de Nantes

2:00 Diversity PIFAs With Common and Compact Ground Plane

2:20 Multi-band, Multi-Mode Antenna Using Meanderline Structures
F. Caimi*, J. Kralovec, SkyCross, Inc.

2:40 The Application of Numerical Optimisation to the Design of Meanderline Polarisers
D. McNamara*, University of Ottawa

3:00 Size Reduction of Circularly-Polarized Microstrip Antennas
J. Powell*, R. Jedlicka, B. Blevins, New Mexico State University

3:20 A Comparative Analysis of Different Microstrip Antenna Structures Designed to Function as Single Frequency Technology
S. Khan*, Kansas State University
Genetic Algorithms
Co-chairs: E. Altshuler, USA and L. Rodgers, USA

1:00 Novel Dual Frequency Antenna with Same Beam Width Generated by GA-ICT Using Improved Objective Function
T. Maruyama*, T. Hori, Nippon Telegraph and Telephone Corporation

1:20 Design of Broadband Radar Absorbers with Genetic Algorithm
A. Bajwa*, T. Williams, M. Stuchly, University of Victoria

1:40 Genetic Algorithm Optimization and Realization of Broadband Loaded Wire Monopoles
S. Rogers*, e-tenna Corporation, C. Butler, A. Martin, Clemson University

2:00 Evolutionary Programming with Niching Technique for Efficient Model Parameter Extraction
N. Damavandi*, S. Safavi-Naeini, University of Waterloo


2:40 A Genetic Algorithm Approach for FSS Filter Design
Y. Yuan*, C.H. Chan, K.F. Man, City University of Hong Kong, R. Mittra, The Pennsylvania State University

3:00 Application of Micro-Genetic Algorithm (MGA) to the Synthesis of Broadband Microwave Absorbers Comprising Multiple Frequency Selective Surfaces
S. Chakravarty, R. Mittra*, The Pennsylvania State University, N. Williams, W.L. Gore & Associates

3:20 Automated Dual Band Patch Antenna Design by a Genetic Algorithm Based Numerical Code
F. Castellana, F. Bilotti*, L. Vegni, University of Roma Tre

3:40 Design of a PIFA Antenna Using FDTD and Genetic Algorithms
P. Pinho*, J.F. Rocha Pereira, Universidade de Aveiro

4:00 Antenna Input Impedance Determination via Genetic Algorithm
S. Selleri*, University of Florence

4:20 Design of Corrugated Absorbers for Oblique Incidence Using Genetic Algorithm
H. Choo*, H. Ling, University of Texas at Austin, C.S. Liang, Lockheed Martin Tactical Aeronautics Company

RCS Calculations
Co-chairs: H. Shirai, Japan and P. Baldensperger, USA

1:00 RCS Calculation for Large Inhomogeneous Penetrable Objects Using a Spectral Integral Equation Solver
Q.H. Liu*, Z.Q. Zhang, Duke University

1:20 Radar Cross Section of a Rectangular Cavity in a Finite Cylinder
R. Paknys*, Concordia University, S. Kashyap, A. Louie, Defence Research Establishment Ottawa

1:40 A New Technique for Scattering by the Electrical Large Body with an Open Cavity - Generalized CFIE
W.H. Gang*, N.Z. Ping, W. Jun, University of Electronic Science and Technology of China

2:00 A Hybrid SBR/FE-BI Technique for Computing the RCS of Electrically Large Objects with Deep Cavities
P. Baldensperger*, J. Liu, J.M. Jin, University of Illinois at Urbana-Champaign

2:20 Dielectric Radome Analysis Using Multilevel Fast Multiple Algorithm
C.C. Lu*, University of Kentucky

2:40 Analytic Scattering Model for Indoor Propagation
R. Musselman*, US Air Force Academy

3:00 The Method of Auxiliary Sources in Scattering and Diffraction Problems
Thursday Afternoon

Active Microstrip Phased Arrays
Co-chairs: H. Steyskal, USA and A. Fenn, USA

1:00 Electronically De-Spun Phased Array Antenna for Spinning Spacecraft
H. Underwood*, Messiah College

1:20 Theory of an Active Transmit/Reflect Array of Patch Antennas Operating as a Spatial Power Combiner
M. Bialkowski*, H. Song, University of Queensland, K-M. Luk, C.H.Chan, City University of Hong Kong

1:40 Spatial Power Combiner Using an Active Reflectarray of Dual-Feed Aperture Coupled Microstrip Patch Antennas
H. Son* , M. Bialkowski, University of Queensland

2:00 A Novel Proximity-Coupled Patch Antenna for Active Circuit Integration
S. Vajha*, TLC Precision Wafer Technology, Inc, P. Shastry, Bradley University

2:20 A Simple Circularly Polarized Beam-Switching Patch Array Antenna for Satellite Communication
D. Delaune*, K. Ito, I. Ida, Yoshimura, Chiba University

2:40 Electronically Switchable Beam Patterns Using Leaky-Wave Antenna
C.J. Wang*, Southern Taiwan University of Technology, C. Jou, I-Y. Chen, National Chiao-Tung University

3:00 A Modified Butler Matrix for Tapered Excitation of Scanned Arrays
A. Fragola, M. Orefice*, M. Pirola, Politecnico di Torino

3:20 Steerable Reactively Loaded Microstrip Loop Antenna
R.L. Li, V.F. Fusco*, Queens University Belfast

3:40 Microstrip Phased Array Development Using Microwave Antenna CAD Tools
N. Karmakar*, Nanyang Technological University, M. Bialkowski, University of Queensland, S. Padhi, Nanyang Technological University

4:00 Printed Dipole Radiating Elements for Broadband and Wide Scan Angle Active Phased Array
U.K. Revankar*, Harishchandra, Electronics and Radar Development Establishment, India

4:20 A Simplified Scanning Scheme for Millimeter-Wave Active Phased Arrays
A. Abbaspour-Tamijani*, K. Sarabandi, University of Michigan

Biology and Medicine
Chair: X. Li, USA

1:00 3-D Microwave Imaging for Biomedical Applications: Numerical Simulations
Qi.H. Liu*, Z.Q. Zhang, Duke University

1:20 Efficient Hybrid Integral Equation and Finite Difference Method for Low-Frequency Electric Induction in Humans
T.W. Dawson*, University of Victoria, S. Velamparabilla, University of Illinois

1:40 Comparison of Experimental and Numerical Methods for SAR Assessment in Human Head Phantoms
A. Christ*, K. Pokovic, H. Gerber, N. Chavannes, N. Kuster, Swiss Federal Institute of Technology

2:00 Fields in Adult and Child bodies from 60 Hz Electric Fields and Contact Currents
M. Stuchly*, T.W. Dawson, K. Caputa, A. Hirata, University of Victoria

2:20 Phased-Array Radar for Breast Cancer Detection
O. Ramahi*, R. Thakker, University of Maryland, S. Trabelsi, Richard B. Russell Agricultural Research Center
Wavelets
Chair: M. Tentzeris, USA

3:00 Multilayer Package Modeling Using the Multi-Resolution Time Domain Technique
N. Bushyager*, A. Obatoyinbo, M. Tentzeris, J. Laskar, Georgia Institute of Technology

3:20 On Daubechies Wavelet Based Time Domain Scheme
Y. Tretiakov*, G. Pan, Arizona State University

3:40 A Wavelet Packet Basis Optimization Approach to Radar Waveform Design
R. Bonneau*, Air Force Research Laboratory

4:00 Using Correlation in Wavelet Transform Coefficients
Z. Baharav*, Agilent Technologies Labs.

4:20 Evaluation of MoM Reaction Integrals for Multiresolution Basis Functions
F. Vipiana*, G. Vecchi, P. Pirinoli, Politecnico di Torino

5:00 Solution of EM Transients by Wavelet Expansion in the Time Domain
S. Barmarda*, Universita di Pisa, N. Ida, The University of Akron, M. Raugi, Universita di Pisa

Analysis Methods for Layered Media
Co-chair: J. Volakis, USA and M. Carr, USA

1:00 Implementation of Formulations for Dielectric Material and Perfect Conductors in G2DMULT
J. Yang*, P. S. Kildal, Chalmers, University of Technology

1:20 Efficient Use of Closed Form Green's Functions for the Electromagnetic Scattering by 3D Buried Objects
P. Yla-Oijala*, M. Taskinen, University of Helsinki

1:40 A Simulated Image Model for Buried Electrodes in Multilayered Media
R.M. Shubair*, Etisalat College of Engineering

2:00 Multi-Domain Pseudospectral Time-Domain Method for Lossy Media
G.X. Fan*, Q.H.Liu, Duke University, J.S. Hesthaven, Brown University

2:20 On the Accuracy of the Complex Image Method
M. Hellen*, I.J. Craddock, University of Bristol

2:40 A Fast Analysis Method Based on Exponential Expansion of Green's Functions for Large Multilayer Structures
M. Ayatollahi*, S. Safavi-Naeini, University of Waterloo

3:00 A Boundary Integral Method for A Mutli-Layered Problem
F. Seydou*, T. Seppanen, University of Oulu

3:20 Adaptive Integral Method Applied to Multilayer Penetrable Scatterers with Junctions
M. Carr*, E. Topsakal, J. Volakis, University of Michigan, D.C. Ross, Sikorsky Aircraft Corporation

3:40 A Robust Generalized DCIM Technique with Pole Extraction
S.A. Teo*, M.S. Leong, S.T. Chew, B.L. Ooi, The National University of Singapore

4:00 Fast Computation of Multi-Layered Green's Function
D. Lee*, S. Safavi-Naeini, Motorola, Inc./University of Waterloo