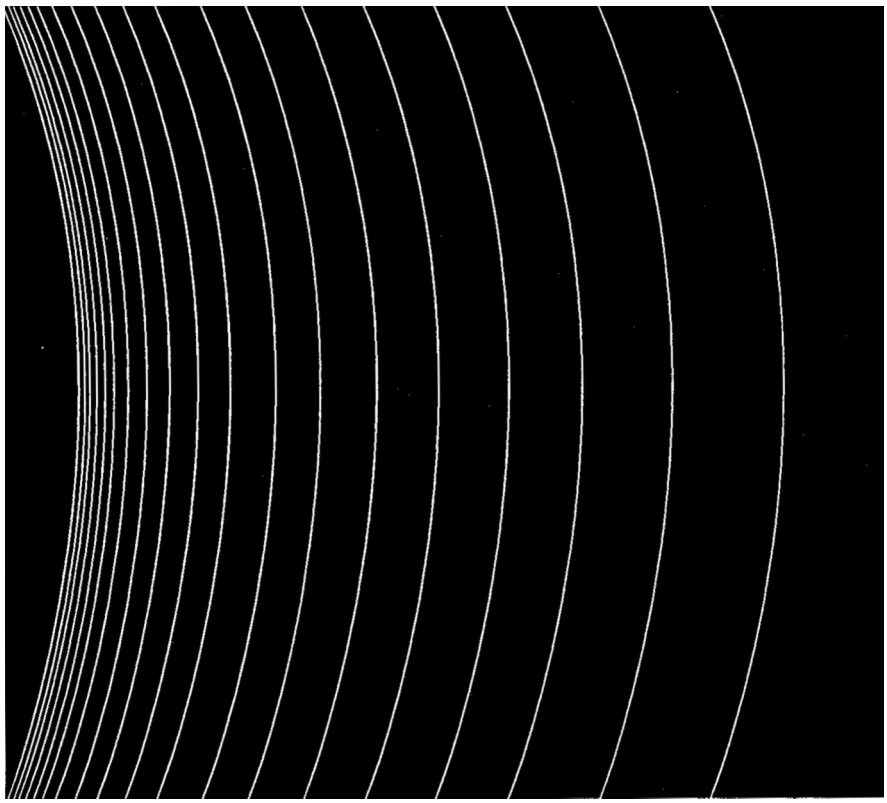
USNC–URSI National Radio Science Meeting

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine



8–11 January 2014

Boulder, Colorado, USA

Sponsored by the US National Committee for

International Union of Radio Science

and CU Conference Services,

University of Colorado Boulder

www.nrsmboulder.org

International Union of Radio Science / Union Radio Scientifique Internationale

Founded in 1919, the International Union of Radio Science (URSI) coordinates studies, research, applications, scientific exchange, and communication in all fields of radio science from telecommunications and radio astronomy to medicine (www.ursi.org).

Both URSI and the U.S. National Committee (USNC) of URSI are organized into ten commissions:

Electromagnetic Metrology (Commission A)
Fields and Waves (Commission B)
Radiocommunication Systems and Signal Processing (Commission C)
Electronics and Photonics (Commission D)
Electromagnetic Environment and Interference (Commission E)
Wave Propagation and Remote Sensing (Commission F)
Ionospheric Radio and Propagation (Commission G)
Waves in Plasmas (Commission H)
Radio Astronomy (Commission J)
Electromagnetics in Biology and Medicine (Commission K)

About the USNC-URSI

The U.S. National Committee of URSI (USNC-URSI) is appointed by the National Research Council of the National Academies and represents U.S. radio scientists in URSI. It encourages studies in radio science, provides a forum for the dissemination of research findings, and provides an organizational infrastructure for the radio science community in the United States.

The USNC-URSI hosts the National Radio Science Meeting (NRSM) each January in Boulder, Colorado. The IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (RSM), co-sponsored by USNC-URSI and the Antennas and Propagation Society of the Institute of Electrical and Electronics Engineers (IEEE/AP-S), is held each summer. Every five to eight years, a North American Radio Science Meeting (NARSM) is organized, co-sponsored by the U.S. and Canadian National Committees to URSI. The next NARSM will be held in Vancouver, British Columbia, Canada on July 19–25, 2015. Therefore, the usual USNC-URSI NRSM in Boulder will not be held in 2015.

The international URSI General Assembly and Scientific Symposium is held every three years in locations around the world. The 30th URSI General Assembly and Scientific Symposium was held in Istanbul, Turkey, on August 13-20, 2011. Over 1,000 U.S. and international scientists, including 264 students and Young Scientists, participated in technical sessions covering the areas of all ten URSI Commissions. The 31st URSI General Assembly and Scientific Symposium will be held in Beijing, China, on August 17–23, 2014. The deadline for abstract submissions and applications for URSI Young Scientist Awards is February 15, 2014. The symposium website is www.chinaursigass.com.

For further information on USNC-URSI please visit www.usnc-ursi.org.

U.S. National Committee Leadership and Commission Chairs (2012-2014)

(In addition to the individuals below, the USNC-URSI includes Members at Large, Society Representatives, and scientists serving in executive roles in international URSI.)

Steven C. Reising
USNC Chair
Professor, Department of Electrical and Computer Engineering
Colorado State University
Email: steven.reising@colostate.edu

David R. Jackson
USNC Secretary and Chair-Elect
Professor, Department of Electrical and Computer Engineering
University of Houston
Email: djackson@uh.edu

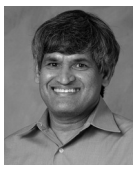
Yahya Rahmat-Samii
USNC Immediate Past Chair
Northrop Grumman Professor of Electrical Engineering
University of California at Los Angeles
Email: rahmat@ee.ucla.edu

Gary S. Brown
USNC Accounts Manager
Bradley Distinguished Professor of Electromagnetics
Virginia Polytechnic Institute and State University
Email: randem@vt.edu

Kathie Bailey-Mathae
Director, Board on International Scientific Organizations
The National Academies
Email: kbmathae@nas.edu

Ana M. Ferreras
Senior Program Officer
Board on International Scientific Organizations
The National Academies
Email: AFerreras@nas.edu

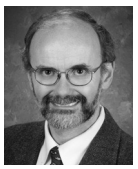
Christopher L. Holloway
Chair, USNC Comm. A
Electromagnetics Division
National Institute of Standards and Technology (NIST)
Email: holloway@boulder.nist. gov



Sembiam Rengarajan
Chair, USNC Comm. B
Professor, Department of Electrical and Computer Engineering
California State University, Northridge
Email: srengarajan@csun.edu

Amir I. Zaghloul
Chair, USNC Comm. C
Professor, Bradley Department of Electrical and Computer Engineering
Virginia Tech
Email: amirz@vt.edu

Jennifer T. Bernhard
Chair, USNC Comm. D
Professor, Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign
Email: jbernhar@illinois.edu



Everett G. Farr
Chair, USNC Comm. E
Farr Fields, LC
Email: efarr@farr-research.com

V. Chandrasekar
Chair, USNC Comm. F
Professor, Departments of Electrical and Computer Engineering and Biomedical Engineering
Colorado State University
Email: chandra@engr.colostate.edu

Frank Lind
Chair, USNC Comm. G
Research Engineer, Atmospheric Sciences Group
MIT Haystack Observatory
Email: flind@haystack.mit.edu

Victor Pasko
Chair, USNC Comm. H
Professor, Department of Electrical Engineering
The Pennsylvania State University
Email: vpasko@psu.edu

Richard F. Bradley
Chair, USNC Comm. J
Scientist/Senior Research Engineer
National Radio Astronomy Observatory
Email: rbradley@nrao.edu

Erdem Topsakal
Chair, USNC Comm. K
Associate Professor, Department of Electrical and Computer Engineering
Mississippi State University
Email: topsakal@ece.msstate.edu

Starting last year, authors have the option to have their abstracts archived in IEEE Xplore (subject to standard IEEE processing) through the technical co-sponsorship of the meeting by the IEEE Antennas and Propagation Society (IEEE/AP-S).

Contents

TUESDAY EVENING, 7 January 2014

19:00 – 23:00 USNC-URSI Committee, Millennium Hotel

WEDNESDAY MORNING, 8 January 2014

Session A1: Theory and Metrology of Antennas, Lenses, and Focusing Structures
Room 151

Co-Chairs: John Ladbury, *NIST*;
Christopher Holloway, *NIST*

08:20 A1-1
FLAT POLARIZING LENSES: DESIGN, SYNTHESIS AND APPLICATIONS
Mehdi Veysi*, Ozdal Boyraz, Filippo Capolino
Dept. of Electrical Engineering and Computer Science, University of California Irvine (UCI), Irvine, CA

08:40 A1-2
MM-WAVE BEAM SCANNING FOCAL PLANE ARRAYS USING MICROFLUIDIC RECONFIGURATION TECHNIQUES
Ahmad Gheethan*, Abhishek Dey, Gokhan Mumcu
Dept. of Electrical Engineering, University of South Florida, Tampa, FL

09:00 A1-3
MEASURED BANDWIDTH OF RESONANT PATCH ANTENNAS SUPPORTED BY A CONDUCTING SPHERE WITH COMPARISONS TO CHU'S LIMIT
Steven Weiss*[1], Amang Boliong[2]
[1]*US Army Research Lab, Adelphi, MD*
[2]*Morgan State University, Baltimore, MD*

09:20 A1-4
WIDEBAND DIRECT ANTENNA MODULATION USING HIGH-Q ANTENNAS
Mohsen Salehi*, Majid Manteghi
Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

09:40 A1-5
A METHOD OF PHASE-LESS MEASUREMENTS FOR THE CIRCULARLY POLARIZED GAIN IN THE SUB-MILLIMETER BAND
Shubhendu Bhardwaj*, Niru K. Nahar, John L. Volakis

Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

10:00 Break

10:20 A1-6
A PHASELESS NEAR-FIELD MEASUREMENT TECHNIQUE FOR ANTENNAS WITH AN INTERNAL SOURCE
Timothy Brockett, Yahya Rahmat-Samii*
Dept. of Electrical Engineering, University of California Los Angeles, Los Angeles, CA

10:40 A1-7
HARMONICALLY LOADED ACTIVE INTEGRATED ANTENNA USING CHARACTERISTIC MODE THEORY
Renaud Moussounda, Ezdeen A. Elghannai*, Roberto G. Rojas
Dept. of Electrical and Computer Engineering, The Ohio State University, Columbus, OH

Session B1: Advances in Antenna Arrays
Room 155

Co-Chairs: John Volakis, *Ohio State University*;
Atef Elsherbeni, *Colorado School of Mines*

08:20 B1-1
DIRECTION OF ARRIVAL ESTIMATION ENHANCEMENT FOR CLOSELY SPACED ELECTRICALLY SMALL ANTENNA ARRAY
Xiaoju Yu, Hao Xin*
Dept. of Electrical and Computer Engineering, University of Arizona, Tucson, AZ

08:40 B1-2
AN ARRAY OF TWO-PORT LOOP ANTENNAS FOR DIRECTION OF ARRIVAL ESTIMATION
Robert A. Scott*, Jennifer T. Bernhard
University of Illinois Urbana-Champaign, Champaign, IL

09:00 B1-3
INVESTIGATION OF SUM-DIFFERENCE BEAM GENERATION USING INTERIOR AND PERIMETER ELEMENTS OF PLANAR RANDOM ARRAY TOPOLOGIES
Kristopher R. Buchanan*, Amanda Couch, David Grayson, Ryan Brown, Gregory H. Huff
Dept. of Electrical and Computer Engineering, Texas A&M University, College Station, TX

09:20 B1-4
ULTRA-WIDEBAND TCDA-IB WITH SUBSTRATE LOADING FOR DUAL POLARIZATION

Dimitrios Papantonis*, Markus H. Novak, John L. Volakis
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

09:40 B1-5
ULTRA-WIDEBAND BANDWIDTH-RECONFIGURABLE TIGHTLY COUPLED ARRAY
Dimitrios Papantonis*, Markus H. Novak, John L. Volakis
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

10:00 Break

10:20 B1-6
HIGH-POWER ULTRA-WIDEBAND SPIRAL ANTENNA ARRAYS
Mohamed A. Elmansouri*, Saurabh Sanghai, Dejan S. Filipovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

10:40 B1-7
THE PARABOLIC-TORUS-PHASE REFLECTARRAY ANTENNA
Payam Nayeri*[1], Fan Yang[2], Atef Z. Elsherbeni[3]
[1]*Dept. of Electrical Engineering, The University of Mississippi, University, MS*
[2]*Dept. of Electronic Engineering, Tsinghua University, Beijing, CHINA*
[3]*Dept. of Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*

11:00 B1-8
TRIPLE-LAYER TRANSMITARRAY ANTENNA DESIGNS
Ahmed H. Abdelrahman*[1], Fan Yang[2], Atef Z. Elsherbeni[3]
[1]*Center of Applied Electromagnetic System Research (CAESR), Dept. of Electrical Engineering, The University of Mississippi, University, MS*
[2]*Microwave and Antenna Institute, Dept. of Electronic Engineering, Tsinghua University, Beijing, CHINA*
[3]*Dept. of Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*

11:20 B1-9
THE EFFECT OF FEEDING TECHNIQUES ON THE BANDWIDTH OF MILLIMETER-WAVE PATCH ANTENNA ARRAYS
Firas N. Ayoub*[1], Christos G. Christodoulou[1], Youssef Tawk[1], Joseph Costantine[2], Sameer Hemmady[1]
[1]*Configuration Space Microsystems Innovation and Applications Center (COSMIAC), University of New Mexico, Albuquerque, NM*
[2]*Dept. of Electrical Engineering, California State University Fullerton, Fullerton, CA*

Session B2: Metamaterials Structures
Room 1B40

Co-Chairs: Filippo Capolino, *University of California, Irvine*;
Yahya Rahmat-Samii, *University of California, Los Angeles*

08:20 B2-1
ROLES OF EPSILON-NEAR-ZERO (ENZ) AND MU-NEAR-ZERO (MNZ) MATERIALS IN OPTICAL METATRONIC CIRCUIT NETWORKS
Fereshteh Abbasi*, Nader Engheta
Dept. of Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, PA

08:40 B2-2
EPSILON-AND-MU-NEAR-ZERO (EMNZ) STRUCTURES
Ahmed M. Mahmoud*, Nader Engheta
Dept. of Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, PA

09:00 B2-3
GRADED METAREFLECTORS FOR WAVE MANIPULATION AND CONTROL AT THE NANOSCALE
Nasim Mohammadi Estakhri*, Andrea Alu
Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX

09:20 B2-4
DESIGN AND REALIZATION OF TRANSISTOR-EMBEDDED ACTIVE RF METAMATERIALS
John P. Barrett*, Steven A. Cummer
Dept. of Electrical and Computer Engineering, Duke University, Durham, NC

09:40 B2-5
IMPEDANCE MATCHING, ENERGY SQUEEZING AND RECONFIGURABLE LENSES BASED ON ENZ METAMATERIALS
Jason C. Soric*, Andrea Alu
Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX

10:00 Break

10:20 B2-6
A MICROWAVE METAMATERIAL WITH INTEGRATED POWER HARVESTED FUNCTIONALITY
Allen M. Hawkes*, Alexander R. Katko, Steven A. Cummer
Dept. of Electrical and Computer Engineering, Duke University, Durham, NC

10:40 B2-7
HIGH POWER MICROWAVE SLOW WAVE STRUCTURE FOR RELATIVISTIC BEAMS
Muhammed R. Zuboraj*, Niru K. Nahar, Kubilay Sertel, John L. Volakis

Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

11:00 B2-8
CANALIZATION OF SURFACE PLASMON POLARITONS ON A GRAPHENE SHEET WITH A PERTURBED GROUND PLANE
Ebrahim Forati*[1], George W. Hanson[1], Alexander B. Yakovlev[2], Andrea Alu[3]
[1]*Dept. of Electrical Engineering, University of Wisconsin Milwaukee, Milwaukee, WI*
[2]*Dept. of Electrical Engineering, University of Mississippi, Oxford, MS*
[3]*Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX*

11:20 B2-9
TRANSISTOR-EMBEDDED ACOUSTO-OPTIC AND NONLINEAR METAMATERIALS
Alexander R. Katko*, Steven A. Cummer
Dept. of Electrical and Computer Engineering, Duke University, Durham, NC

11:40 B2-10
SUPERQUADRIC SHAPED NANO-PILLARS FOR IMPROVED ELECTROMAGNETIC ABSORPTION IN NANO-STRUCTURED SOLAR CELLS
Timothy Brockett, Yahya Rahmat-Samii*
Dept. of Electrical and Computer Engineering, University of California, Los Angeles, Los Angeles, CA

Session EGH1: Lightning and its Interactions with the Ionosphere I
Mathematics Auditorium (Math 100)

Co-Chairs: Joseph Dwyer, *Florida Tech*;
Steven Cummer, *Duke University*;
Ningyu Liu, *Florida Institute of Technology*

08:20 EGH1-1
SPRITE STREAMER LUMINOSITY RESPONSE TO MULTI-STROKE LIGHTNING DYNAMICS
Matthew G. McHarg*[1], Hans C. Stenbaek-Nielsen[2], Takeshi Kanmae[2], Ryan Haaland[3], Steven Cummer[4], Tom Warner[5], Tom Nelson[5], Walt Lyons[5], Bill Rison[6], Paul Krehbiel[6]
[1]*US Air Force Academy, US Air Force Academy, CO*
[2]*Geophysical Institute, University of Alaska, Fairbanks, AK*
[3]*Fort Lewis College, Durango, CO*
[4]*Duke University, Durham, NC*
[5]*FMA Research, Fort Collins, CO*
[6]*New Mexico Tech., Socorro, NM*

08:40 EGH1-2
INVESTIGATION OF STREAMER INITIATION IN SPRITE-HALO EVENTS
Jianqi Qin*[1], Victor P. Pasko[1], Matthew G. McHarg[2], Hans C. Stenbaek-Nielsen[3]

[1]*Dept. of Electrical Engineering, The Pennsylvania State University, University Park, PA*
[2]*Dept. of Physics, United States Air Force Academy, Colorado Spring, CO*
[3]*Geophysical Institute, University of Alaska Fairbanks, Fairbanks, AK*

09:00 EGH1-3
MODELING SPRITE STREAMER INITIATION FROM AN UNSTABLE SPRITE HALO FRONT
Ningyu Liu*, Joseph Dwyer
Dept. of Physics and Space Sciences, Florida Institute of Technology, FL

09:20 EGH1-4
MECHANISM OF FAST AIR HEATING AND INFRASOUND GENERATION BY SPRITES
Caitano L. da Silva*, Victor P. Pasko
Communications and Space Sciences Laboratory, Dept. of Electrical Engineering, Pennsylvania State University, University Park, PA

09:40 EGH1-5
LATITUDINAL DEPENDENCE OF THE QUASI-ELECTROSTATIC FIELDS ABOVE THUNDERSTORMS
Rasoul Kabirzadeh*[1], Nikolai Lehtinen[1], Fadi Zoghzoghy[1], Morris Cohen[2], Umran Inan[1,3]
[1]*Dept. of Electrical Engineering, Stanford University, Stanford, CA*
[2]*Georgia Institute of Technology, Atlanta, GA*
[3]*Koc University, Istanbul, TURKEY*

10:00 Break

10:20 EGH1-6
THE VLF FINGERPRINT OF ELVES: STEP-LIKE AND LONG-RECOVERY EARLY VLF PERTURBATIONS CAUSED BY POWERFUL CG LIGHTNING EM PULSES
Christos Haldoupis*[1], Morris B. Cohen[2], Enrico Arnone[3], Benjamin R. T. Cotts[4], Stefano Dietrich[5]
[1]*Dept. of Physics, University of Crete, Heraklion, GREECE*
[2]*School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA*
[3]*Istituto di Scienze dellAtmosfera e del Clima, CNR, Bologna, ITALY*
[4]*Electrical Engineering and Computer Science Practice, Exponent Inc., Bowie, MD*
[5]*Istituto di Scienze dellAtmosfera e del Clima, CNR, Rome, ITALY*

10:40 EGH1-7
CHARACTERIZATION OF ONSET DURATIONS FOR EARLY VLF SCATTERING EVENTS
Daniel A. Kotovsky, Robert C. Moore*
Dept. of Electrical and Computer Engineering, University of Florida, Gainesville, FL

11:00 EGH1-8
LOCAL AND CONJUGATE IONOSPHERIC DISTURBANCES FROM HIGH PEAK CURRENT OCEANIC LIGHTNING EVENTS

Nicholas C. Gross*[1], Mark Golkowski[1], Robert C. Moore[2], Benjamin R. T. Cotts[3]
[1]*Dept. of Electrical Engineering, University of Colorado Denver, Denver, CO*
[2]*Dept. of Electrical and Computer Engineering, University of Florida, Gainesville, FL*
[3] *Electrical Engineering and Computer Science Practice, Exponent, Bowie, MD*

11:20 EGH1-9
CHARACTERISTICS OF VLF/LF SFERICS FROM ELVE-PRODUCING LIGHTNING
Patrick R. Blaes*, Robert A. Marshall
Dept. of Electrical Engineering, Stanford University, Stanford, CA

11:40 EGH1-10
MEASUREMENT OF SENSITIVE CURRENT AND CHARGE MOTION USING COHERENT AVERAGING OF REMOTE LOW FREQUENCY MAGNETIC FIELD OBSERVATIONS
Joel L. Weinert*, Steven A. Cummer
Dept. of Electrical and Computer Engineering, Duke University, Durham, NC

12:00 EGH1-11
AN ANALYSIS OF ELF SFERICS PRODUCED BY ROCKET-TRIGGERED LIGHTNING
Neal A. Dupree*, Robert C. Moore
Dept. of Electrical and Computer Engineering, University of Florida, Gainesville, FL

Session F1: Propagation and Remote Sensing in Complex and Random Media
Room 1B12

Co-Chairs: Gary Brown, *Virginia Polytechnic Institute and State University*;
Joel Johnson, *The Ohio State University*

08:20 F1-1
A PROPAGATION MODEL FOR CLOSE-IN DISTANCES AND VERY LOW ANTENNA HEIGHTS BASED ON BOTH ELECTROMAGNETIC THEORY AND MEASURED DATA
Nicholas N. DeMinco*, Paul M. McKenna, Robert T. Johnk
NTIA/ITS, Institute for Telecommunication Sciences, Boulder, CO

08:40 F1-2
EXAMINING CONSTANTS IN THE PAULUS-JESKE EVAPORATION DUCT MODEL
Nathaniel G. Grimes, Erin E. Hackett*
School of Coastal and Marine Systems Science, Coastal Carolina University, Conway, SC

09:00 F1-3
A REEXAMINATION OF THE SINGLE SCATTERING APPROXIMATION
Gary S. Brown*
Virginia Polytechnic Institute and State University, Blacksburg, VA

09:20 F1-4

A COMPARISON OF PROPAGATION OVER ROUGH SEA SURFACES USING MOM AND PWE METHODS
Frank J. Ryan*[1], Joel T. Johnson[2], Robert J. Burkholder[2]
[1]*Applied Technology, Inc., San Diego, CA*
[2]*Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH*

09:40 F1-5
CALCULATION OF KU- AND C-BAND POLARIMETRIC AZIMUTHAL DEPENDENCES OF RADAR BACKSCATTERING FROM SEA SURFACES
Alexander G. Voronovich*, Valery U. Zavorotny
Physical Sciences Division, NOAA/Earth System Research Laboratory, Boulder, CO

10:00 Break

10:20 F1-6
PRELIMINARY ELECTROMAGNETIC MEASUREMENT RESULTS FROM TRIDENT WARRIOR13 USING SOURCES OF OPPORTUNITY
Caglar Yardim*[1], Ted Rogers[2], Steve Lynch[2], Nathan Fuhrer[2], Peter Gerstoft[1]
[1]*University of California, San Diego, La Jolla, CA*
[2]*SSC Pacific, San Diego, CA*

10:40 F1-7
CHARACTERIZATION OF ELECTROMAGNETIC FIELDS IN COMPLEX SYSTEMS THROUGH PHASE-SPACE TECHNIQUES
Gabriele Gradoni*, Stephen C. Creagh, Gregor Tanner
School of Mathematical Sciences, University of Nottingham, Nottingham, UNITED KINGDOM

Session FGH1: Global Navigation Satellite Systems and Radio Beacon Remote Sensing I
Room 1B28

Co-Chairs: Charles Carrano, *Boston College*;
Carl Siefring, *Naval Research Laboratory*;
Valery Zavorotny, *NOAA/Earth System Research Laboratory*

08:20 FGH1-1
MULTI-CONSTELLATION AND MULTI-FREQUENCY GNSS STUDIES OF IONOSPHERIC SCINTILLATION
Yu Jade Morton*[1], Dongyang Xu[1], Mark Carroll[1], Yu Jiao[1], Jun Wang[1], Steve Taylor[1], Xiaolei Mao[2]
[1]*Dept. of Electrical and Computer Engineering, Miami University, Oxford, OH*
[2]*Samsung, Cedar Rapids, IA*

08:40 FGH1-2

STUDIES OF IONOSPHERIC STRUCTURE USING THE GPS OCCULTATION EXPERIMENT (GOX) ON THE COSMIC SATELLITE CONSTELLATION
Kenneth Dymond*
Naval Research Laboratory, Washington, DC

09:00 FGH1-3
INFERRING 2D SPATIO-TEMPORAL PROPERTIES OF IRREGULARITIES FROM A CLOSELY-SPACED SUB-AURORAL SCINTILLATION ARRAY
Seebany Datta-Barua*[1], Gary S. Bust[2], Yang Su[1], Kshitija Deshpande[3]
[1]*Dept. of Mechanical, Materials and Aerospace Engineering, Illinois Institute of Technology, Chicago, IL*
[2]*Applied Physics Laboratory, Johns Hopkins University, Laurel, MD*
[3]*Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA*

09:20 FGH1-4
REAL-TIME SCINTILLATION MONITORING IN THE AURORAL ZONE FROM A LONGITUDINAL CHAIN OF ASTRAS SM-211 GPS TEC AND SCINTILLATION RECEIVERS
Geoff Crowley*[1], Irfan Azeem[1], Adam Reynolds[1], Julio Santana[1], Donald Hampton[2]
[1]*ASTRA, Boulder, CO*
[2]*Geophysical Institute, Fairbanks, AK*

09:40 FGH1-5
AN INVERSE DIFFRACTION METHOD FOR MAPPING THE DETERMINISTIC STRUCTURE OF IONOSPHERIC SCINTILLATIONS FROM ONE FREQUENCY TO ANOTHER
Charles S. Carrano*, Keith M. Groves
Institute for Scientific Research, Boston College, Chestnut Hill, MA

10:00 Break

10:20 FGH1-6
REVISITING THE TOTAL ELECTRON CONTENT ANOMALY OVER MID-NORTH AMERICA
Anthea J. Coster*[1], Evan Thomas[2], Shunrong Zhang[1], Ziwei Chen[1]
[1]*MIT Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*
[2]*Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA*

10:40 FGH1-7
ANALYSIS OF TEC MEASUREMENTS FROM SOUNDING ROCKETS USING DIFFERENTIAL PHASE FROM TWO-FREQUENCY RADIO BEACONS
Carl L. Siefring*[1], Paul A. Bernhardt[1], Matthew R. Wilkens[2], Ronald G. Caton[3], Richard T. Parris[3], Jack W. Hines[3], Kieth M. Groves[4], Mamoru Yamamoto[5]

[1]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*
[2]*Sotera Defense Solution Inc., Herndon, VA*
[3]*Space Vehicles Directorate, Air Force Research Laboratory, Kirtland AFB, NM*
[4]*Institute for Space Research, Boston College, Boston, MA*
[5]*RISH, Kyoto University, Kyoto, JAPAN*

11:00 FGH1-8
TOMOGRAPHIC RECONSTRUCTION OF SIMULATED TWO-DIMENSIONAL PROPAGATION DATA
Charles L. Rino*
Institute for Scientific Research, Boston College, Boston, MA

11:20 FGH1-9
2-D RADIO IMAGING OF IONOSPHERIC ELECTRON DENSITY IN THE EQUATORIAL PLANE: ALGORITHMS AND RESULTS
Kirk T. Landin*[1], Farzad Kamalabadi[1], Paul A. Bernhardt[2]
[1]*University of Illinois at Urbana-Champaign, Urbana, IL*
[2]*U.S. Naval Research Laboratory, Washington, DC*

11:40 FGH1-10
THREE-DIMENSIONAL IONOSPHERE TOMOGRAPHY WITH GPS-TEC FROM GEONET IN JAPAN
Mamoru Yamamoto*[1], Gopi Seemala[1], Chia-Hung Chen[2], Akinori Saito[3]
[1]*Research Institute for Sustainable Humanosphere, Kyoto University, Kyoto, JAPAN*
[2]*Dept. of Earth Science, National Cheng Kung University, Tainan, TAIWAN*
[3]*Dept. of Geophysics, Kyoto University, Kyoto, JAPAN*

Session G1: Space Plasma Measurement Techniques I
Room 1B51

Co-Chairs: Philip Erickson, *MIT Haystack Observatory*;
Tom Gaussiran, *University of Texas at Austin*

08:20 G1-1
INVERTING ARECIBO PLASMA RESONANCE MEASUREMENTS TO RECOVER ELECTRON TEMPERATURE AND DENSITY
Michael P. Sulzer*
Arecibo Observatory, Arecibo, PR

08:40 G1-2
PLANS FOR AN MF/HF ANTENNA ARRAY FOR IONOSPHERIC RADIO AND RADAR IMAGING
Brett Isham*[1], Tamara Vega[2]
[1]*Dept. of Electrical and Computer Engineering, Interamerican University of Puerto Rico, Bayamon, PR*
[2]*Trigon Digital Inc., Quebradillas, PR*

09:00 G1-3
PASSIVE RADAR INTERFEROMETRY OF METEOR TRAILS
Shayan Sohbatzadeh*, Frank Lind, Philip Erickson, Robert Schaefer
MIT Haystack Observatory, Massachusetts Institute of Technology, Westford, MA

09:20 G1-4
ITERATIVE THRESHOLDING MATCHED FILTERS FOR SPARSE RADAR TARGETS
Ryan Volz*, Sigrid Close
Dept. of Aeronautics and Astronautics, Stanford University, Stanford, CA

09:40 G1-5
RADAR HOLOGRAPHY USING COMPRESSED SENSING FOR POINT TARGETS
Qian Zhu*[1], John Mathews[1], Ryan Volz[2]
[1]*Dept. of Electrical Engineering, The Pennsylvania State University, State College, PA*
[2]*Dept. of Aeronautics and Astronautics, Stanford University, Stanford, CA*

10:00 Break

10:20 G1-6
TRANSIENT PLASMA ANALYZER FOR HYPERVELOCITY IMPACT EXPERIMENTS
David Lauben*, Sigrid Close, Ashish Goel, Paul Tarantino
Dept. of Aeronautics and Astronautics, Stanford University, Stanford, CA

10:40 G1-7
SIMULATION OF ISR DATA AND APPLICATION TO SPATIAL SAMPLING OF THE IONOSPHERE
John P. Swoboda*[1], Joshua L. Semeter[1], Philip J. Erickson[2]
[1]*Dept. of Electrical and Computer Engineering, Boston University, Boston, MA*
[2]*Atmospheric Sciences Group, MIT Haystack Observatory, Westford, MA*

11:00 G1-8
NEW METHODS FOR RFI MITIGATION WITH APPLICATIONS TO INCOHERENT SCATTER AND TO IONOSONDE PROCESSING
Juha Vierinen*
MIT Haystack Observatory, Massachusetts Institute of Technology, Westford, MA

11:20 G1-9
WAVE ACTIVITY IN THE THERMOSPHERE-IONOSPHERE SYSTEM AS DETERMINED FROM DYNASONDE DATA
Catalin Negrea*[1,2,3], Nikolay Zabotin[1,4], Terrence Bullett[2,4], Oleg Godin[2,5]
[1]*Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO*
[2]*Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder, Boulder, CO*
[3]*Space Weather Prediction Center, National Oceanic and Atmospheric Administration, Boulder,*

CO
[4]*Cooperative Institute for Research in Environmental Sciences, National Oceanic and Atmospheric Administration, Boulder, CO*
[5]*Physical Sciences Division, National Oceanic and Atmospheric Administration, Boulder, CO*

Session J1: New Telescopes, Techniques, and Observations
Room 265

Co-Chairs: David DeBoer, *University of California Berkeley*;
Richard Bradley, *National Radio Astronomy Observatory*

08:20 J1-1
MEASUREMENT OF ABSOLUTE FLUX DENSITIES FOR METER-WAVELENGTH CALIBRATION SOURCES
Richard H. Tillman*, Steven W. Ellingson
Bradley Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

08:40 J1-2
AN ENGINEERING PROTOTYPE FOR THE DARE (DARK AGES RADIO EXPLORER)
Abhirup Datta*[1], Richard Bradley[2], Bang D. Nhan[1], Jack O. Burns[1]
[1]*Dept. of Astrophysics and Planetary Science, Center for Astrophysics and Space Astronomy, University of Colorado Boulder, Boulder, CO*
[2]*National Radio Astronomy Observatory, Charlottesville, VA*

09:00 J1-3
CHASING COSMIC DAWN: THE LEDA EXPERIMENT
Danny C. Price*, Jonathon Kocz, Benjamin R. Barsdell, Lincoln J. Greenhill
Harvard-Smithsonian Center for Astrophysics, Cambridge, MA

09:20 J1-4
THE CHIME (CANADIAN HYDROGEN INTENSITY MAPPING EXPERIMENT) INSTRUMENT: A NOVEL CYLINDRICAL INTERFEROMETER
Kevin M. Bandura*, Chime Collaboration
Dept. of Physics, McGill University, Montreal, QC, CANADA

09:40 J1-5
LEKID-BASED INSTRUMENTS FOR COSMIC MICROWAVE BACKGROUND POLARIMETRY
Glenn Jones*
NRAO /Columbia University, New York, NY

10:00 Break

10:20 J1-6
REPORT ON PROGRESS OF THE DEVELOPMENT OF MMIC RECEIVERS FOR OBSERVATION IN THE 3-MM BAND AT CARMA
James W. Lamb*[1], Michael Laxen[1], Jacob W. Kooi[2], Kieran Cleary[2], Rodrigo Reeves[2], Rohit Gawande[2], Richard L. Plambeck[3]
[1]*OVRO, California Institute of Technology, Big Pine, CA*
[2]*Radio Astronomy, California Institute of Technology, Pasadena, CA*
[3]*Radio Astronomy, UC Berkeley, Berkeley, CA*

10:40 J1-7
ARGUS: A W-BAND 16-PIXEL FOCAL PLANE ARRAY FOR THE GREEN BANK TELESCOPE
Kiruthika Devaraj*[1], Sarah Church[1], Kieran Cleary[2], David Frayer[3], Rohit Gawande[2], Paul Goldsmith[4], Joshua Gundersen[5], Andrew Harris[6], Pekka Kangaslahti[4], Anthony Readhead[2], Rodrigo Reeves[2], Lorene Samoska[4], Matt Sieth[1], Patricia Voll[1]
[1]*Kavli Institute for Particle Astrophysics and Cosmology, Stanford University, Stanford, CA*
[2] *Dept. of Astronomy, Caltech, Pasadena, CA*
[3]*National Radio Astronomy Observatory, Green Bank, WV*
[4]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[5]*University of Miami, Miami, FL*
[6]*University of Maryland, College Park, MD*

11:00 J1-8
SETI SEARCHES FOR RADIO TRANSIENTS FROM KEPLER FIELD PLANETS AND ASTROPULSE CANDIDATES
Abhimat K. Gautam*, Andrew Siemion, Eric Korpela, Jeff Cobb, Matt Lebofsky, Dan Werthimer
University of California, Berkeley, Berkeley, CA

11:20 J1-9
SWARM: 4-GHZ SUBMILLIMETER CORRELATOR AND VLBI BEAMFORMER
Rurik A. Primiani*, Jonathan Weintroub
Smithsonian Astrophysical Observatory, Cambridge, MA

11:40 J1-10
EXPERIENCES WITH THE DESIGN AND CONSTRUCTION OF WIDEBAND SPECTRAL LINE AND PULSAR INSTRUMENTATION WITH CASPER HARDWARE AND SOFTWARE: THE DIGITAL BACKEND SYSTEM
John Ford*[1], Marty Bloss[1], Joe Brandt[1], Ramon Creager[1], Paul Demorest[1], Glenn Jones[2], Jintao Luo[1], Randy McCullough[1], Richard Prestage[1], Scott Ransom[1], Jason Ray[1], Galen Watts[1], Mark Whitehead[1]
[1]*National Radio Astronomy Observatory, Green Bank, WV*
[2]*Columbia University, New York, NY*

WEDNESDAY AFTERNOON, 8 January 2014

Session A2: Theory and Metrology of Wireless, Millimeter Wave, and Terahertz Devices
Room 151

Co-Chairs: Jason Coder, *National Institute of Standards and Technology*;
John Ladbury, *NIST*

13:20 A2-1
TIME-FREQUENCY ANALYSIS OF THE SCATTERED SIGNAL FROM CHIPLESS RFID TAGS
Reza Rezaiesarlak*, Majid Manteghi
Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

13:40 A2-2
TESTING TELECOMMUNICATIONS DEVICES IN REVERBERATION CHAMBERS USING BROADBAND SIGNALS
Jason B. Coder*[1], John M. Ladbury[1], David Hunter[2]
[1]*Electromagnetics Division, National Institute of Standards and Technology, Boulder, CO*
[2]*CableLabs, Louisville, CO*

14:00 A2-3
EFFECTS OF LTE SIGNALS ON CABLE TV DEVICES
David F. Hunter*[1], Jason B. Coder[2], John Ladbury[2]
[1]*CableLabs, Louisville, CO*
[2]*RF Fields Group, National Institute of Standards and Technology, Boulder, CO*

14:20 A2-4
RANDOM COUPLING MODEL FOR WIRELESS COMMUNICATION SYSTEMS
Gabriele Gradoni*[1], Thomas M. Antonsen[2], Steven M. Anlage[3], Edward Ott[2]
[1]*School of Mathematical Sciences, University of Nottingham, Nottingham, UNITED KINGDOM*
[2]*Institute for Research in Electronics and Applied Physics, University of Maryland, College Park, MD*
[3]*Center for Nanophysics and Advanced Materials, University of Maryland, College Park, MD*

14:40 A2-5
REFLECTIVITY OF ROUGH COPPER SURFACES AT SUBMILLIMETER WAVELENGTHS
M. P. Kirley*, John H. Booske
Dept. of Electrical and Computer Engineering, University of Wisconsin-Madison, Madison, WI

15:00 Break

15:20 A2-6
NON-CONTACT PROBES FOR ON-WAFER CHARACTERIZATION OF THZ DEVICES AND INTEGRATED CIRCUITS
Cosan Caglayan*, Georgios C. Trichopoulos, Kubilay Sertel
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus OH

15:40 A2-7
TIME-DOMAIN TERAHERTZ IMAGING AND SPECTROSCOPY OF X-RAY BLOCKING AND SCATTERING COATINGS
Nathan M. Burford*, Magda O. El-Shenawee
Dept. of Electrical Engineering, University of Arkansas, Fayetteville, AR

Session B3: Antenna Theory, Design and Measurement
Room 1B40
Co-Chairs: Dejan Filipovic, *University of Colorado Boulder*;
Christos Christodoulou, *University of New Mexico*

13:20 B3-1
CHARACTERISTIC MODE ANALYSIS APPLIED TO THE DESIGN OF VEHICULAR HF ANTENNAS
Maxim Ignatenko*, Dejan Filipovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

13:40 B3-2
EVALUATION OF TOTAL ANTENNA (Q) IN TERMS OF THE QN OF MODES PROVIDED BY THEORY OF CHARACTERISTIC MODES
Ezdeen A. Elghannai*, Roberto G. Rojas
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

14:00 B3-3
DESIGN AND SIMULATION OF MINIATURIZED PIFA ANTENNA FOR BIOMEDICAL SENSORS
Mohannad M. Alharbi*, Sima Noghanian
Dept. of Electrical Engineering, University of North Dakota, Grand Forks, ND

14:20 B3-4
A MINIMIZED ARCHITECTURE FOR TRANSMITTING HIGH-RATE DATA THROUGH A SMALL ANTENNA
Mohsen Salehi*, Majid Manteghi
Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

14:40 B3-5
VERTICAL STRIP TRANSMISSION LINE PRIMARY RADIATOR AS A BEAM SCANNING ANTENNA AT 60 GHZ
Futoshi Kuroki*, Tomonori Morita
Kure National College of Technology, Kure, JAPAN

15:00 Break

15:20 B3-6
ON THE USE OF MULTI-TURN LOOP ANTENNAS FOR VEHICLE-BASED COMMUNICATIONS IN HIGH FREQUENCY (HF) BAND
Sushant Shrestha*, Maxim Ignatenko, Dejan S. Filipovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

15:40 B3-7
FRISBEE ANTENNA: A ROBUST, COMPACT AND RECONFIGURABLE ANTENNA DESIGN CONCEPT
Saurabh Sanghai*, Jaegeun Ha, Dejan Filipovic
Dept. of Electrical Engineering, University of Colorado Boulder, Boulder, CO

16:00 B3-8
A SOFT CORRUGATED PYRAMIDAL HORN ANTENNA FOR RADIAL POWER EXTRACTION FROM AN A6 MAGNETRON
Georgios Atmatzakis*[1], Tyler Wynkoop[1], Mohammed Al-Husseini[2], Sarita Prasad[1], Mark Gilmore[1], Christos G. Christodoulou[1]
[1]*Dept. of Electrical and Computer Engineering, The University of New Mexico, Albuquerque, NM*
[2]*Beirut Research and Innovation Center, Lebanese Center for Studies and Research, Beirut, LEBANON*

16:20 B3-9
A METAMATERIAL PYRAMIDAL HORN ANTENNA FOR HIGH POWER APPLICATIONS
Georgios Atmatzakis*, Tyler Wynkoop, Xuyuan Pan, Sarita Prasad, Mark Gilmore, Christos G. Christodoulou
Dept. of Electrical and Computer Engineering, The University of New Mexico, Albuquerque, NM

16:40 B3-10
TIME-DOMAIN ANALYSIS OF HIGH-Q ANTENNAS
Mohsen Salehi*, Majid Manteghi
Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

Session BK1: Biophotonics
Room 155

Co-Chairs: Jamesina Simpson, *University of Utah*;
Ilker Capoglu, *Delcross Technologies*

13:20 BK1-1
A HIGH-THROUGHPUT OPTICAL BIOSENSOR PLATFORM FOR IN VITRO MONITORING DNA CONFORMATION AND DNA-PROTEIN INTERACTION
Xirui Zhang*[1], George G. Daaboul[1], Philipp S. Spuhler[1], David S. Freedman[2], Abdulkadir Yurt[3], Sunmin Ahn[1], Selim Unlu[1,2]
[1]*Dept. of Biomedical Engineering, Boston University, Boston, MA*
[2]*Dept. of Electrical and Computer Engineering, Boston University, Boston, MA*
[3]*Div. of Materials Science and Engineering, Boston University, Boston, MA*

13:40 BK1-2
NONLINEAR OPTICAL IMAGING OF THE MICROENVIRONMENT OF BREAST CANCER
Joseph M. Szulczewski*[1,2], David Inman[2], Jeremy Bredfeldt[2], Patricia J. Keely[1,2], Kevin W. Eliceiri[2]
[1]*Laboratory of Optical and Computational Instrumentation, University of Wisconsin-Madison, Madison, WI*
[2]*Molecular Pharmacology, University of Wisconsin-Madison, Madison, WI*

14:00 BK1-3
COMPUTER SIMULATIONS DRIVING IMPROVED IMPLEMENTATION OF OPTICAL PROJECTION TOMOGRAPHIC MICROSCOPY
Ryan L. Coe*[1], Eric J. Seibel[2]
[1]*Dept. of Bioengineering, University of Washington, Seattle, WA*
[2]*Dept. of Mechanical Engineering, University of Washington, Seattle, WA*

14:20 BK1-4
PHASE MICROSCOPY WITH OBLIQUE FIELDS
John D. Giese*, Tim Ford, Roman Barankov, Jean-Charles Baritaux, Jiang Li, Cliff Chan, Jerome Mertz
Dept. of Biomedical Engineering, Boston University, Boston, MA

14:40 BK1-5
OPTICAL IMAGING OF BIOLOGICAL TISSUE USING ADVANCED SPATIAL FREQUENCY DOMAIN TECHNIQUES
Kyle P. Nadeau*, Bruce J. Tromberg
Beckman Laser Institute and Medical Clinic, Irvine, CA

15:00 Break

Session C1: Radar Systems and Signal Processing for Radar
Room 200

Co-Chairs: Gregory Huff, *Texas A & M University*;
Tegan Webster, *Naval Research Laboratory*

13:20 C1-1
EFFECTS OF BANDWIDTH ON JOINT ESTIMATION PERFORMANCE OF DIRECTION-OF-DEPARTURE AND DIRECTION-OF-ARRIVAL IN ULTRA-WIDEBAND MIMO RADAR
Kotaro Nagano*[1], Idnin Pasya[1], Naohiko Iwakiri[2], Takehiko Kobayashi[1]
[1]*Wireless Systems Laboratory, Tokyo Denki University, Tokyo, JAPAN*
[2]*The Tokyo University, Tokyo, JAPAN*

13:40 C1-2
AN EHF RADAR FOR CHARACTERIZATION OF HUMAN MICRO-DOPPLER PROPERTIES AND BACKSCATTER FROM SURFACES AND RAIN
Charles R. Dietlein*[1], Abigail S. Hedden[1], Jerry L. Silvious[1], Jeremy A. Green[2], David A. Wikner[1]
[1]*Sensors and Electron Devices Directorate, US Army Research Laboratory, Adelphi, MD*
[2]*University of Maryland, College Park, MD*

14:00 C1-3
SUPPLY-MODULATED POWER AMPLIFIERS FOR AMPLITUDE MODULATION RADAR TRANSMITTERS
Andrew Zai*, Zoya Popovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

14:20 C1-4
MICROWAVE IMAGING OF OBJECTS HIDDEN BY NON-PENETRATING OBSTACLES USING TIME REVERSAL IMAGING TECHNIQUE
Ce Zhang*, Akira Ishimaru, Yasuo Kuga
Dept. of Electrical Engineering, University of Washington, Seattle, WA

14:40 C1-5
TIDS OBSERVED IN THE BOTTOMSIDE IONOSPHERIC F-REGION USING THE TIDDBIT HF DOPPLER SOUNDER
Geoff Crowley*
ASTRA, Boulder, CO

15:00 Break

Session CEB1: Wireless Power Transfer and Energy Harvesting Systems
Room 200

Session Co-Chairs: Majid Manteghi, *Virginia Polytechnic Institute and State University*; Danilo Erricolo, *University of Illinois at Chicago*

15:20 CEB1-1
OPTIMAL MICROWAVE POWER TRANSFER THROUGH UNKNOWN REGION BASED ON TIME REVERSAL TECHNIQUE
Ce Zhang*, Akira Ishimaru, Yasuo Kuga
Dept. of Electrical Engineering, University of Washington, Seattle, WA

15:40 CEB1-2
A SIMPLE WIRELESS POWER TRANSFER SCHEME FOR IMPLANTED DEVICES
Shyam C. Nambiar*, Majid Manteghi
Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

16:00 CEB1-3
OVER-MODED CAVITY FOR WIRELESS CHARGING APPLICATIONS
Sean Regalia-Korhummel*
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

16:20 CEB1-4
A DUAL-FREQUENCY ULTRA-LOW POWER EFFICIENT 0.5-GRAM RECTENNA
Sean Regalia-Korhummel*, Rob Scheeler, Zoya Popovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

16:40 CEB1-5
USING POLARIZATION RECONFIGURABLE ANTENNAS IN A SMARTPHONE-ENABLED DIRECTION OF ARRIVAL SYSTEM
Elija Foster, Russel Haley, Quinn Manley, Ryan Moore, Joel D. Barrera, Jean-Francois Chamberland, Gregory H. Huff*
Dept. of Electrical and Computer Engineering, Texas A & M University, College Station, TX

Session EGH2: Lightning and its Interactions with the Ionosphere II
Mathematics Auditorium (Math 100)

Co-Chairs: Joseph Dwyer, *Florida Tech*;
Steven Cummer, *Duke University*;
Ningyu Liu, *Florida Institute of Technology*

13:20 EGH2-1
WHISTLER OBSERVATIONS ON DEMETER COMPARED WITH FULL ELECTROMAGNETIC WAVE METHOD SIMULATIONS
Andrew Compston*[1], Morris Cohen[2], Nikolai Lehtinen[1], Umran Inan[1,3], Ivan Linscott[1], Ryan Said[4], Michel Parrot[5]
[1]*Dept. of Electrical Engineering, Stanford University, Stanford, CA*
[2]*Dept. of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA*
[3]*Koc University, Istanbul, TURKEY*
[4]*Vaisala, Inc., Boulder, CO*
[5]*LPC2E, CNRS, Orleans, FRANCE*

13:40 EGH2-2
IONOSPHERIC RESEARCH HIGH-ALTITUDE ATMOSPHERIC DISCHARGES IN MICROSATELLITE
Stanislav I. Klimov*[1], Vladimir M. Gotlib[1], Lev M. Zelenyi[1], Victor N. Karedin[1], Dmitryi I. Vavilov[1], Maksim S. Dolgonosov[1], Gali K. Garipov[2], Sergei I. Svertilov[2], Ivan V. Yashin[2], Valery E. Korepanov[3], Csaba Ferenz[4]
[1]*Dept. of Space Plasma Physics, Space Research Institute of the RAS, Moscow, RUSSIAN FEDERATION*
[2]*Institute of Nuclear Physics, Moscow State University, Moscow, RUSSIAN FEDERATION*
[3]*Lviv Centre of Institute for Space Research NANU-GSAU, Lviv, UKRAINE*
[4]*Space Research Group, Etvos University, Budapest, HUNGARY*

14:00 EGH2-3
GBM TERRESTRIAL GAMMA-RAY FLASHES (TGFS) AND LIGHTNING
Michael S. Briggs*
CSPAR, University of Alabama in Huntsville, Huntsville, AL

14:20 EGH2-4
A FOUR-YEAR FERMI LARGE AREA TELESCOPE SURVEY OF TERRESTRIAL GAMMA-RAY FLASHES
J. Eric Grove*[1], Alexandre Chekhtman[2], Meagan M. Schaal[3]
[1]*Space Science Division, Naval Research Laboratory, Washington, DC*
[2]*George Mason University, Fairfax, VA*
[3]*National Research Council, resident at Naval Research Lab, Washington, DC*

14:40 EGH2-5
LATEST TGF RESULTS FROM ADELE AND RHESSI

Nicole A. Kelley*[1], David M. Smith[1], Gregory S. Bowers[1], Paul Puzbee[1], Forest Martinez-McKinney[1], Alexander Infanger[1], Joseph R. Dwyer[2], Steven A. Cummer[3], Gaopeng Lu[4], Robert H. Holzworth[5], Michael L. Hutchins[5], Michael E. Splitt[6], Steven M. Lazarus[6], Eric Cramer[2], Shahab Arabshahi[2], Thomas Gjesteland[7], Nikolai Ostgaard[7], Hamid Rassoul[2]
[1]*Dept. of Physics and Santa Cruz Institute for Particle Physics, University of California, Santa Cruz, Santa Cruz, CA*
[2]*Dept. of Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL*
[3]*Dept. of Electrical and Computer Engineering, Duke University, Durham, NC*
[4]*Laboratory for Middle Atmosphere and Global Environment Observation, Chinese Academy of Sciences, Institute for Atmospheric Physics, Beijing, CHINA*
[5]*Dept. of Earth and Space Sciences, University of Washington, Seattle, WA*
[6]*Dept. of Marine and Environmental Systems, Florida Institute of Technology, Melbourne, FL*
[7]*Dept. of Physics and Technology, University of Bergen, Bergen, NORWAY*

15:00 Break

15:20 EGH2-6
INITIAL BREAKDOWN PULSES IN INTRACLOUD LIGHTNING FLASHES AND THEIR RELATION TO TERRESTRIAL GAMMA RAY FLASHES
Thomas Marshall*[1], Maribeth Stolzenburg[1], Sumedhe Karunarathne[1], Steve Cummer[2], Gaopeng Lu[2], Hans-Deiter Betz[3], Michael Briggs[4,5], Valerie Connaughton[4,5], Shaolin Xiong[4]
[1]*Dept. of Physics and Astronomy, University of Mississippi, University, MS*
[2]*Dept. of Electrical and Computer Engineering, Duke University, Durham, NC*
[3]*University of Munich, Munich, GERMANY*
[4]*CSPAR, University of Alabama in Huntsville, Huntsville, AL*
[5]*University of Alabama in Huntsville, Huntsville, AL*

15:40 EGH2-7
A RADIO-INFORMED SEARCH FOR WEAK TERRESTRIAL GAMMA-RAY FLASHES WITH FERMI GBM
Lindsay E. McTague*[1], Steven A. Cummer[1], Michael S. Briggs[2], Valerie Connaughton[2], Shaolin Xiong[2], Gerald J. Fishman[3]
[1]*Dept. of Electrical and Computer Engineering, Duke University, Durham, NC*
[2]*CSPAR, University of Alabama in Huntsville, Huntsville, AL*
[3]*Jacobs Engineering Group Inc., Huntsville, AL*

16:00 EGH2-8
A FULLY 3-D, TIME-DEPENDENT AND SELF-CONSISTENT MODEL OF RELATIVISTIC FEEDBACK DISCHARGES
Joseph R. Dwyer*, Ningyu Liu, Hamid Rassoul
Florida Institute of Techology, Melbourne, FL

16:20 EGH2-9
X-RAY EMISSIONS PRODUCED BY STEPPING LIGHTNING LEADERS
Wei Xu*[1], Sebastien Celestin[2], Victor P. Pasko[1]

[1]*Dept. of Electrical Engineering, Pennsylvania State University, University Park, PA*
[2]*University of Orleans, Orleans, FRANCE*

16:40 EGH2-10
OPTICAL EMISSIONS ASSOCIATED WITH TERRESTRIAL GAMMA-RAY FLASHES
Wei Xu*[1], Sebastien Celestin[2], Victor P. Pasko[1]
[1]*Dept. of Electrical Engineering, Pennsylvania State University, University Park, PA*
[2]*University of Orleans, Orleans, FRANCE*

17:00 EGH2-11
TIME-DOMAIN SOLUTION TO MAXWELL'S EQUATIONS FOR A LIGHTNING DART LEADER AND SUBSEQUENT RETURN STROKE
Edward M. Thiemann*, Albin J. Gasiewski
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

Session F2: Propagation Modeling, Measurements and Effects
Room 1B12

Co-Chairs: Michael Newkirk, *Johns Hopkins University*;
Robert Marshall, *NSWCDD*

13:20 F2-1
DUCTED MILLIMETER PROPAGATION OVER ROUGH SEAS USING PWE
Frank Ryan*
Applied Technology, Inc., San Diego, CA

13:40 F2-2
MICRO-DOPPLER SIGNATURE OF HUMAN WALKING IN FOREST ENVIRONMENT
Nghia Tran*, Ozlem Kilic, Jose Miguel Garcia-Rubia, Vinh Dang, Quang Nguyen
Dept. of Electrical and Computer Science, The Catholic University of America, Washington, DC

14:00 F2-3
COMPARISON OF RAINFALL RATE AND ATTENUATION MODELS FOR TROPICAL REGION IN SOUTHWESTERN NIGERIA
Elijah O. Olurotimi*, Joseph S. Ojo, Moses O. Ajewole
Dept. of Physics, Federal University of Technology Akure, Akure, Ondo, NIGERIA

14:20 F2-4
PERFORMANCE OF KU-BAND SATELLITE SIGNALS DURING RAINY CONDITIONS IN AKURE, SOUTHWESTERN NIGERIA
Omotayo M. Durodola*[1,2], Moses O. Ajewole[2], Joseph S. Ojo[2]
[1]*Dept. of Physics/Electronics & Communications, University of Jos, Jos, Plateau, NIGERIA*
[2]*Dept. of Physics/Radio Communication, The Federal University of Technology Akure, Akure, Ondo, NIGERIA*

14:40 F2-5
MEASUREMENT OF S-, C-, AND X-BAND PROPAGATION IN THE MARINE ATMOSPHERIC BOUNDARY LAYER THROUGH OBSERVATIONS OF TRANSMITTERS OF OPPORTUNITY
Jonathan M. Pozderac*[1], Joel T. Johnson[1], Craig F. Merrill[2]
[1]*Dept. of Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Carderock, NSWC, West Bethesda, MD*

15:00 Break

15:20 F2-6
RAPTIR: RADIO-WAVE PROPAGATION THROUGH IONOSPHERE REGIONS CUBESAT MISSION
Julio Martin-Hidalgo*, Charles M. Swenson, Daniel Farr
Dept. of Electrical and Computer Engineering, Utah State University, Logan, UT

15:40 F2-7
CHARACTERIZATION OF SIDE MOUNTED VEHICULAR ANTENNAS
Timothy Samson*, Maxim Ignatenko, Dejan Filipovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

16:00 F2-8
ANTENNA LOCATION EFFECTS ON THE CAPACITY OF MIMO DSRC CHANNELS
Nischal Adhikari*, Sima Noghanian
Dept. of Electrical Engineering, University of North Dakota, Grand Forks, ND

Session FGH2: Global Navigation Satellite Systems and Radio Beacon Remote Sensing II
Room 1B28

Co-Chairs: Charles Carrano, *Boston College*;
Carl Siefring, *Naval Research Laboratory*;
Valery Zavorotny, *NOAA/Earth System Research Laboratory*

13:20 FGH2-1
ANALYSIS OF SLANT TEC METHODOLOGIES
Ben Schilling*[1], Roy Calfas[1], Anthea Coster[2], Thomas Gaussiran[1], Attila Komjathy[3]
[1]*Applied Research Laboratories, University of Texas at Austin, Austin, TX*
[2]*Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*
[3]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

13:40 FGH2-2
LARGE EXPANSES OF KILOMETER-SCALE WAVES PREDOMINANTLY OBSERVED BELOW THE F-PEAK ENCOUNTERED BY PROBES ON THE C/NOFS SATELLITE THAT ARE NOT ASSOCIATED WITH PLASMA DEPLETIONS
Robert F. Pfaff*, Carmen Liebrecht, Henry T. Freudenreich, Jeff Klenzing
NASA/Goddard Space Flight Center, Greenbelt, MD

14:00 FGH2-3
USE OF GPS RADIO OCCULTATION OBSERVATIONS TO IMPROVE NUMERICAL WEATHER PREDICTION FORECAST SKILL AT NOAA
Lidia Cucurull*
NOAA/OAR/ESRL/GSD, Boulder, CO

14:20 FGH2-4
HIGH-RESOLUTION EARTH ATMOSPHERIC SENSING USING COMBINED MICROWAVE RADIOMETRY AND GNSS RADIO OCCULTATION
William Blackwell*[1], Kerri Cahoy[2], Pratik Dave[2]
[1]*MIT Lincoln Laboratory, Lexington, MA*
[2]*MIT Space Systems Laboratory, Cambridge, MA*

14:40 FGH2-5
GNSS REFLECTOMETRY FROM ORBIT: UK-DMC TO CYGNSS
Scott Gleason*
Southwest Research Institute, Boulder, CO

15:00 Break

15:20 FGH2-6
OPTIMIZING AN OBSERVABLE FOR OCEAN WIND SPEED RETRIEVAL FROM CALIBRATED GNSS-R DELAY-DOPPLER MAPS
Nereida Rodriguez-Alvarez*[1], James L. Garrison[1], Christopher S. Ruf[2], Maria Paola Clarizia[2]
[1]*School of Aeronautics and Astronautics, Purdue University, IN*
[2]*Space Physics Research Laboratory, Dept. of Atmospheric Oceanic and Space Sciences, University of Michigan, Ann Arbor, MI*

15:40 FGH2-7
RESULTS FROM A GNSS ALTIMETRY OSSE
Stephen T. Lowe*, Tony Lee, Cinzia Zuffada
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

16:00 FGH2-8
STUDIES OF GNSS-R OCEAN ALTIMETRY USING FULL DDM-BASED RETRIEVAL
Jeonghwan Park*[1], Joel T. Johnson[1], Stephen T. Lowe[2]
[1]*The Ohio State University, Columbus, OH*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

16:20 FGH2-9
GPS SBAS L1/L5 BISTATIC RADAR - ALTIMETRY
Sara J. Powell*[1], Dennis M. Akos[1], Valery U. Zavorotny[2]
[1]*Dept. of Aerospace Engineering Sciences, University of Colorado, Boulder, CO*
[2]*Earth System Research Laboratory, NOAA, Boulder, CO*

Session G2: Space Plasma Measurement Techniques II
Room 1B51
Co-Chairs: Philip Erickson, *MIT Haystack Observatory*;
Tom Gaussiran, *University of Texas at Austin*

13:20 G2-1
HF RADAR MEASUREMENT TECHNIQUES IN THE THERMOSPHERE-IONOSPHERE USING DYNASONDE METHODS
Terence Bullett*, Nikolay Zabotin, Justin Mabie, Catalin Negrea
University of Colorado Boulder, Boulder, CO

13:40 G2-2
SUB-5KM BASELINE TOMOGRAPHY FOR FINE-SCALE AURORAL MEASUREMENTS
Michael A. Hirsch*[1], Joshua L. Semeter[1], Hanna Dahlgren[2], Chhavi Goenka[1], Hassanali Akbari[1], Donald Hampton[3]
[1]*Center for Space Physics, Boston University, Boston, MA*
[2]*KTH Royal Institute of Technology, Stockholm, SWEDEN*
[3]*Geophysical Institute, University of Alaska Fairbanks, Fairbanks, AK*

14:00 G2-3
RADIO-TOMOGRAPHIC IMAGES OF POST-MIDNIGHT EQUATORIAL PLASMA DEPLETIONS
Matthew Hei*[1], Paul Bernhardt[1], Carl Siefring[1], Joseph Huba[1], Jonathan Krall[1], Cesar Valladares[2], Roderick Heelis[3], Marc Hairston[3], William Coley[3], Jorge Chau[4], Cesar De La Jara[4], Matthew Wilkens[1]
[1]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*
[2]*Institute for Scientific Research, Boston College, Chestnut Hill, MA*
[3]*Center for Space Sciences, University of Texas at Dallas, Richardson, TX*
[4]*Jicamarca Radio Observatory, Instituto Geofisico del Peru, Lima, PERU*

14:20 G2-4
MULTI-INSTRUMENT IONOSPHERIC TOMOGRAPHY IN SCANDINAVIA WITH BAYESIAN STATISTICAL INVERSION AND CORRELATION PRIORS
Johannes Norberg*[1,2], Juha Vierinen[3], Lassi Roininen[2], Olaf Amm[1], Markku S. Lehtinen[2]
[1]*Finnish Meteorological Institute, Helsinki, FINLAND*
[2]*Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*
[3]*Sodankyla Geophysical Observatory, University of Oulu, Oulu, FINLAND*

Session H1: Physics of the Radiation Belts
Room 245

Session Co-Chairs: Mark Golkowski, *University of Colorado Denver*;
Christopher Crabtree, *Naval Research Laboratory*

13:20 H1-1
MODELING AND MEASUREMENTS OF VERY LOW FREQUENCY WAVE PROPAGATION THROUGH THE IONOSPHERE
Bogdan Popa*[1], Steven A. Cummer[1], Douglas E. Rowland[2], John R. Wygant[3]
[1]*Dept. of Electrical and Computer Engineering, Duke University, Durham, NC*
[2]*NASA Goddard Space Flight Center, Greenbelt, MD*
[3]*School of Physics and Astronomy, University of Minnesota, Minneapolis, MN*

13:40 H1-2
PROPAGATION OF WHISTLER-MODE WAVES THROUGH THE IONOSPHERE TO THE RADIATION BELTS
Anatoly V. Streltsov*, Jesse R. Woodroffe
Dept. of Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL

14:00 H1-3
ANALYSIS OF MAGNETOSPHERIC ELF/VLF WAVE AMPLIFICATION FROM THE SIPLE TRANSMITTER EXPERIMENT
Justin D. Li*[1], Maria Spasojevic[1], Vijay Harid[1], Morris B. Cohen[1], Mark Golkowski[2], Donald L. Carpenter[1], Umran Inan[1,3]
[1]*Dept. of Electrical Engineering, Stanford University, Stanford, CA*
[2]*Dept. of Electrical Engineering, University of Colorado Denver, Denver, CO*
[3]*Dept. of Electrical Engineering, Koc University, Istanbul, TURKEY*

14:20 H1-4
WAVE-KINETIC SIMULATIONS OF LOWER-HYBRID TURBULENCE DRIVEN BY VELOCITY RING INSTABILITIES
C. Crabtree*[1], G. Ganguli[1], M. Mithaiwala[1], L. Rudakov[2]
[1]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*
[2]*Icarus Research Inc., Bethesda, MD*

14:40 H1-5
LABORATORY INVESTIGATION OF NONLINEAR WHISTLER WAVE INTERACTIONS*
Bill Amatucci*[1], Erik Tejero[1], Chris Cothran[2], Dave Blackwell[1], Guru Ganguli[1]
[1]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*
[2]*Sotera Defense Solutions, Crofton, MD*

15:00 Break

15:20 H1-6
AN EXPERIMENTAL CONCEPT FOR PROBING NONLINEAR PHYSICS IN RADIATION BELTS
Gurudas Ganguli*, Chris Crabtree, Manish Mithaiwala, Carl Siefringe
Plasma Physics Division, Naval Research Laboratory, Washington, DC

15:40 H1-7
CONVECTIVE AMPLIFICATION OF EMIC WAVES FROM RING-DISTRIBUTION PROTONS IN THE INNER MAGNETOSPHERE: IMPLICATIONS FOR THE VAN ALLEN PROBES
Manish J. Mithaiwala*[1], Chris Crabtree[1], Gurudas Ganguli[1], Leonid Rudakov[2], Kunihiro Keika[3]
[1]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*
[2]*Icarus Research Inc., Bethesda, MD*
[3]*Solar-Terrestrial Laboratory, Nagoya, JAPAN*

16:00 H1-8
LARGE-AMPLITUDE OBLIQUE WHISTLER WAVES AND RELATIVISTIC ELECTRON ACCELERATION
Peter H. Yoon*
Institute for Physical Science and Technology, University of Maryland, College Park, MD

16:20 H1-9
THEORETICAL AND NUMERICAL ANALYSIS OF RADIATION BELT ELECTRON PRECIPITATION BY COHERENT WHISTLER MODE WAVES: PHASE-TRAPPING, WAVE AMPLITUDE DEPENDENCE, AND PULSING.
Vijay Harid*[1], Mark Golkowski[2], Timothy F. Bell[1], Maria Spasojevic[1], Donald Carpenter[1], Justin Li[1], Umran S. Inan[1]
[1]*Dept. of Electrical Engineering, Stanford University, Stanford, CA*
[2]*Dept. of Electrical Engineering, University of Colorado Denver, Denver, CO*

16:40 H1-10
EFFECTS OF CHORUS ON RADIATION BELT ELECTRON DYNAMICS MODELED USING TEST PARTICLE SIMULATIONS
Xin Tao*[1], Jacob Bortnik[1], Jay M. Albert[2], Richard M. Thorne[1], Wen Li[1]
[1]*Dept. of Atmospheric and Oceanic Sciences, University of California Los Angeles, Los Angeles, CA*
[2]*Air Force Research Lab/RVBXR, Albuquerque, NM*

17:00 H1-11
RECENT RESULTS FROM THE ELECTRIC AND MAGNETIC FIELD INSTRUMENT SUITE AND INTEGRATED SCIENCE (EMFISIS) ON THE VAN ALLEN PROBES
Craig Kletzing*
Dept. of Physics and Astronomy, University of Iowa, Iowa City, IA

Session J2: Timely Technical Tutorials
Room 265

Co-Chairs: Richard Bradley, *National Radio Astronomy Observatory*;
David DeBoer, *University of California Berkeley*

13:20 J2-1
WHAT'S NEW IN CASPER?
Dan Werthimer*
Space Sciences Lab, University of California, Berkeley, CA

14:00 J2-2
MOVING BEYOND VISIBILITIES
Miguel F. Morales*
Dept. of Physics, University of Washington, Seattle, WA

14:40 J2-3
IMPLEMENTING RADIO EXPERIMENTS IN SPACE
Charles Dunn*
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

15:00 Break

15:40 J2-4
THE 21-CM SPIN-FLIP TRANSITION AS A PROBE OF THE COSMIC DAWN
Steven Furlanetto*
Dept. of Physics and Astronomy, University of California Los Angeles, Los Angeles, CA

16:20 J2-5
BUILDING THE SUBMILLIMETER ARRAY
James M. Moran*
Harvard-Smithsonian Center for Astrophysics, Cambridge, MA

Business Meetings

17:00	Commission E	Mathematics Auditorium (Math 100)
17:00	Commission F	Room 1B28
18:00	Commission A	Room 151
18:00	Commission C	Room 200

Reception

18:30-21:00 Engineering Center Lobby
(Beer and Wine Provided)

THURSDAY MORNING, 9 January 2014

Plenary Session
Mathematics Auditorium (Math 100)

Ernest K. Smith USNC-URSI Student Paper Competition

Chair: Danilo Erricolo, *University of Illinois at Chicago*

8:20 Announcements

8:30 Rules and Guidelines of the Competition

8:40 Student Paper Presentations

9:40 Break

Meeting Highlight: Atom-Based Metrology

Co-Chairs: Christopher Holloway, *NIST*;
Zoya Popovic, *University of Colorado Boulder*

10:00 P1-1
NIST ON A CHIP: A REVOLUTION IN MEASUREMENT SCIENCE
Thomas O'Brian*
Quantum Physics & Time and Frequency Divisions, National Institute of Standards and Technology, Boulder, CO

10:50 P1-2
ATOM OSCILLATORS AND OTHER ATOM-BASED CIRCUITS
Dana Z. Anderson*
The JILA Institute, University of Colorado Boulder, Boulder, CO

11:40 Awards Ceremony for Student Paper Competition

12:00 Lunch for Student Travel Awardees, USNC Officers and Commission Chairs
Leeds Business School Atrium

THURSDAY AFTERNOON, 9 January 2014

Session B4: Scattering and Inverse Scattering
Room 155

Co-Chairs: Danilo Erricolo, *University of Illinois at Chicago*;
Piergiorgio Uslenghi, *University of Illinois at Chicago*

13:20 B4-1
SCATTERING BY A HALF-PLANE AT THE INTERFACE BETWEEN ISOREFRACTIVE MEDIA
Piergiorgio L. E. Uslenghi*
University of Illinois at Chicago, Chicago, Illinois

13:40 B4-2
QUADRATIC FORWARD MODEL FOR RF TOMOGRAPHY: PRELIMINARY RESULTS
Vittorio Picco*[1], Francesco Soldovieri[2], Tadahiro Negishi[1], Danilo Erricolo[1]
[1]Dept. of Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL
[2]Institute for Electromagnetic Sensing of the Environment, National Research Council, Napoli, ITALY

14:00 B4-3
WIDEBAND TUNABLE AND NON-FOSTER MANTLE CLOAKS
Jason C. Soric*, Andrea Alu
Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX

14:20 B4-4
BURIED OBJECTS AND VOID DETECTION USING RF TOMOGRAPHY
Tadahiro Negishi*, Vittorio Picco, Douglas Spitzer, Danilo Erricolo
Dept. of Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

14:40 B4-5
SCATTERING OF WIND TURBINES - RADAR WAVE PROPAGATION ANALYSIS IN WIND FARMS
Fanxing Kong*, Yan Zhang, Robert Palmer
Dept. of Electrical and Computer Engineering, University of Oklahoma, OK

15:00 Break

Session B5: Wideband Antennas
Room 155

Co-Chairs: Kubilay Sertel, *The Ohio State University*;
Sembiam Rengarajan, *California State University, Northridge*

15:20 B5-1
5:1 BANDWIDTH DUAL-POLARIZED DIELECTRIC ROD ANTENNA
Anas J. Abumunshar*, Kubilay Sertel
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

15:40 B5-2
LOW PROFILE WIDE BAND VHF/UHF ANTENNA
Gregory Mitchell[1,2], Dr. Wasyl Wasylkiwskyj*[2]
[1]*U.S. Army Research Laboratory, Adelphi, MD*
[2] *Dept. of Electrical and Computer Engineering, The George Washington University, Washington, D.C.*

16:00 B5-3
AN INVESTIGATION OF TECHNIQUES TO ACHIEVE MULTI-FREQUENCY OPERATION OF A BAZOOKA BALUN
Christie M. Bermudez*, Jennifer T. Bernhard
Dept. of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL

16:20 B5-4
BROADBAND ROTMAN LENS DESIGN
Nathan Jastram*, Dejan Filipovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

Session B6: Complex Media & Novel Materials for Antennas
Room 1B40

Co-Chairs: James Breakall, *Pennsylvania State University*;
Michael Havrilla, *Air Force Institute of Technology*

13:20 B6-1
SIMULATION AND EXPERIMENTAL RESULTS FOR A CROSSED-DIPOLE OVER PEC AND FERRITE NANOPARTICLE COMPOSITE GROUND PLANES
Johnny Daniel[1], Glenn Minko[1], Paul Parsons[1,2], Kate Duncan[1], James Breakall*[1,3]
[1]*CERDEC STCD, Aberdeen Proving Ground, MD*
[2]*Dept. of Physics and Astronomy, University of Delaware, Newark, DE*
[3]*Dept. of Electrical Engineering, Penn State University, University Park, PA*

13:40 B6-2
SIMULATION AND ANALYSIS OF NON-PERIODIC AND RANDOM METAMATERIAL STRUCTURES
John A. Hodge*[1], Theodore K. Anthony[2], Amir I. Zaghloul[1,2]
[1]*Dept. of Electrical and Computer Engineering, Virgnia Tech, Falls Church, VA*
[2]*SEDD, US Army Research Laboratory, Adelphi, MD*

14:00 B6-3
DYADIC GREEN'S FUNCTIONS FOR A PARALLEL PLATE WAVEGUIDE FILLED WITH UNIAXIAL MEDIA
Neil G. Rogers*, Michael J. Havrilla
Dept. of Electrical and Computer Engineering, Air Force Institute of Technology, WPAFB, OH

14:20 B6-4
SCALAR POTENTIAL FORMULATION FOR A UNIAXIAL INHOMOGENEOUS MEDIUM
Michael J. Havrilla*
Dept. of Electrical and Computer Engineering, Air Force Institute of Technology, Beavercreek, OH

14:40 B6-5
ROBUST AND EFFICIENT PSEUDO-ANALYTICAL COMPUTATION OF FIELDS FROM ARBITRARILY-ORIENTED DIPOLES IN GENERAL DOUBLY-ANISOTROPIC, PLANAR-STRATIFIED ENVIRONMENTS
Kamalesh K. Sainath*, Fernando L. Teixeira
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, Ohio State University, Columbus, OH

15:00 Break

Session B7: Guided Waves and Waveguiding Structures
Room 1B40

Co-Chairs: Filippo Capolino, *University of California, Irvine*;
Hao Xin, *University of Arizona*

15:20 B7-1
OPTICAL LEAKY WAVE ANTENNAS INTEGRATED WITH RESONATOR TOPOLOGIES
Caner Guclu*, Salvatore Campione, Ozdal Boyraz, Filippo Capolino
Dept. of Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA

15:40 B7-2
A W-BAND BAND-STOP FILTER USING ELECTROMAGNETIC CRYSTAL (EMXT) SURFACE

Te-Chuan Chen*[1], Hualiang Zhang[2], Hao Xin[1,3]
[1]*Dept. of Electrical and Computer Engineering, University of Arizona, Tucson, AZ*
[2]*Dept. of Electrical Engineering, University of North Texas, Denton, TX*
[3]*Dept. of Physics, University of Arizona, Tucson, AZ*

16:00 B7-3
DESIGN OF NRD GUIDE AT 94 GHZ BAND
Shingo Inoue*, Futoshi Kuroki
Kure National College of Technology, Kure, Hiroshima, JAPAN

16:20 B7-4
AN SRR-LOADED SUB-WAVELENGTH WAVEGUIDE WITH H-PLANE-BEND RADIATOR AND IMPROVED MATCHING FOR HIGH POWER APPLICATION
Xuyuan Pan*[1], Mohammed Al-Husseini[2], Georgios Atmatzakis[1], Christos G. Christodoulou[1]
[1]*Dept. of Electrical Engineering, University of New Mexico, Albuquerque, NM*
[2]*Beirut Research & Innovation Center, Lebanese Center for Studies and Research, Beirut, LEBANON*

Session D1: Advanced Electronics and Photonics Technology and Techniques
Room 151

Co-Chairs: Zoya Popovic, *University of Colorado Boulder*;
Jennifer Bernhard, *University of Illinois at Urbana-Champaign*

13:20 D1-1
THERMO-OPTICALLY TUNABLE LINEAR PHOTONIC CRYSTAL MICROCAVITIES IN ADVANCED SOI CMOS TECHNOLOGY
Christopher V. Poulton*, Xiaoge Zeng, Mark T. Wade, Jeffrey M. Shainline, Milos A. Popovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

13:40 D1-2
DESIGN OF OPTO-ELECTRONIC NANO-STRUCTURES AND CAPABILITY FOR OPTIMIZATION OF DIFFERENT SOLAR CELLS
Ahmadreza Ghahremani*, Aly Fathy
Dept. of Electrical Engineering, University of Tennessee Knoxville, Knoxville, TN

14:00 D1-3
SUPER-ENHANCED OPTICAL ENERGY CONCENTRATION THROUGH A SUBWAVELENGTH APERTURE USING A PHOTONIC NANOJET
Mehdi Hasan*
Dept. of Electrical and Computer Engineering, University of Utah, Salt Lake City, UT

14:20 D1-4
GYROTROPIC EFFECTS IN HYPERBOLIC METAMATERIALS

Mohamed Othman*, Caner Guclu, Filippo Capolino
Dept. of Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA

14:40 D1-5
HIGH EFFICIENCY X-BAND MMIC GAN POWER AMPLIFIERS
Scott Schafer*, David Sardin, Zoya Popovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

15:00 Break

15:20 D1-6
X-BAND ISOLATED OUTPHASING GAN MMIC PA WITH TRANSISTOR RECTIFIER FOR POWER RECYCLING
Michael Litchfield*, Zoya Popovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

15:40 D1-7
SELF-INJECTION LOCKED NRD GUIDE GUNN OSCILLATORS USING METAL ROD RESONATOR AT 60 GHZ
Futoshi Kuroki*, Kento Ichinose, Tomohiro Tanaka
Kure National College of Technology, Kure, JAPAN

Session F3: Radar Remote Sensing of the Earth's Environment
Room 1B28

Co-Chairs: Mahta Moghaddam, *University of Southern California*;
Chandrasekar V. Chandra, *Colorado State University*

13:20 F3-1
ACTIVE-PASSIVE FORWARD AND INVERSE MODELING IN SUPPORT OF SMAP AND SOIL MOISTURE REMOTE SENSING
Ruzbeh Akbar*, Mahta Moghaddam
Dept. of Electrical Engineering, University of Southern California, Los Angeles, CA

13:40 F3-2
A STUDY OF SOIL MOISTURE ESTIMATION FROM MULTI-TEMPORAL L-BAND RADAR OBSERVATIONS OF VEGETATED SURFACES
Jeffrey D. Ouellette*[1], Joel T. Johnson[1], Anna Balenzano[2], Francesco Mattia[2], Giuseppe Satalino[2], Seungbum Kim[3], Jeff Walker[4], Rocco Panciera[5]
[1]*Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH*
[2]*Istituto di Studi sui Sistemi Intelligenti per lAutomazione, Consiglio Nazionale delle Ricerche,*

Bari, ITALY
[3]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[4]*Dept. of Civil Engineering, Monash University, Melbourne, NSW, AUSTRALIA*
[5]*Dept. of Infrastructure Engineering, University of Melbourne, Melbourne, NSW, AUSTRALIA*

14:00 F3-3
REMOTE SENSING OF SEA ICE COVER USING SUPERDARN HF RADARS
Evan G. Thomas*[1], Kevin T. Sterne[1], Pasha V. Ponomarenko[1,2], J. Michael Ruohoniemi[1], Joseph B. H. Baker[1]
[1]*Bradley Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA*
[2]*Institute of Space and Atmospheric Studies, University of Saskatchewan, Saskatoon, SK, CANADA*

14:20 F3-4
PHASE CALIBRATION OF AN ALONG-TRACK INTERFEROMETRIC FMCW SAR
Huazeng Deng*[1], Yuriy V. Goncharenko[2], Gordon Farquharson[3]
[1]*Dept. of Electrical Engineering, University of Washington, SEATTLE, WA*
[2]*Dept. of Institute of Radiophysics and Electronics NAS of Ukraine, Ukraine, UKRAINE*
[3]*Applied Physics Laboratory, University of Washington, Seattle, WA*

14:40 F3-5
QUANTITATIVE PRECIPITATION ESTIMATION USING DUAL-POLARIZATION RADAR NETWORK OVER THE DALLAS-FORT WORTH (DFW) METROPLEX
Haonan Chen*, V. Chandrasekar
Dept. of Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

15:00 Break

Session F4: Memorial Session for Prof. Richard K. Moore
Room 1B28

Co-Chairs: Sivaprasad Gogineni, *University of Kansas*;
Chandrasekar V. Chandra, *Colorado State University*

15:20 F4-1
L-BAND RADAR BACKSCATTERING FROM A MATURE CORN CANOPY: EFFECT OF COBS
Roger H. Lang*[1], Selim S. Seker[1], Qianyi Zhao[1], Mehmet Kurum[2], Mehmet Ogut[1], Peggy E. O'Neill[3], Micheal H. Cosh[4]
[1]*Dept. of Electrical and Computer Engineering, George Washington University, Washington, DC*
[2]*Information Technologies Institute, Gebze, Kocaeli, TURKEY*
[3]*Hydrological Sciences Lab, NASA Goddard Space Flight Center, Greenbelt, MD*
[4]*Hydrology and Remote Sensing Lab, USDA, Beltsville, MD*

15:40 F4-2
MEGHA-TROPIQUES: A LOW-EARTH ORBIT SATELLITE MISSION FOR CLIMATE AND ATMOSPHERIC RESEARCH AND APPLICATIONS
Raju Garudachar*
School of Engineering and Technology, Jain University, Ramanagara Dist., Karnataka, INDIA

16:00 F4-3
DISCOVERY AND MAPPING OF A NEAR SURFACE WATER LAYER WITHIN THE GREENLAND ICE SHEET WITH AIRBORNE RADAR
Richard Forster*[1], Jason Box[2], Clement Miege[1], Evan Burgess[1], S. Prasad Gogineni[3], Carl Leuschen[3], John Paden[3], Cameron Lewis[3], Lora Koenig[4]
[1]Dept. of Geography, University of Utah, Salt Lake City, UT
[2]Dept. of Geological Survey of Denmark and Greenland, Copenhagen, DENMARK
[3]CReSIS, University of Kansas, Lawrence, KS
[4]NASA Goddard Space Flight Center, Greenbelt, MD

16:20 F4-4
DECONVOLUTION OF FMCW RADARS FOR OPERATION ICEBRIDGE MISSIONS
Jilu Li*, Fernando Rodriguez-Morales, Jie-Bang Yan, Daniel Gomez-Garcia, Aziz Masud, Aqsa Patel, Tamara Gaynes, Carl Leuschen, Prasad Gogineni
The University of Kansas, Lawrence, KS

16:40 F4-5
MINIATURIZED RADAR DEPTH SOUNDER FOR DEPLOYMENT ON SMALL AUTONOMOUS VEHICLES
Fernando Rodriguez, Stephen Yan, Jay Fuller, Ali Mahmood, David Braaten, Rick Hale, Shawn Keshmiri, Prasad Gogineni, Carl Leuschen*, Bruno Camps
The University of Kansas, Lawrence, KS

17:00 F4-6
FROM SCANSAR TO SWEEPSAR: EVOLVING TECHNOLOGY TO MEASURE EARTH'S CHANGING LANDSCAPE
Paul A. Rosen*, Scott Hensley, Benjamin Holt
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

Session FB1: Small Satellite Radio Science and Technology
Room 1B12

Co-Chairs: William Blackwell, *MIT Lincoln Laboratory*;
Reyhan Baktur, *Utah State University*

13:20 FB1-1
A 6U CUBESAT CONSTELLATION CONCEPT FOR ATMOSPHERIC TEMPERATURE AND HUMIDITY SOUNDING

Sharmila Padmanabhan*, Shannon Brown, Pekka Kangaslahti, Boon Lim, Damon Russell, Richard Cofield, Robert Stachnik
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

13:40 FB1-2
THE MICROMAS CUBESAT MISSION: DEMONSTRATION OF A CORE ELEMENT OF ATMOSPHERIC CONSTELLATION SENSING
William Blackwell*[1], Idahosa Osaretin[1], R. V. Leslie[1], Kerri Cahoy[2], Neal Erickson[3]
[1]*MIT Lincoln Laboratory, Lexington, MA*
[2]*MIT Space Systems Laboratory, Cambridge, MA*
[3]*University of Massachusetts Amherst, Amherst, MA*

14:00 FB1-3
SUPPORTING COMMUNICATION NEEDS OF CUBESAT CONSTELLATION MISSIONS
Charles M. Swenson*[1], Jacob Gunther[1], Chad Fish[2]
[1]*Dept. of Electrical and Computer Engineering, Utah State University, Logan, UT*
[2]*Utah State University Space Dynamics Laboratory, North Logan, UT*

14:20 FB1-4
THE RADIOMETER ATMOSPHERIC CUBESAT EXPERIMENT PAYLOAD: PRE-FLIGHT INTEGRATION AND TEST RESULTS
Boon Lim*
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

14:40 FB1-5
MILLIMETER AND SUBMILLIMETER WAVE REMOTE SENSING USING SMALL SATELLITES
Negar Ehsan*, Dong Wu, Paul Racette, Jaime Esper, Jeffrey Piepmeier
NASA Goddard Space Flight Center, Greenbelt, MD

15:00 Break

15:20 FB1-6
DESIGN OF HIGH PRECISION LENS OR REFLECTOR ANTENNA SYSTEMS FOR CUBESAT MMW/ SMMW RADIOMETERS
Lavanya Periasamy*, Albin J. Gasiewski
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

15:40 FB1-7
EXPERIMENTAL STUDY ON THE EFFECT BETWEEN COMMERCIAL SPACE SOLAR CELLS AND THE ANTENNAS INTEGRATED ON THEIR COVER GLASS
Taha Shahvirdi dizaj yekan*, Reyhan Baktur
Department of Electrical and Computer Engineering, Utah State University, Logan, UT

16:00 FB1-8
UHF DEPLOYABLE ANTENNA STRUCTURES FOR CUBESATS
Joseph Costantine[1], Youssef Tawk[2], Firas Ayoub[2], Christos G. Christodoulou*[2], Gina M. Olson[3], Sergio Pellegrino[3]
[1]*Dept. of Electrical Engineering, California State University Fullerton, Fullerton, CA*
[2]*Configurable Space Microsystems Innovations and Applications Center (COSMIAC), The University of New Mexico, Albuquerque, NM*
[3]*Graduate Aerospace Laboratories, California Institute of Technology, Pasadena, CA*

16:20 FB1-9
MEASUREMENT OF LOWER THERMOSPHERE USING THE OPTICAL PROFILING OF THE ATMOSPHERIC LIMB (OPAL) CUBESAT EXPERIMENT
Padmashri Suresh*, Charles M. Swenson
Dept. of Electrical and Computer Engineering, Utah State University, Logan, UT

16:40 FB1-10
DEVELOPMENT OF SILICON-GERMANIUM CIRCUITS FOR HIGH-FREQUENCY SMALL SATELLITE-BASED RADIOMETERS
Christopher T. Coen*, A. Çağrı Ulusoy, Robert L. Schmid, John D. Cressler
School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA

Session GH1: Ionospheric Modification
Room 200

Co-Chairs: Michael Sulzer, *Arecibo Observatory*;
Robert Moore, *University of Florida*

13:20 GH1-1
MODIFICATION OF THE NATURAL EQUATORIAL IONOSPHERE: THE METAL OXIDE SPACE CLOUD (MOSC) EXPERIMENT
Keith M. Groves*[1], Ronald G. Caton[2], Todd R. Pedersen[2], Richard T. Parris[2], Yi-Jiun Su[2], Paul S. Cannon[3], Natasha K. Jackson-Booth[3], Matthew J. Angling[3], John M. Retterer[1], Charles S. Carrano[1]
[1]*Institute for Scientific Research, Boston College, Chestnut Hill, MA*
[2]*Space Vehicles Directorate, Air Force Research Laboratory, Kirtland AFB, NM*
[3]*QinetiQ, Malvern Worcs, UNITED KINGDOM*

13:40 GH1-2
CALCULATIONS OF 4278 ARTIFICIAL AURORAL AIRGLOW EMISSIONS RESULTING FROM POWERFUL HF RADIO TRANSMISSIONS
Christopher T. Fallen*[1], Brenton J. Watkins[2]
[1]*Arctic Region Supercomputing Center, University of Alaska Fairbanks, Fairbanks, AK*
[2]*Geophysical Institute, University of Alaska Fairbanks, Fairbanks, AK*

14:00 GH1-3

FINE-SCALE OBSERVATIONS OF ARTIFICIAL AURORA AT 777.4 NM
Robert G. Michell[1], Paul Bernhardt*[2], Marilia Samara[1]
[1]*Southwest Research Institute, San Antonio, TX*
[2]*Naval Research Laboratory, Washington, DC*

14:20 GH1-4
IMPACT OF LONG-LIVED ARTIFICIAL IONIZATION CLOUDS ON VHF SCINTILLATIONS
Paul A. Bernhardt*, Carl L. Siefring, Stanley J. Briczinski, Keith Aikens, Mike Nurnburger
Naval Research Laboratory, Washington, DC

14:40 GH1-5
SIMULTANEOUS MULTI-ANGLE MEASUREMENTS OF PLASMA TURBULENCE AT HAARP
Naomi Watanabe*, Mark Golkowski, James Sheerin
Dept. of Electrical Engineering, University of Colorado Denver, Denver, CO

15:00 Break

15:20 GH1-6
PHYSICAL MECHANISMS ASSOCIATED WITH LONG RANGE PROPAGATION OF SIGNALS FROM IONOSPHERIC HEATERS
Nikolay Zabotin*[1], Valery Zavorotny[2]
[1]*Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO*
[2]*Div. of Physical Sciences, NOAA/ESRL, Boulder, CO*

15:40 GH1-7
HF CROSS MODULATION AS A FUNCTION OF HF POWER
Sydney N. Greene*, Robert C. Moore, Jerrod S. Langston
Dept. of Electrical and Computer Engineering, University of Florida, Gainesville, FL

16:00 GH1-8
SUBSTORM-RELATED ULF WAVES AT HIGH LATITUDES
Thomas M. Guido*, Beket Tulegenov, Anatoly V. Streltsov
Dept. of Physical Sciences, Embry Riddle Aeronautical University, Daytona Beach, FL

16:20 GH1-9
MULTI-STATION OBSERVATIONS OF FREQUENCY DEPENDENCE OF AMPLITUDE AND POLARIZATION OF THE ELF WAVES GENERATED VIA IONOSPHERIC MODIFICATION
Ashanthi S. Maxworth*[1], Mark Golkowski[1], Morris B. Cohen[2]
[1]*Dept. of Electrical Engineering, University of Colorado Denver, Denver, CO*
[2]*Dept. of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA*

16:40 GH1-10
OPTIMIZED BEAM-PAINTING AS A MORE EFFICIENT ALTERNATIVE TO GEOMETRIC MODULATION FOR ELF/VLF WAVE GENERATION
Shuji Fujimaru*, Robert C. Moore
Dept. of Electrical and Computer Engineering, University of Florida, Gainesville, FL

17:00 GH1-11
INTERHARMONIC MODULATION PRODUCTS AS A MEANS TO QUANTIFY NONLINEAR D-REGION INTERACTIONS
Robert C. Moore*, Daniel A. Kotovsky
Dept. of Electrical and Computer Engineering, University of Florida, Gainesville, FL

Session H2: Waves and Turbulence in Space and Laboratory Plasmas
Room 245

Co-Chairs: Edward Thomas, *Auburn University*;
Manish Mithaiwala, *Naval Research Laboratory*

13:20 H2-1
DISCRETE AURORAL ARCS GENERATED BY IONOSPHERIC FEEDBACK INSTABILITY
Nan Jia*[1], Anatoly V. Streltsov[2]
[1]*Thayer School of Engineering, Dartmouth College, Hanover, NH*
[2]*Dept. of Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL*

13:40 H2-2
HIGH-RESOLUTION GROUND-LEVEL OBSERVATIONS OF AKR-LIKE EMISSIONS
James LaBelle*, Xi Yan
Dept. of Physics and Astronomy, Dartmouth College, Hanover, NH

14:00 H2-3
A LABORATORY INVESTIGATION OF THE DYNAMICS OF SHEAR FLOWS IN A PLASMA BOUNDARY LAYER
Ami M. DuBois*[1], Edward Thomas[1], William E. Amatucci[2], Gurudas Ganguli[2]
[1]*Dept. of Physics, Auburn University, Auburn, AL*
[2]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*

14:20 H2-4
INVESTIGATION OF THE ELECTRON-ION HYBRID INSTABILITY IN A COLLISIONAL ENVIRONMENT
Erik M. Tejero*[1], Lon C. Enloe[2], Vladimir I. Sotnikov[3], Bill E. Amatucci[1], Guru Ganguli[1]
[1]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*
[2]*Dept. of* Physics, US Air Force Academy, Colorado Springs, CO
[3]Sensors Directorate, Air Force Research Laboratory, Dayton, OH

14:40 H2-5
ELECTRON DENSITIES INFERRED FROM PLASMA WAVE SPECTRA OBTAINED BY THE VAN ALLEN PROBES EMFISIS WAVES INSTRUMENT
W. S. Kurth*[1], S. De Pascuale[1], C. A. Kletzing[1], J. B. Faden[1], S. Thaller[2], J. R. Wygant[2]
[1]*University of Iowa, Iowa City, IA*
[2]*University of Minnesota, Minneapolis, MN*

15:00 Break

15:20 H2-6
WAVES IN WAVE-PRODUCED PLASMAS: DUCTED KINETIC ALFVÉN WAVES IN HELICON SOURCES
Saeid Houshmandyar*[1], Earl E. Scime[2]
[1]*Dept. of Physics, Gonzaga University, Spokane, WA*
[2]*Dept. of Physics, West Virginia University, Morgantown, WV*

15:40 H2-7
INVESTIGATION OF TEMPERATURE GRADIENT INSTABILITY AS THE SOURCE OF MID-LATITUDE DECAMETER-SCALE QUIET-TIME IONOSPHERIC IRREGULARITIES
Ahmed Eltrass*[1], Wayne Scales[1], Alireza Mahmoudian[1], Sbastien de Larquier[1],
John Ruohoniemi[1], Joseph Baker[1], Ray Greenwald[1], Philip Erickson[2]
[1]*Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA*
[2]*MIT Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*

16:00 H2-8
THE FARLEY-BUNEMAN INSTABILITY IN THE SOLAR CHROMOSPHERE
Meers Oppenheim*[1], Chad Madsen[1], Yakov Dimant[1], John Fontenla[2]
[1]*Center for Space Physics, Boston University, Boston, MA*
[2]*CoRA, NorthWest Research Associates, Boulder, CO*

16:20 H2-9
SOLAR ACTIVITY TRIGGERING INTERSTELLAR ELECTRON PLASMA OSCILLATIONS
W. S. Kurth*[1], D. A. Gurnett[1], R. L. McNutt[2], E. Roelof[2], M. E. Hill[2], D. J. McComas[3,4]
[1]*University of Iowa, Iowa City, IA*
[2]*Applied Physics Laboratory, Johns Hopkins University, Laurel, MD*
[3]*Southwest Research Institute, San Antonio, TX*
[4]*University of Texas at San Antonio, San Antonio, TX*

Session J3: Wide-Field Imaging and Power Spectrum Measurements
Room 265

Co-Chairs: Miguel Morales, *University of Washington*;
Adrian Liu, *University of California Berkeley*

13:20 J3-1
WHAT WILL THE NEXT GENERATION OF 21 CM EXPERIMENTS TEACH US ABOUT THE EPOCH OF REIONIZATION?
Jonathan C. Pober*[1], Joshua S. Dillon[2], Adrian Liu[3]
[1]*Dept. of Physics, University of Washington, Seattle, WA*
[2]*Dept. of Physics, Massachusetts Institute of Technology, Cambridge, MA*
[3]*Dept. of Astronomy, University of California Berkeley, Berkeley, CA*

13:40 J3-2
HOW THE UW IMAGING PIPELINE PREPARES 350 HOURS OF MWA OBSERVATIONS FOR EOR POWER SPECTRUM MEASUREMENTS
Adam P. Beardsley*, Ian S. Sullivan, Bryna J. Hazelton, Miguel F. Morales
Dept. of Physics, University of Washington, Seattle, WA

14:00 J3-3
UW EOR POWER SPECTRUM PIPELINE
Bryna J. Hazelton*, Miguel F. Morales, Adam P. Beardsley, Ian S. Sullivan
Dept. of Physics, University of Washington, Seattle, WA

14:20 J3-4
APPLICATIONS OF FAST 21 CM POWER SPECTRUM ESTIMATION
Joshua S. Dillon*
Dept. of Physics, Massachusetts Institute of Technology, Cambridge, MA

14:40 J3-5
SHEDDING LIGHT ON FOREGROUNDS WITH NEW MWA AND PAPER DATA
Daniel Jacobs*, Judd Bowman
Arizona State University, Tempe, AZ

15:00 Break

15:20 J3-6
RESULTS FROM THE GREEN BANK TELESCOPE 21 CM INTENSITY SURVEY
Eric R. Switzer*
NASA Goddard Space Flight Center, Greenbelt, MD

15:40 J3-7
ANALYZING TRANSIT TELESCOPES WITH THE M-MODE FORMALISM
Richard Shaw*[1], Kris Sigurdson[2], Ue-Li Pen[1], Albert Stebbins[3], Michael Sitwell[2]

[1]*Canadian Institute for Theoretical Astrophysics, Toronto, ON, CANADA*
[2]*Dept. of Physics and Astronomy, University of British Columbia, Vancouver, BC, CANADA*
[3]*Theoretical Astrophysics Group, Fermi National Accelerator Laboratory, Batavia, IL*

16:00 J3-8
CHARTING MOLECULAR GAS THROUGH COSMOLOGICAL TIME: PRESENT RESULTS AND FUTURE DIRECTIONS
Garrett K. Keating*[1], Geoffrey C. Bower[1], David R. DeBoer[1], Daniel Marrone[2]
[1]*Dept. of Astronomy, University of California, Berkeley, Berkeley, CA*
[2]*Dept. of Astronomy, University of Arizona, Tucson, AZ*

16:20 J3-9
PROBABILISTIC IMAGE RECONSTRUCTION FOR RADIO INTERFEROMETERS
Paul M. Sutter*, Benjamin D. Wandelt
Paris Institute of Astrophysics, Paris, FRANCE

16:40 J3-10
SPT-3G: A NEXT-GENERATION COSMIC MICROWAVE BACKGROUND POLARIZATION EXPERIMENT ON THE SOUTH POLE TELESCOPE
Jason E. Austermann*[1], for the SPT Collaboration[2]
[1]*Center for Astrophysics and Space Astronomy, Boulder, CO*
[2]*Kavli Institute for Cosmological Physics, University of Chicago, Chicago, IL*

17:00 J3-11
REDUNDANT AND NON-IMAGING CALIBRATION OF THE PRECISION ARRAY FOR PROBING THE EPOCH OF REIONIZATION (PAPER)
James E. Aguirre*[1], Aaron R. Parsons[2], Rich F. Bradley[3], Christopher L. Carilli[4], David R. DeBoer[5], Zaki S. Ali[2], Adrian Liu[2], Daniel C. Jacobs[6], David F. Moore[1], Jonathan C. Pober[7], Irina I. Stefan[8]
[1]*University of Pennsylvania, Philadelphia, PA*
[2]*University of California, Berkeley, Berkeley, CA*
[3]*National Radio Astronomy Observatory, Charlottesville, VA*
[4]*National Radio Astronomy Observatory, Socorro, NM*
[5]*Radio Astronomy Laboratory, Berkeley, CA*
[6]*Arizona State University, Tempe, AZ*
[7]*University of Washington, Seattle, WA*
[8]*Cavendish Laboratory, Cambridge, UNITED KINGDOM*

17:20 J3-12
HOW DO POLARIZED FOREGROUNDS AFFECT 21 CM EOR POWER SPECTRUM DETECTION?
David F. Moore*[1], James E. Aguirre[1], Aaron R. Parsons[2], Richard F. Bradley[3], Christopher L. Carilli[4], David R. DeBoer[5], Zaki S. Ali[2], Adrian Liu[2], Daniel C. Jacobs[6], Jonathan C. Pober[7], Irina I. Stefan[8]
[1]*Dept. of Physics, University of Pennsylvania, Philadelphia, PA*
[2]*Dept. of Astronomy, University of California, Berkeley, Berkeley, CA*

[3]*National Radio Astronomy Observatory, Charlottesville, VA*
[4]*National Radio Astronomy Observatory, Socorro, NM*
[5]*Radio Astronomy Laboratory, University of California Berkeley, Berkeley, CA*
[6]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[7]*Dept. of Physics, University of Washington, Seattle, WA*
[8]*Cavendish Lab, Cambridge, UNITED KINGDOM*

Session K1: Human Body Interactions with Antennas and Other Electromagnetic Devices
Room 1B51

Co-Chairs: Dejan Filipovic, *University of Colorado Boulder*;
Gianluca Lazzi, *University of Utah*

13:20 K1-1
COMPUTATIONAL STUDY OF ELECTROMAGNETIC EXPOSURE OF MILITARY PERSONNEL IN A HUMVEE
David Garrido*, Maxim Ignatenko, Dejan S. Filipovic
Dept. of Electrical Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

13:40 K1-2
ELECTRICALLY COUPLED LOOP ANTENNA AS AN IMPLANTED ANTENNA
Ali A. Y. Ibraheem, Majid Manteghi*
Bradly Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

14:00 K1-3
CONFORMAL ANTENNA APPLICATOR FOR MICROWAVE ABLATION THERAPY
Robert W. Hulsey*, Mustafa Asili, Erin Colebeck, Erdem Topsakal
Dept. of Electrical and Computer Engineering, Mississippi State University, Starkville, MS

14:20 K1-4
EDDY CURRENT MEASUREMENT AND SIMULATION IN DIELECTRIC FLUIDS FOR TRANSCRANIAL MAGNETIC SIMULATION CALIBRATION
Ahmed Abdellatif*, Daniel Van Mater, David Carey, Amjad Nazzal, Rodney Ridley, Abas Sabouni
Wilkes University, Wilkes-Barre, PA

14:40 K1-5
HYBRID HYDROGELS FOR MEDICAL APPLICATIONS OF MICROWAVES
Emily E. Dance*, Erin E. Colebeck, Erdem Topsakal
Dept. of Electrical and Computer Engineering, Mississippi State University, Mississippi State, MS

15:00 Break

15:20 K1-6
INCREASING EFFICIENCY IN THE POWERING OF IMPLANTABLE BIOMEDICAL DEVICES USING NEGATIVE PERMEABILITY METAMATERIALS
Erik S. Gamez*, Ajit Rajagopalan, Gianluca Lazzi
University of Utah, Salt Lake City, UT

15:40 K1-7
FLEXIBLE MICROWAVE ANTENNA APPLICATOR FOR THERMOTHERAPY OF THE BREAST
Mustafa Asili*[1], Erin Colebeck[1], Robert Hulsey[1], Pu Chen[2], Utkan Demirci[3], Erdem Topsakal[1]
[1]*Dept. of Electrical and Computer Engineering, Mississippi State University, Mississippi State, MS*
[2]*Dept. of Medicine, Harvard Medical School, Boston, MA*
[3]*(3) Harvard-MIT Division of Health Sciences and Technology, Massachusetts Institute of Technology, Cambridge, MA*

16:00 K1-8
TRANSCRANIAL MAGNETIC STIMULATION PROCEDURE AUTOMATION
Garth D. Todd*, Kevin Vanderhoof, David Carey, Rodney Ridley, Abas Sabouni
Div. of Engineering and Physics, Wilkes University, Wilkes-Barre, PA

Business Meetings

17:00	Commission B	Room 1B40
17:00	Commission G	Room 200
17:00	Commission J	Room 265
18:00	Commission D	Room 151
18:00	Commission H	Room 245
18:00	Commission K	Room 1B51

FRIDAY MORNING, 10 January 2014

Session B8: Microstrip & Printed Devices and Antennas
Room 155
Co-Chairs: Sembiam Rengarajan, *California State University, Northridge*; Gregory Huff, *Texas A & M University*

08:20 B8-1
SCREEN PRINTED L-BAND CIRCULARLY POLARIZED ANTENNA FOR TEXTILE PLATFORMS
Kate J. Duncan[1], Johnny Daniel[1], Glenn Minko[1], James Breakall*[2]

[1]*CERDEC STCD, Aberdeen Proving Ground, MD*
[2]*Dept. of Electrical Engineering, Pennsylvania State University, University Park, PA*

08:40 B8-2
LIQUID-METAL RECONFIGURABLE RF COMPONENTS AND ANTENNAS
Jonathan H. Dang*, Andy M. Morishita, Ryan C. Gough, Wenqi Hu, Aaron T. Ohta, Wayne A. Shiroma
Dept. of Electrical Engineering, University of Hawaii at Manoa, Honolulu, HI

09:00 B8-3
LOOP-TYPE ELECTRICALLY SMALL ANTENNA LOADED WITH NON-FOSTER CIRCUIT
Aseim M. Elfrgani*, Roberto G. Rojas
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

09:20 B8-4
STABILITY ANALYSIS OF NON-FOSTER CIRCUIT LOADED ARTIFICIAL MAGNETIC CONDUCTORS
Sembiam R. Rengarajan*[1], Carson R. White[2]
[1]*Dept. of Electrical and Computer Engineering, California State University, Northridge, Northridge, CA*
[2]*HRL Laboratories, LLC., Malibu, CA*

09:40 B8-5
DESIGN, ANALYSIS, AND RECONFIGURATION OF A MULTI-ARM SPIRAL FREQUENCY SELECTIVE SURFACE
Michael S. Kelley*, Gregory H. Huff
Dept. of Electrical and Computer Engineering, Texas A&M, College Station, TX

10:00 Break

Session B9: Electromagnetic Interaction and Coupling
Room 155

Co-Chairs: David Jackson, *University of Houston*;
Zoya Popovic, *University of Colorado Boulder*

10:20 B9-1
EFFECTS OF DIPOLAR SCATTERER ORIENTATION BESIDE A PLASMONIC NANOSPHERE IN EXCITATION RATE ENHANCEMENT
Faezeh Tork Ladani*, Filippo Capolino
Dept. of Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA

10:40 B9-2
FAST ELECTROMAGNETIC MODELING OF MASSIVELY COUPLED VIAS IN 3-D INTERCONNECTS
Xichen Guo*, David R. Jackson, Ji Chen
Dept. of Electrical and Computer Engineering, University of Houston, Houston, TX

11:00 B9-3
A 2.16 GHZ HARMONICALLY TERMINATED 55% EFFICIENT DC-DC CONVERTER
Ignacio Ramos*, Leonardo Ranzani, Dragan Maksimovic, Zoya Popovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

11:20 B9-4
MICROFABRICATED TRANSMISSION-LINE TRANSFORMERS WITH DC ISOLATION
Leonardo M. Ranzani*, Ignacio Ramos, Zoya Popovic, Dragan Maksimovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

11:40 B9-5
NUMERICAL STUDY OF SOURCE LOCALIZATION USING THE TDOA METHOD
Mengna Yang*[1], David R. Jackson[1], Zubiao Xiong[1], Ji Chen[1], Jeffery T. Williams[2]
[1]*Dept. of Electrical and Computer Engineering, University of Houston, Houston, TX*
[2]*Sandia National Laboratories, Albuquerque, NM*

Session B10: Terahertz Applications
Room 1B40

Session Co-Chairs: Hao Xin, *University of Arizona*;
John Volakis, *Ohio State University*

10:20 B10-1
COMPONENTS AND SYSTEMS FOR TERAHERTZ APPLICATIONS
Goutam Chattopadhyay*
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

10:40 B10-2
THEORETICAL AND EXPERIMENTAL STUDY OF A TERAHERTZ TIME-DOMAIN SPECTROMETER BASED ON PHOTOCONDUCTIVE ANTENNA
Jitao Zhang[1], Wei-Ren Ng[1], Mingguang Tuo[1], Min Liang[1], D.r. Golish[1], M. E. Gehm[1,2], Hao Xin[1]*
[1]*Dept. of Electrical and Computer Engineering, University of Arizona, Tucson, AZ*
[2]*Dept. of Electrical and Computer Engineering, Duke University, Durham, NC*

11:00 B10-3
MODELING OF RTD-GATED GAN HEMTS AT TERAHERTZ FREQUENCIES USING A FULL-WAVE SIMULATION TOOLSET COUPLED WITH PARTICLE-BASED EQUATIONS
Sai N. Tenneti*, Niru K. Nahar, John L. Volakis
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

11:20 B10-4
EXTRACTION OF PARASITICS IN SUB-MILLIMETER WAVE DEVICES VIA FULL-WAVE ELECTROMAGNETIC MODELING
Yasir Karisan*, Kubilay Sertel
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

11:40 B10-5
PLASMONICS-ENHANCED TERAHERTZ SPECTROSCOPY
Christopher W. Berry, Ning Wang, Mohammad R. Hashemi, Mona Jarrahi*
Dept. of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI

Session BC1: Cognitive Radio and Signal Processing
Room 1B40

Co-Chairs: Christos Christodoulou, *University of New Mexico*;
Jean-Francois Chamberland, *Texas A&M University*

08:20 BC1-1
A SURVEY OF COGNITIVE BEAMFORMING TECHNIQUES
Bryan Murray[1], Amir Zaghloul*[2]
[1]*Virginia Polytechnic Institute and State University, Blacksburg, VA*
[2]*US Army Research Laboratory, Adelphi, MD*

08:40 BC1-2
ANTENNA FUNCTIONALITIES IN A COGNITIVE RADIO ENVIRONMENT
Youssef Tawk[1], Joseph Costantine[2], Firas Ayoub[1], Christos G. Christodoulou*[1]
[1]*Configurable Space Microsystems Innovation and Applications Center (COSMIAC), The University of New Mexico, Albuquerque, NM*
[2]*Dept. of Electrical Engineering, California State University Fullerton, Fullerton, CA*

09:00 BC1-3
ANTENNA DESIGN FOR GRAPH INFERENCE: STRIKING A BALANCE BETWEEN QUALITY AND QUANTITY
Travis Taghavi*[1], Jean-Francois Chamberland[2], Gregory H. Huff[2]
[1]*Computer Science and Engineering, Texas A&M University, College Station, TX*
[2]*Dept. of Electrical and Computer Engineering, Texas A&M University, College Station, TX*

09:20 BC1-4
IMAGE AND ALIASING TOLERANT WIDEBAND SPECTRUM SENSING
Eyosias Yoseph Imana*, Taeyoung Yang, Jeffrey Reed
Virginia Polytechnic Institute and State University, Blacksburg, VA

09:40 BC1-5
ANALYTICAL AND EXPERIMENTAL EVALUATION OF A NOVEL WIDEBAND TRANSCEIVER WITH ON-SITE CODING
Elias A. Alwan*, Waleed Khalil, John L. Volakis
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

10:00 Break

Session CEB2: Spectrum Challenges and Changes
Room 151

Co-Chairs: Lawrence Cohen, *Naval Research Laboratory*;
Thomas Higgins, *Naval Research Laboratory*;
Charles Baylis, *Baylor University*

08:20 CEB2-1
SPECTRUM CONGESTION -- IS IT A TECHNICAL PROBLEM?
Stephen Berger*
TEM Consulting, Georgetown, TX

08:40 CEB2-2
PASSIVE BISTATIC AND MULTISTATIC RADAR USING WIMAX SIGNALS OF OPPORTUNITY
Thomas Higgins*
Radar Division, United States Naval Research Laboratory, Washington, DC

09:00 CEB2-3
MULTISTATIC VELOCITY BACKPROJECTION FOR SIMULATED AND EXPERIMENTAL MULTISTATIC RADAR DATA
Tegan Webster*
Radar Division, United States Naval Research Laboratory, Washington, DC

09:20 CEB2-4
ELECTROMAGNETIC INTERFERENCE TO RADAR RECEIVERS DUE TO OFDM COMMUNICATIONS SYSTEMS
Brian D. Cordill[1], Sarah A. Seguin*[1], Larry Cohen[2]
[1]*Radar Systems Laboratory, University of Kansas, Lawrence, KS*
[2]*Radar Division, Naval Research Laboratory, Washington, D.C.*

09:40 CEB2-5
A FAST-FADING MOBILE CHANNEL MEASUREMENT SYSTEM
Robert T. Johnk*, Chriss A. Hammerscmidt, Mark A. McFarland, John J. Lemmon
Institute for Telecommunication Sciences, Boulder, CO

10:00 Break

10:20 CEB2-6
A RESEARCH PATH FOR THE DESIGN OF FUTURE SPECTRALLY COMPLIANT, FLEXIBLE RADAR TRANSMITTERS
Charles Baylis*[1], Matthew Fellows[1], Lawrence Cohen[2], Robert J. Marks II[1]
[1]*Dept. of Electrical and Computer Engineering, Baylor University, Waco, TX*
[2]*Radar Division, Naval Research Laboratory, Washington, DC*

10:40 CEB2-7
A VECTOR-BASED ALGORITHM FOR REAL-TIME, SPECTRALLY SENSITIVE LOAD IMPEDANCE RECONFIGURATION IN RADAR TRANSMITTERS
Matthew W. Fellows*[1], Charles Baylis[1], Lawrence Cohen[2], Robert J. Marks II[1]
[1]*Dept. of Electrical and Computer Engineering, Baylor University, Waco, TX*
[2]*Radar Division, Naval Research Laboratory, Washington, DC*

11:00 CEB2-8
A NEW DETECTION TECHNIQUE FOR IDENTIFYING CHIPLESS RFID TAGS
Reza Rezaiesarlak*, Majid Manteghi
Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

11:20 CEB2-9
ON THE DESIGN AND ANALYSIS OF ANTENNA PATTERNS FOR LOCALIZATION WITH SMART DEVICES
Daniel Tunon[1], Travis Taghavi[2], Jean-Francois Chamberland*[1], Gregory Huff[1]
[1]*Dept. of Electrical and Computer Engineering, Texas A&M University, College Station, TX*
[2]*Computer Science and Engineering, Texas A&M University, College Station, TX*

Session F5: Mesoscale Numerical Weather Prediction in Support of Wave Propagation Modeling I
Room 1B12

Co-Chairs: Tracy Haack, *Naval Research Laboratory*;
Katherine Horgan, *Naval Surface Warfare Center Dahlgren Division*

08:20 F5-1
FORECASTING RF SCINTILLATION AND IR BEAM SPREADING DUE TO TURBULENCE FROM NUMERICAL WEATHER PREDICTION BASED CALCULATIONS OF REFRACTIVE INDEX STRUCTURE CONSTANT
Robert E. Marshall*
NSWCDD, Dahlgren, VA

08:40 F5-2
PRACTICAL CONSIDERATIONS FOR DERIVING REFRACTIVITY FOR PARABOLIC WAVE PROPAGATION MODELS
Ian Will*
Naval Research Laboratory, Washington, DC

09:00 F5-3
ASSESSMENT OF PUBLIC DOMAIN FORECAST PRODUCTS FOR PREDICTING ANOMALOUS RF PROPAGATION
Thomas R. Hanley*, Jonathan Z. Gehman, Richard M. Giannola
Applied Physics Laboratory, Johns Hopkins University, Laurel, MD

09:20 F5-4
THE SENSITIVITY OF THE MET OFFICE EVAPORATION DUCT MODEL TO INPUT PARAMETERS
Martin J. Veasey, Damian Wilson, Warren Lewis*
UK Met Office, Exeter, Devon, UNITED KINGDOM

09:40 F5-5
CHARACTERIZING THE MARINE REFRACTIVITY ENVIRONMENT FROM NUMERICAL WEATHER PREDICTION DATA FOR ELECTROMAGNETIC PROPAGATION MODELING
Paul A. Frederickson*
Naval Postgraduate School, Monterey, CA

10:00 Break

10:20 F5-6
COASTAL MEASUREMENTS COMPARED TO NUMERICAL WEATHER PREDICTION DURING A FOGGY SUB-REFRACTIVE ENVIRONMENT
Isha M. Renta*, Victor R. Wiss, Katherine L. Horgan, Robert E. Marshall, William D. Thornton
Naval Surface Warfare Center, Dahlgren Division, Dahlgren, VA

10:40 F5-7
A REANALYSIS OF THE PREDEM CAMPAIGN WITH A COUPLED ATMOSPHERIC-WAVE MODELING SYSTEM
Francois C. Vandenberghe*[1], Eric Mandine[2], Michel Aidonidis[3]
[1]*National Center for Atmospheric Research, Boulder, CO*
[2]*C-S, Toulon, FRANCE*
[3]*Meteo France, Brest, FRANCE*

11:00 F5-8
ELECTROMAGNETIC PROPAGATION ENVIRONMENT IN TROPICAL DISTURBANCES USING DROPSONDE MEASUREMENTS
Qing Wang*[1], David Ziemba[1], Patrick Harr[1], Junhong Wang[2]
[1]*Dept. of Meteorology, Naval Postgraduate School, Monterey, CA*
[2]*Dept. of Atmospheric & Environmental Sciences, University at Albany, SUNY, Albany, NY*

11:20 F5-9
FIRST RESULTS FROM THE TROPICAL AIR-SEA PROPAGATION STUDY (TAPS) CAMPAIGN
Andy S. Kulessa*, Jorg M. Hacker
Defense Science & Technology Organization, Edinburgh, SA, AUSTRALIA

11:40 F5-10
EXPLOITING FIELD INTENSITY AND SIGNAL FILTERING IN IMAGING THROUGH RANDOM CLOUD-LIKE MEDIA WITH SHORT PULSES
Elizabeth Bleszynski*, Marek Bleszynski, Thomas Jaroszewicz
Monopole Research, Thousand Oaks, CA

Session F6: Computational Electromagnetics for Hydrometeors
Room 1B28

Co-Chairs: Jani Tyynela, *Colorado State University*;
Kultegin Aydin, *Pennsylvania State University*

08:20 F6-1
PERFORMANCE OF IDEALIZED SNOW PARTICLE MODELS FOR SIMULATING W-BAND REFLECTIVITY AND IMPLICATIONS FOR GLOBAL SNOWFALL RETRIEVALS
Norman B. Wood*[1], Tristan S. L'Ecuyer[2]
[1]*Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin Madison, Madison, WI*
[2]*Dept. of Atmospheric and Oceanic Sciences, University of Wisconsin Madison, Madison, WI*

08:40 F6-2
CLOUD WATER CONTENT CHARACTERIZATION BY MULTIFREQUENCY WEATHER RADAR OBSERVATIONS AND NUMERICAL SCATTERING SIMULATIONS

Anna C. Marra*[1], Franco Prodi[2], Gian P. Marra[1]
[1]*Italian National Research Council, Institute of Atmospheric Sciences and Climate, Lecce, ITALY*
[2]*Italian National Research Council, Institute of Atmospheric Sciences and Climate, Bologna, ITALY*

09:00 F6-3
EXPLORING RADAR OBSERVABLES FOR ICE WATER CONTENT RETRIEVAL USING AN ICE CRYSTAL SCATTERING DATABASE
Yinghui Lu[1], Kultegin Aydin*[2], Eugene E. Clothiaux[1], Johannes Verlinde[1]
[1]*Dept. of Electrical Engineering, Pennsylvania State University, University Park, PA*
[2]*Dept. of Meteorology, Pennsylvania State University, University Park, PA*

09:20 F6-4
RETRIEVAL OF SNOWFLAKE TYPES FROM MULTI-FREQUENCY DUAL-POLARIZATION MEASUREMENTS
Jani Tyynela*, V. Chandrasekar
Colorado State University, Fort Collins, CO

09:40 F6-5
AN IMPLEMENTATION OF THE INVARIANT IMBEDDING T-MATRIX SOLUTION TO ELECTROMAGNETIC SCATTERING
J. Ashley Alford[1], Kwo-Sen Kuo*[2,3], Thomas L. Clune[2]
[1]*Sigma Space Corporation, Lanham, MD*
[2]*NASA Goddard Space Flight Center, Greenbelt, MD*
[3]*Earth System Science Interdisciplinary Center, University of Maryland, College Park, MD*

10:00 Break

Session F7: RFI Mitigation in Microwave Radiometry
Room 1B28

Co-Chairs: David Kunkee, *The Aerospace Corporation*;
Sidharth Misra, *Jet Propulsion Laboratory*

10:20 F7-1
DEMONSTRATION OF SPECTRUM SHARING BETWEEN A MICROWAVE RADIOMETER AND A COMMUNICATIONS SYSTEM
Huaiyi Wang*[1], Joel T. Johnson[1], Christopher J. Baker[1], Lixin Ye[2]
[1]*Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH*
[2]*Dept. of Economics, The Ohio State University, Columbus, OH*

10:40 F7-2
IMPLEMENTATION OF A FLEXIBLE WIDE-BAND ON-BOARD RADIO FREQUENCY INTERFERENCE MITIGATING DIGITAL BACK-END RADIOMETER SYSTEM
Sidharth Misra*[1], Andre Tkacenko[1], Suraj Gowda[2], Robert Jarnot[1], Shannon Brown[1]
[1]Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
[2]University of California, Berkeley, CA

11:00 F7-3
RFI REMOVAL FROM 385 CHANNEL HYPERSPECTRAL L-BAND RADIOMETER MEASUREMENTS
Fredrick S. Solheim*[1], Peter Toose[2], Tom Watts[3]
[1]Radiometrics Corporation, Boulder, CO
[2]Environment Canada, Toronto Ontario, CANADA
[3]Northumbria University, Newcastle upon Tyne, UNITED KINGDOM

11:20 F7-4
MANIFOLD-BASED INTERFERENCE MITIGATION
Joshua W. K. Chong*, Albin J. Gasiewski
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

Session GH2: Satellite and Sub-orbital Measurements of the Ionosphere and Magnetosphere I
Room 200

Co-Chairs: Paul Bernhardt, *Naval Research Laboratory*;
Joshua Semeter, *Boston University*

08:20 GH2-1
THE CANADIAN ENHANCED POLAR OUTFLOW PROBE (E-POP)
Andrew W. Yau*[1], H. G. James[2]
[1]University of Calgary, Calgary, AB, CANADA
[2]Communications Research Centre, Ottawa, ON, CANADA

08:40 GH2-2
ALTAIR AND IRIS IN-SITU AND CHEMICAL RELEASE MEASUREMENTS OF "SUNSET ELECTRODYNAMICS" OF THE EQUATORIAL IONOSPHERE DURING THE NASA EVEX CAMPAIGN AT KWAJALEIN
Erhan Kudeki*[1], Steven J. Franke[1], Robert F. Pfaff[2], Miguel F. Larsen[3], Douglas E. Rowland[2], Jeffrey H. Klenzing[2]
[1]Dept. of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Champaign, IL
[2]NASA Goddard Space Flight Center, Greenbelt, MD
[3]Dept. of Physics and Astronomy, Clemson University, Clemson, SC

09:00 GH2-3
NRL CERTO BEACONS FOR SATELLITE AND SOUNDING ROCKET APPLICATIONS
Paul A. Bernhardt*, Carl L. Siefring
Naval Research Laboratory, Washington, DC

09:20 GH2-4
AURORAL SPATIAL STRUCTURES PROBE (ASSP)
Daniel L. Farr*[1], Cameron Weston[2], Tim Nielson[2], Crystal Frazier[2], Erik Stromberg[2], Jaden Miller[2], Anthony Swenson[2], Brian Carrick[2], Weston Nelson[2], Victoria Vangeison[2], Tanner Evans[2], Wade Cox[2], Ben Byers[2], Julio M. Hidalgo[1], Chris Perkins[2], Chad Fish[2], Charles M. Swenson[1]
[1]*Utah State University, Logan, UT*
[2]*Space Dynamics Laboratory, Logan, UT*

09:40 GH2-5
A NOVEL METHOD TO ANALYZE IONOSPHERIC MEASUREMENTS MADE BY A NON-UNIFORMLY CONTAMINATED LANGMUIR PROBE ON-BOARD A SOUNDING ROCKET
Padmashri Suresh*, Charles M. Swenson
Dept. of Electrical and Computer Engineering, Utah State University, Logan, UT

10:00 Break

10:20 GH2-6
ELECTRON BEAMS AND LANGMUIR TURBULENCE IN HIGH-LATITUDE IONOSPHERE
Hassanali Akbari*, Joshua L. Semeter
Boston University, Boston, MA

10:40 GH2-7
SWEEPING IMPEDANCE PROBE: NEW TECHNIQUES FOR IONOSPHERIC PLASMA DIAGNOSTICS
Julio Martin-Hidalgo*, Charles M. Swenson, Daniel Farr
Dept. of Electrical and Computer Engineering, Utah State University, Logan, UT

11:00 GH2-8
IONOSPHERIC STORM ENHANCED DENSITY OBSERVATIONS USING THE DICE CUBESAT LANGMUIR PROBES
Geoff Crowley*[1], Marcin Pilinski[1], Irfan Azeem[1], Charles Swenson[2], Chad Fish[2], Tim Neilsen[2], DICE Engineering Team[2], Aroh Barjatya[3]
[1]*ASTRA, Boulder, CO*
[2]*Space Dynamics Lab/USURF, North Logan, UT*
[3]*Embry-Riddle Aeronautical University, Daytona Beach, FL*

Session HG1: Meteors, Orbital Debris, and Dusty Plasmas I
Room 245

Co-Chairs: Gurudas Ganguli, *Naval Research Laboratory*;
Jonathan Fentzke, *Scientific Solutions, Inc.*

08:20 HG1-1
SOME EVOLVING THOUGHTS REGARDING RADAR METEOR OBSERVATIONS
John D. Mathews*
Radar Space Sciences Laboratory, Pennsylvania State University, University Park, PA

08:40 HG1-2
THE CONFIRMATION OF HIGH-ALTITUDE RADAR METEORS OBSERVED WITH THE JICAMARCA 50 MHZ ARRAY RADAR
Boyi Gao*, John Mathews
Dept. of Electrical Engineering, Pennsylvania State University, State College, PA

09:00 HG1-3
QUANTIFYING THE IMPACT OF ATMOSPHERIC PARAMETERS ON THE DURATION OF NON-SPECULAR METEOR TRAILS
Freddy Galindo[1], Julio Urbina*[1], Lars Dyrud[2], Jonathan Fentzke[3]
[1]*Pennsylvania State University, University Park, PA*
[2]*Earth and Space Science, Charles Stark Draper Laboratory, Cambridge, MA*
[3]*Scientific Solutions, Inc. and Shell, Cambridge, MA*

09:20 HG1-4
METEOR TRAIL OBSERVATIONS COLLECTED WITH THE PENN STATE VHF RADAR
Julio Urbina*[1], Robert Sorbello[1], Lars P. Dyrud[2], Jonathan Fentzke[3], Freddy Galindo[1]
[1]*CSSL/Electrical Engineering, Pennsylvania State University, University Park, PA*
[2]*Charles Stark Draper Laboratory, Cambridge, MA*
[3]*Scientific Solutions, Inc., North Chelmsford, MA*

09:40 HG1-5
INITIAL RESULTS FROM SIMULTANEOUS 30 MHZ AND 50 MHZ JICAMARCA ALL-SKY SPECULAR METEOR RADAR OBSERVATIONS
Glenn F. Sugar*[1], Danny Scipion[2], Sigrid Close[1], Marco Milla[2]
[1]*Dept. of Aeronautical and Astronautical Engineering, Stanford University, Stanford, CA*
[2]*Jicamarca Radio Observatory, Lima, PERU*

10:00 Break

10:20 HG1-6
INITIAL RESULTS FROM A FORWARD-SCATTER METEOR WIND RADAR EXPERIMENT BASED ON THE COLORADO SOFTWARE RADAR (COSRAD)
Cody Vaudrin*, Scott Palo
Dept. of Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO

10:40 HG1-7
RF EMISSION FROM HYPERVELOCITY IMPACT PLASMA
Sigrid Close*, Alex Fletcher, Theresa Johnson, Ivan Linscott, Ashish Goel, Nicolas Lee
Stanford University, Stanford, CA

11:00 HG1-8
SIMULATING HYPERVELOCITY IMPACT PLASMAS AND THEIR EFFECTS ON SPACECRAFT
Alexander Fletcher*, Sigrid Close
Dept. of Aeronautics and Astronautics, Stanford University, Stanford, CA

11:20 HG1-9
FUNDAMENTAL ASTRODYANMICS CHALLENGES IN ORBITAL DEBRIS DETECTION, TRACKING, IDENTIFICATION, AND CHARACTERIZATION
Moriba Jah*
Space Vehicles Directorate, Air Force Research Laboratory, Kirtland AFB, NM

11:40 HG1-10
HYPERVELOCITY IMPACTS OF MICROSCOPIC DUST GRAINS FOR ORBITAL DEBRIS REMEDIATION
C. Crabtree*[1], G. Ganguli[1], A. Velikovich[1], L. Rudakov[2]
[1]Plasma Physics Division, Naval Research Laboratory, Washington, DC
[2]Icarus Research Inc., Bethesda, MD

Session J4: Hydrogen-Based Cosmology
Room 265

Co-Chairs: Jack Burns, *University of Colorado Boulder*;
Steven Furlanetto, *University of California Los Angeles*

08:20 J4-1
OVERVIEW OF THE CANADIAN HYDROGEN INTENSITY MAPPING EXPERIMENT (CHIME)
Adam D. Hincks*[1], For The CHIME Collaboration[2]
[1]Dept. of Physics & Astronomy, University of British Columbia, Vancouver, BC, CANADA
[2]University of British Columbia, McGill University, the University of Toronto and the Dominion Radio Astrophysical Observatory, Various, CANADA

08:40 J4-2
21-CM INTENSITY MAPPING
Tzu-Ching Chang*
ASIAA, Taipei, TAIWAN

09:00 J4-3
FIRST OBSERVATIONS WITH THE MWA
Miguel F. Morales*
Dept. of Physics, University of Washington, Seattle, WA

09:20 J4-4
LOFAR AND THE EPOCH OF REIONIZATION
Leon V. E. Koopmans*
Kapteyn Astronomical Institute, Groningen, THE NETHERLANDS

09:40 J4-5
THE PRECISION ARRAY FOR PROBING THE EPOCH OF REIONIZATION (PAPER): OVERVIEW AND RECENT RESULTS
James E. Aguirre*[1], Aaron R. Parsons[2], Richard F. Bradley[3], Christopher L. Carilli[4], David R. DeBoer[5], Zaki S. Ali[2], Adrian Liu[2], Daniel C. Jacobs[6], David F. Moore[1], Jonathan C. Pober[7], Irina I. Stefan[8]
[1]*Dept. of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA*
[2]*University of California, Berkeley, Berkeley, CA*
[3]*National Radio Astronomy Observatory, Charlottesville, VA*
[4]*National Radio Astronomy Observatory, Socorro, NM*
[5]*Radio Astronomy Laboratory, University of California Berkeley, Berkeley, CA*
[6]*Arizona State University, Tempe, AZ*
[7]*University of Washington, Seattle, WA*
[8]*Cavendish Lab, Cambridge, UNITED KINGDOM*

10:00 Break

10:20 J4-6
MITEOR: A PROTOTYPE HIGHLY SCALABLE INTERFEROMETER FOR 21 CM COSMOLOGY
Joshua S. Dillon*, Haoxuan Zheng, Max Tegmark
Dept. of Physics, Massachusetts Institute of Technology, Cambridge, MA

10:40 J4-7
GLOBAL 21-CM-LINE MEASUREMENTS WITH THE EDGES TELESCOPE
Raul A. Monsalve*[1], Judd D. Bowman[1], Alan E. E. Rogers[2], Thomas J. Mozdzen[1]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*

11:00 J4-8
DATA ANALYSIS AND FOREGROUND REMOVAL ALGORITHMS FOR 21-CM COSMOLOGY EXPERIMENTS
Geraint J. Harker*
Center for Astrophysics and Space Astronomy, University of Colorado Boulder, Boulder, CO

11:20 J4-9

THE LARGE APERTURE EXPERIMENT TO DETECT THE DARK AGES
Jonathon Kocz*, Benjamin R. Barsdell, Daniel Price, Lincoln J. Greenhill
Harvard-Smithsonian Center for Astrophysics, Cambridge, MA

11:40 J4-10
DETECTING THE 21 CM FOREST AND X-RAY HEATING IN 21 CM POWER SPECTRUM MEASUREMENTS
Aaron Ewall-Wice*[1], Joshua S. Dillon[1], Andrei Mesinger[2], Jacqueline Hewitt[1]
[1]*Dept. of Physics, MIT, Cambridge*
[2]*Dept. of Physics, Scuola Normale Superiore di Pisa, Pisa, ITALY*

12:00 J4-11
HERA: ILLUMINATING OUR EARLY UNIVERSE
David R. DeBoer*[1], James Aguirre[2], Judd Bowman[3], Richard Bradley[4], Chris Carilli[4], Josh Dillon[5], Steve Furlanetto[6], Jacqueline Hewitt[5], Daniel Jacobs[3], Adrian Liu[1], Miguel Morales[7], Aaron Parsons[1], Jonathan Pober[7], Max Tegmark[5], Dan Werthimer[1]
[1]*University of California Berkeley, Berkeley, CA*
[2]*University of Pennsylvania, Philadelphia, PA*
[3]*Arizona State University, Tempe, AZ*
[4]*National Radio Astronomy Observatory, Charlottesville, VA*
[5]*Massachusetts Institute of Technology, Cambridge, MA*
[6]*University of California Los Angeles, Los Angeles, CA*
[7]*University of Washington, Seattle, WA*

12:20 J4-12
PROBING THE DARK AGES AND COSMIC DAWN: TOWARD A ROADMAP FOR NASA ASTROPHYSICS
Joseph Lazio*[1], Jack O. Burns[2]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*University of Colorado Boulder, Boulder, CO*

Session KB1: Advances in Human Body Modeling for Sensing
Room 1B51

Co-Chairs: Yahya Rahmat-Samii, *University of California Los Angeles*;
Erdem Topsakal, *Mississippi State University*

08:20 KB1-1
ADVANCES IN IMPLANTABLE AND WEARABLE ANTENNAS FOR WIRELESS BRAIN-MACHINE INTERFACE SYSTEMS
Elham Moradi[1], Karoliina Koski[1], Toni Bjorninen[1], Rikky Muller[2], Peter Ledochowitcsh[2], Lauri Sydanheimo[1], Elad Alon[2], Michel M. Maharbiz[2], Jan M. Rabaey[2], Leena Ukkonen[1], Yahya Rahmat-Samii*[3]
[1]*Dept. of Electronics and Communications Engineering, Tampere University of Technology, Tampere, FINLAND*

[2]*Dept. of Electrical Engineering and Computer Science, University of California Berkeley, Berkeley, CA*
[3]*Dept. of Electrical Engineering, University of California Los Angeles, Los Angeles, CA*

08:40 KB1-2
A WIRELESS, FULLY-PASSIVE NEUROSENSING SYSTEM FOR BRAIN SIGNAL MONITORING
Asimina Kiourti*, Zheyu Wang, John L. Volakis
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

09:00 KB1-3
COMPARISON OF CARBON NANOTUBES AND MICROBUBBLES AS CONTRAST AGENTS FOR THERMOACOUSTIC IMAGING BY COMPUTATIONAL STUDIES
Xiong Wang[1], Tao Qin[1], Russell S. Witte[2], Hao Xin*[1]
[1]*Dept. of Electrical and Computer Engineering, University of Arizona, Tucson, AZ*
[2] *Dept. of Medical Imaging, University of Arizona, Tucson, AZ*

09:20 KB1-4
5.8-GHZ NONCONTACT VITAL SIGN DETECTION RADAR WITH RESPIRATION HARMONICS CANCELLATION
Jianxuan Tu*, Jenshan Lin
Dept. of Electrical and Computer Engineering, University of Florida, Gainesville, FL

09:40 KB1-5
CONFORMAL ANTENNA APPLICATOR FOR TRAUMATIC BRAIN INJURY ASSESSMENT
Megan K. Gillespie*, Mustafa Asili, Erin Colebeck, Erdem Topsakal
Dept. of Electrical and Computer Engineering, Mississippi State University, Starkville, MS

10:00 Break

10:20 KB1-6
AN ON-BODY WRAP-AROUND SENSOR FOR MONITORING CHANGES IN LUNG PERMITTIVITY
Safa Salman*, Asimina Kiourti, John L. Volakis
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

10:40 KB1-7
USE OF IMPEDANCE METHOD TO STUDY THE EFFICACY OF MAGNETIC STIMULATION IN FELINE SCIATIC NERVE
Anil K. RamRakhyani*, Gianluca Lazzi
Dept. of Electrical and Computer Engineering, University of Utah, Salt Lake City, UT

11:00 KB1-8
LAB-ON-A-CHIP: CONTINUOUS GLUCOSE MONITORING ANTENNA SENSORS
Erdem Topsakal*[1], Mustafa Asili[1], Pu Chen[2], Utkan Demirci[2]
[1]*Dept. of Electrical and Computer Engineering, Mississippi State University, Mississippi State, MS*
[2]*Harvard Medical School Brigham & Women's Hospital, Cambridge, MA*

11:20 KB1-9
CELL SELECTIVITY IN RESPONSE TO RETINAL PROSTHETIC STIMULATION
Kyle Loizos*, Jordan Cline, Gianluca Lazzi
Dept. of Electrical and Computer Engineering, University of Utah, Salt Lake City, UT

FRIDAY LUNCH HOUR, 10 January 2014

Special Event: First Hans Liebe Lecture
Mathematics Auditorium (Math 100)

12:15 S1-1
USING MICROWAVE AND SUB-MILLIMETER RADIOMETER OBSERVATIONS TO IMPROVE CLIMATE MODELS
David D. Turner
National Severe Storms Laboratory / NOAA, Norman, OK

FRIDAY AFTERNOON, 10 January 2014

Session B11: Antenna Theory and Design
Room 155

Co-Chairs: Everett Farr, *Farr Fields, LC*;
Gregory Huff, *Texas A & M University*

13:20 B11-1
A POWER WAVE THEORY OF ANTENNAS
Everett G. Farr*
Farr Fields, LC, Albuquerque, NM

13:40 B11-2
A MICROFLUIDICALLY-CONTROLLED, POLARIZATION AND FREQUENCY RECONFIGURABLE ANTENNA ON A HEXAGONAL SUBSTRATE TILE
Nicholas W. Brennan*, Gregory H. Huff
Dept. of Electrical and Computer Engineering, Texas A&M University, College Station, TX

14:00 B11-3
IMPROVED SLOTTED WAVEGUIDE ANTENNA WITH OPTIMIZED CORRUGATIONS AND SUPPRESSED SIDELOBES FOR HIGH-POWER APPLICATIONS
Mohammed Al-Husseini*[1], Xuyuan Pan[2], Georgios Atmatzakis[2], Christos Christodoulou[2]
[1]*Beirut Research and Innovation Center, Lebanese Center for Studies and Research, Beirut, LEBANON*
[2]*Dept. of Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM*

14:20 B11-4
RADIATION PATTERN ANOMALIES IN THE BROADBAND CP RECONFIGURABLE E-SHAPED PATCH ANTENNA
Joshua M. Kovitz*, Yahya Rahmat-Samii
Dept. of Electrical Engineering Department, University of California Los Angeles, Los Angeles, CA

Session B12: Numerical Methods
Room 1B40

Co-Chairs: Branislav Notaros, *Colorado State University*;
Atef Elsherbeni, *Colorado School of Mines*

13:20 B12-1
EFFICIENT HIGHER ORDER MOM-VIE/MOM-SIE/DIAKOPTICS COMPUTATION OF SCATTERING FROM FINITE ARRAYS OF ARBITRARY DIELECTRIC OBJECTS
Elene Chobanyan*[1], Dragan I. Olcan[2], Milan M. Ilic[1,2], Branislav M. Notaros[1]
[1]*Dept. of Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*School of Electrical Engineering, University of Belgrade, Belgrade, YUGOSLAVIA*

13:40 B12-2
STABLE SEMI-ANALYTICAL COMPUTATION OF FIELDS FROM ARBITRARILY-ORIENTED DIPOLES IN CYLINDRICALLY STRATIFIED MEDIA
Haksu Moon*, Fernando L. Teixeira
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

14:00 B12-3
INTEGRATION OF THE FDTD METHOD INTO THE ITERATIVE MULTI-REGION TECHNIQUE FOR SCATTERING FROM MULTIPLE THREE DIMENSIONAL OBJECTS
Fatih Kaburcuk*[1], Veysel Demir[2], Atef Z. Elsherbeni[3], Ercument Arvas[1]
[1]*Dept. of Electrical Engineering and Computer Science, Syracuse University, Syracuse, NY*
[2]*Dept. of Electrical Engineering, Northern Illinois University, DeKalb, IL*
[3]*Dept. of Electrical Engineering and Computer Science, Colorado School of Mines, Golden, CO*

14:20 B12-4
P-REFINED LARGE-DOMAIN 3-D CURVILINEAR FEM SOLUTIONS OF ARBITRARILY LOADED AND SHAPED WAVEGUIDE SECTIONS AND BENDS IN TIME DOMAIN
Nada Sekeljic*[1], Milan Ilic[1,2], Branislav Notaros[1]
[1] *Dept. of Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*University of Belgrade, Belgrade, YUGOSLAVIA*

14:40 B12-5
NUMERICAL CALCULATION OF LOSS MARGINS FOR SHORT DISTANCE COMMUNICATION OVER ROUGH SURFACES
Maxim Ignatenko*, Dejan Filipovic
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

15:00 Break

15:20 B12-6
HYBRID METHODS SIMULATION FOR ELECTRICALLY LARGE ANTENNA SYSTEM IN HFSS
Mahmoud N. Mahmoud*, Andrew Wang
ANSYS Inc., Canonsburg, PA

Session F8: Mesoscale Numerical Weather Prediction in Support of Wave Propagation Modeling II
Room 1B12

Session Co-Chairs: Tracy Haack, *Naval Research Laboratory*;
Katherine Horgan, *Naval Surface Warfare Center Dahlgren Division*

13:20 F8-1
COMPARISONS OF RADIOSONDE MEASUREMENTS AND NUMERICAL WEATHER PREDICTION RESULTS BLENDED WITH A SURFACE LAYER MODEL FOR THE RADIO FREQUENCY APPLICATION
Katherine Horgan*[1], Tracy Haack[2], Qing Wang[3], William Thornton[1], Victor Wiss[1], Robert Marshall[1]
[1]*Naval Surface Warfare Center Dahlgren Division, Dahlgren, VA*
[2]*Naval Research Laboratory, Monterey, CA*
[3]*Naval Postgraduate School, Monterey, CA*

13:40 F8-2
NEAR-SURFACE CHARACTERISTICS OVER THE OCEAN AFFECTING ELECTROMAGNETIC WAVE PROPAGATION
Robin C. Cherrett*[1], Qing Wang[1], Richard J. Lind[1], John A. Kalogiros[2], Hway-Jen Chen[1], Katherine L. Horgan[3], Tracy Haack[4], Peter Guest[1]

[1]*Dept. of Meteorology, Naval Postgraduate School, Monterey, CA*
[2]*National Observatory of Athens, Athens, GREECE*
[3]*Naval Surface Warfare Center Dahlgren Division, Dahlgren, VA*
[4]*Naval Research Laboratory, Monterey, CA*

14:00 F8-3
SENSOR PERFORMANCE MODELING DURING NAVY EXERCISES USING COAMPS
Tracy Haack*[1], James Doyle[1], Teddy Holt[1], David Flagg[2], Dan Tyndall[3], Dan Gieszler[4], Jason Nachamkin[1]
[1]*Naval Research Laboratory, Monterey, CA*
[2]*University Corporation for Atmospheric Research, Boulder, CO*
[3]*NRC, Rockville, MD*
[4]*SAIC, San Diego, CA*

14:20 F8-4
DISCRIMINATION DATA SOURCES FOR ESTIMATING ELECTROMAGNETIC PROPAGATION
Lee T. Rogers*[1], Qing Wang[2]
[1]*Code 55280, SPAWAR Systems Center, Pacific, San Diego, CA*
[2]*Dept. of Meteorology, Naval Postgraduate School, Monterey, CA*

Session F9: Passive Remote Sensing of the Earth's Environment
Room 1B28

Session Co-Chairs: Albin Gasiewski, *University of Colorado Boulder*;
Steven Reising, *Colorado State University*

13:20 F9-1
SUBMILLIMETER WAVE LNA BASED RECEIVERS USING INP HEMT TECHNOLOGY
William R. Deal*
RF and Mixed Signal Products, Northrop Grumman Corporation, Redondo Beach, CA

13:40 F9-2
DEVELOPMENT OF INTERNALLY-CALIBRATED, DIRECT-DETECTION MILLIMETER-WAVE RADIOMETERS FOR HIGH-RESOLUTION REMOTE SENSING OF WET-TROPOSPHERIC PATH DELAY
Victoria D. Hadel*[1], Steven C. Reising[1], Xavier Bosch-Lluis[1], Thaddeus Johnson[1], Pekka Kangaslahti[2], Sharmila Padmanabhan[2], Chaitali Parashare[2], Shannon T. Brown[2], Alan B. Tanner[2], Oliver Montes[2]
[1]*Dept. of Electrical and Computer Engineering, Microwave Systems Laboratory, Colorado State University, Fort Collins, CO*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

14:00 F9-3
APPLICATION OF COHERENCE THEORY TO MODELING OF BLACKBODY RADIATION AT CLOSE RANGE
Dazhen Gu*, David K. Walker
Electromagnetics, NIST, Boulder, CO

14:20 F9-4
CHARACTERIZATION OF AUTOEMISSION REFLECTION AT HIGH FREQUENCIES FOR PRECISE RADIOMETER CALIBRATION
Derek A. Houtz*[1,2], Al J. Gasiewski[3], David Kraft[3], Vladimir Leuski[3]
[1]*Dept. of Aerospace Engineering & Sciences, University of Colorado Boulder, Boulder, CO*
[2]*RF/Electromagnetics, National Institute of Standards and Technology, Boulder, CO*
[3]*Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO*

14:40 F9-5
DESIGN AND PERFORMANCE OF AN AMBIENT CALIBRATION TARGET FOR AN AIRBORNE MICROWAVE AND MILLIMETER-WAVE RADIOMETER
Thaddeus P. Johnson*[1], Xavier Bosch-Lluis[1], Steven C. Reising[1], Weldon A. Johnson[1], Victoria D. Hadel[1], Pekka Kangaslahti[2], Shannon T. Brown[2], Alan B. Tanner[2]
[1] *Dept. of Electrical and Computer Engineering, Microwave Systems Laboratory, Colorado State University, Fort Collins, CO*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

15:00 Break

15:20 F9-6
PRACTICAL CONSIDERATIONS FOR ACHIEVING SI TRACEABILITY IN MICROWAVE REMOTE SENSING
David K. Walker*[1], Dazhen Gu[2], Derek Houtz[2]
[1]*Electromagnetics Division, NIST, Boulder, CO*
[2]*Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO*

15:40 F9-7
ENHANCED VALIDATION OF SATELLITE DERIVED SOUNDING PRODUCTS USING REFERENCE AND DEDICATED RADIOSONDES
Flavio Iturbide-Sanchez*[1], Anthony Reale[2], Nicholas R. Nalli[1], Murty Divakarla[1], Antonia Gambacorta[1], Bomin Sun[1], Changyi Tan[1], Xiaozheng Xiong[1], Eric S. Maddy[3], Mike Wilson[1]
[1]*I. M. Systems Group, Inc. at the NOAA/NESDIS/Center for Satellite Applications and Research, College Park, MD*
[2]*NOAA/NESDIS/Center for Satellite Applications and Research, College Park, MD*
[3]*Science and Technology Corporation at the NOAA/NESDIS/Center for Satellite Applications and Research, College Park, MD*

16:00 F9-8
RECENT PROGRESS IN AIRBORNE MICROWAVE ATMOSPHERIC SOUNDING
William Blackwell*[1], Gregory Allen[1], Michael DiLiberto[1], Christopher Galbraith[1], R. V. Leslie[1], Idahodsa Osaretin[1], Michael Scarito[1], Michael Shields[1], Erik Thompson[1], David Toher[1], Paul Racette[2], Larry Hilliard[2]
[1]*MIT Lincoln Laboratory, Lexington, MA*
[2]*NASA Goddard Space Flight Center, Greenbelt, MD*

16:20 F9-9
RESOLUTION AND PERFORMANCE OF THE CLOUDY SKY RATIO USING MEASURED BRIGHTNESS TEMPERATURES FROM GROUND-BASED MICROWAVE RADIOMETERS
Swaroop Sahoo*[1], Xavier Bosch-Lluis[1], Steven C. Reising[1], Jothiram Vivekanandan[2], Paquita Zuidema[3], Scott M. Ellis[2]
[1]*Microwave Systems Laboratory, Colorado State University, Fort Collins, CO*
[2]*Earth Observing Laboratory, National Center for Atmospheric Research, Boulder, CO*
[3]*Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL*

16:40 F9-10
OCEAN SALINITY FROM SPACE: ADVANCES AND CHALLENGES IN L-BAND RADIOMETRY
Thomas Meissner*, Frank Wentz, Kyle Hilburn
Remote Sensing Systems, Santa Rosa, CA

17:00 F9-11
IMPROVEMENTS IN AN ANISOTROPIC OCEAN SURFACE EMISSIVITY MODEL BASED ON WINDSAT POLARIMETRIC BRIGHTNESS OBSERVATIONS
Dean F. Smith*, Albin J. Gasiewski
Dept. of Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

Session G3: Space Weather Events and Assimilative Models
Room 200

Co-Chairs: Anthea Coster, *MIT Haystack Observatory*;
Atilla Komjathy, *Jet Propulsion Laboratory*

15:20 G3-1
HEIGHT DEPENDENCE OF EQUATORIAL ZONAL PLASMA DRIFTS
Debrup Hui*, Bela G. Fejer
Center for Atmospheric and Space Sciences, Utah State University, Logan, UT

15:40 G3-2
AN EXAMINATION OF THE SOURCE OF DECAMETER-SCALE IRREGULARITIES IN THE GEOMAGNETICALLY DISTURBED MID-LATITUDE IONOSPHERE

Evan G. Thomas*[1], Joseph B. H. Baker[1], J. Michael Ruohoniemi[1], Keisuke Hosokawa[2], Philip J. Erickson[3], Anthea J. Coster[3], John C. Foster[3]
[1]*Bradley Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA*
[2]*Dept. of Communication and Engineering Informatics, University of Electro-Communications, Chofu, Tokyo, JAPAN*
[3]*Atmospheric Sciences Group, MIT Haystack Observatory, Westford, MA*

16:00 G3-3
NONLINEAR MODE CONVERSION OF VLF WAVES OVER ARECIBO, PUERTO RICO
Kangping Hu*[1], Min-Chang Lee[2]
[1]*Dept. of Electrical Engineering, California Institute of Technology, Pasadena, CA*
[2]*Dept. of Electrical and Computer Engineering, Boston University, Boston, MA*

16:20 G3-4
A 3-D STOCHASTIC FDTD MODEL OF ELECTROMAGNETIC WAVE PROPAGATION IN MAGNETIZED IONOSPHERE PLASMA
Bach T. Nguyen*, Jamesina J. Simpson
Dept. of Electrical and Computer Engineering, University of Utah, Salt Lake City, UT

16:40 G3-5
ASSIMILATIVE MODEL BIAS CORRECTION SCHEMES FOR GLOBAL IONOSPHERIC MODELING
Yang-Yi Sun*[1], Tomoko Matsuo[1], Naomi Maruyama[1], Jann-Yenq Liu[2]
[1]*CIRES-CU, NOAA-SWPC, Boulder, CO*
[2]*Institute of Space Science, National Central University, Jhongli, TAIWAN*

17:00 G3-6
ADVANCES IN DETECTION OF NATURAL-HAZARD GENERATED TEC PERTURBATIONS
Attila Komjathy*[1], Oscar Yang[1], Richard Langley[2]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*University of New Brunswick, Fredericton, CANADA*

Session GH3: Satellite and Sub-Orbital Measurements of the Ionosphere and Magnetosphere II
Room 200

Co-Chairs: Paul Bernhardt, *Naval Research Laboratory*;
Joshua Semeter, *Boston University*

13:20 GH3-1
CUBESAT SENSORS AND CONSTELLATION MISSIONS FOR ADVANCING SPACE SCIENCE
Charles M. Swenson*[1], Chad Fish[2], Erik Syrstad[2], Alan Marchant[1]

[1]*Dept. of Electrical and Computer Engineering, Utah State University, Logan, UT*
[2]*Utah State University Space Dynamics Laboratory, North Logan, UT*

13:40 GH3-2
ONE YEAR OF ON-ORBIT PERFORMANCE OF THE COLORADO STUDENT SPACE WEATHER EXPERIMENT (CSSWE)
Scott Palo*[1], David Gerhardt[1], Xinlin Li[1,2], Lauren Blum[1,2], Quntin Schiller[1,2], Rick Kohnert[2]
[1]*Dept. of Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*
[2]*Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO*

14:00 GH3-3
FEEDBACK-UNSTABLE ULF WAVES IN THE IONOSPHERIC ALFVEN RESONATOR DETECTED BY THE MICA FLIGHT
Albert D. Weigel*[1], Anatoly V. Streltsov[1], Kristina Lynch[2], Peter Horak[2], Phillip Fernandes[2], Robert Miceli[3], Don Hampton[4], Robert Mitchell[5], Marilia Samara[5]
[1]*Embry-Riddle Aeronautical University, Daytona Beach, FL*
[2]*Dartmouth College, Hanover, NH*
[3]*Cornell University, Cornell, NY*
[4]*University of Alaska Fairbanks, Fairbanks, AK*
[5]*Southwest Research Institute, San Antonio, TX*

14:20 GH3-4
ELECTRIC AND MAGNETIC FIELD MEASUREMENTS ON TWO SOUNDING ROCKETS AND THE C/NOFS SATELLITE IN THE LOW LATITUDE IONOSPHERE AT SUNSET
Robert F. Pfaff*[1], Erhan Kudeki[2], Doug E. Rowland[1], Jeff Klenzing[1], Henry T. Freudenreich[1]
[1]*NASA Goddard Space Flight Center, Greenbelt, MD*
[2]*University of Illinois at Urbana-Champaign, Champaign, IL*

Session HG2: Meteors, Orbital Debris, and Dusty Plasmas II
Room 245
Co-Chairs: Gurudas Ganguli, *Naval Research Laboratory*;
Jonathan Fentzke, *Scientific Solutions, Inc.*

13:20 HG2-1
STABILIZATION OF AN INJECTED CONDUCTING LAYER FOR ARTIFICIALLY ENHANCING DRAG ON ORBITAL DEBRIS
Russell B. Dahlburg*, David A. Kessler, Guru Ganguli
Naval Research Laboratory, Washington DC

13:40 HG2-2
GRAVITATIONAL INSTABILITY AND SHEAR STABILIZATION IN A DUSTY PLASMA LAYER
David A. Kessler*, Russell B. Dahlburg, Gurudas Ganguli
Naval Research Laboratory, Washington, DC

14:00 HG2-3
DUST MOBILIZATION ON SURFACES IN SPACE
Mihaly Horanyi*
University of Colorado Boulder, Boulder, CO

14:20 HG2-4
DEVELOPMENT OF THE DUST IMPACT MONITOR FOR EXPLORATION IN THE INNER HELIOSPHERE
Kirstyn M. Johnson*[1], David Malaspina[2], Zoltan Sternovsky[1]
[1]*Dept. of Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*
[2]*Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO*

14:40 HG2-5
THE MAGNETIZED DUSTY PLASMA EXPERIMENT (MDPX) DEVICE: FIRST OBSERVATIONS
Edward Thomas*[1], Ross K. Fisher[1], Uwe Konopka[1], Robert L. Merlino[2], Marlene Rosenberg[3]
[1]*Dept. of Physics, Auburn University, Auburn, AL*
[2]*Dept. of Physics and Astronomy, The University of Iowa, Iowa City, IA*
[3]*Dept. of Electrical and Computer Engineering, University of California - San Diego, La Jolla, CA*

15:00 Break

15:20 HG2-6
MICROWAVE MEASUREMENTS ON A WELL-COLLIMATED DUSTY PLASMA SHEET FOR COMMUNICATIONS BLACKOUT APPLICATIONS
Eric D. Gillman*, Bill Amatucci
Plasma Physics Division, Naval Research Laboratory, Washington, DC

15:40 HG2-7
INVESTIGATION OF MAGNETIZED DUSTY PLASMAS IN THE LABORATORY AND NEAR-EARTH SPACE ENVIRONMENT
Alireza Mahmoudian*, Wayne A. Scales, Haiyang Fu
Bradley Dept. of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

16:00 HG2-8
CHARACTERIZATION OF METEOR HEAD ECHOES AND CORRESPONDING NON-SPECULAR TRAIL AS MEASURED BY A HIGH POWER LARGE APERTURE RADAR
Ana M. Tarano*, Jonathan Yee, Sigrid Close
Dept. of Aeronautics and Astronautics, Stanford University, Stanford, CA

Session J5: Radio Astronomy from Space
Room 265

Co-Chairs: Joseph Lazio, *Jet Propulsion Laboratory, California Institute of Technology*; Judd Bowman, *Arizona State University*

13:20 J5-1
A SURVEY OF ACTIVE GALACTIC NUCLEI JETS WITH THE RADIOASTRON SPACE VLBI MISSION
Matthew Lister*
Dept. of Physics, Purdue University, West Lafayette, IN

13:40 J5-2
RADIOASTRON OBSERVATIONS OF PULSARS AND INTERSTELLAR SCATTERING
C. R. Gwinn*[1], M. V. Popov[2], T. V. Smirnova[3], V. I. Shishov[3], J. M. Anderson[4], A. S. Andrianov[2], N. Bartel[5], S. Buchner[6], A. Deller[7], W. J. Hankey[8], S. Horiuchi[9], M. D. Johnson[1], B. C. Joshi[10], N. S. Kardashev[2], R. Karuppusamy[4], Y. Y. Kovalev[2], M. Kramer[4], J. McCallum[8], C. Phillips[11], J. Quick[6], J. Reynolds[11], A. Rudnitsky[2], E. Safudtinov[2], V. Soglasnov[2], A. Tzioumis[11], J. A. Zensus[4], V. Zhuravlev[2]
[1]*Dept. of Physics, University of California, Santa Barbara, Santa Barbara, CA*
[2]*Astro Space Center, Lebedev Physical Institute, Moscow, RUSSIAN FEDERATION*
[3]*Pushchino Radio Astronomy Observatory, Lebedev Physical Institute, Pushchino, RUSSIAN FEDERATION*
[4]*Max-Planck-Institut fuer Radioastronomie, Bonn, GERMANY*
[5]*Dept. of Physics and Astronomy, York University, Toronto, CANADA*
[6]*Hartebeesthoek Radio Astronomy Observatory, Krugersdorp, SOUTH AFRICA*
[7]*ASTRON, Dwingeloo, THE NETHERLANDS*
[8]*School of Mathematics & Physics, University of Tasmania, Hobart, AUSTRALIA*
[9]*Canberra Deep Space Communication Complex, Canberra, AUSTRALIA*
[10]*National Centre for Radio Astrophysics, Pune, INDIA*
[11]*Australia Telescope National Facility, Marsfield, AUSTRALIA*

14:00 J5-3
THE RADIOASTRON GREEN BANK EARTH STATION
H. Alyson Ford*
National Radio Astronomy Observatory, Green Bank, WV

14:20 J5-4
AN OVERVIEW OF STEREO/SWAVES SCIENCE RESULTS
Nat Gopalswamy*[1], Pertti Makela[2], Seiji Yashiro[2]
[1]*Heliophysics, NASA Goddard Space Flight Center, Greenbelt, MD*
[2]*Dept. of Physics, The Catholic University of America, Washington, DC*

14:40 J5-5
CONCEPT AND ANALYSIS OF A SATELLITE FOR SPACE-BASED RADIO DETECTION OF ULTRA-HIGH ENERGY COSMIC RAYS

Andrew F. Romero-Wolf*[1], Peter Gorham[2], Kurt Liewer[1], Jeff Booth[1], Riley Duren[1], Harm Schoorlemmer[2], David Saltzberg[3], Stephanie Wissel[3], Pezhman Zarifian[1], Jiwoo Nam[4], Pisin Chen[4]
[1]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[2]*University of Hawaii at Manoa, Honolulu, HI*
[3]*University of California Los Angeles, Los Angeles, CA*
[4]*National Taiwan University, Taipei City, TAIWAN*

15:00 Break

15:20 J5-6
THE EXA VOLT ANTENNA
Harm Schoorlemmer*[1], Peter W. Gorham[1], C Miki[1], B Hill[1], Gary S. Varner[1], P Allison[2], F E. Baginski[3], K M. Liewer[4]
[1]*Dept. of Physics and Astronomy, University of Hawaii, Honolulu, HI*
[2]*Dept. of Physics, Ohio State University, Columbus, OH*
[3]*Dept. of Mathematics, The George Washington University, Washington, DC*
[4]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

15:40 J5-7
LOW FREQUENCY HYDROGEN COSMOLOGY FROM SPACE: THE DARK AGES RADIO EXPLORER
Jack Burns*
University of Colorado Boulder, Boulder, CO

16:00 J5-8
TECHNOLOGIES FOR LUNAR LOW FREQUENCY RADIO ANTENNAS
Dayton Jones*, Louis Giersch, Issa Nesnas, Ian O'Dwyer, Mauricio Sanchez Barterry, Joseph Lazio
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

16:20 J5-9
LOCO1: PATHFINDING SPACE-BASED LOW FREQUENCY COSMOLOGY
Daniel C. Jacobs*[1], Judd Bowman[1], Joseph Lazio[2], Robert Jarnot[2], Christopher Groppi[1], Paul Scowen[1], Richard Bradley[3], Ricardo Astrain[1], Jordan Bridgeman[1], Owen Ma[1], Alexander Cannady[1]
[1]*Arizona State University, Tempe, AZ*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[3]*University of Virginia, Charlottesville, VA*

16:40 J5-10
TECHNOLOGY DEVELOPMENTS FOR SPACE-BASED INTENSITY MAPPING OF CARBON MONOXIDE DURING THE EPOCH OF REIONIZATION AND GALAXY FORMATION
Sarah Church*[1], Kieran Cleary[2], Kiruthika Devaraj[1], Todd Gaier[3], Pekka Kangaslahti[3], Anthony Readhead[2], Lorene Samoska[3], Michael Seiffert[3]

[1]*Dept. of Physics, Stanford University, Stanford, CA*
[2]*Dept. of Physics, Math and Astronomy, California Institute of Technology, Pasadena, CA*
[3]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

Session KB2: Terahertz Medical Imaging
Room 1B51

Co-Chairs: Kubilay Sertel, *The Ohio State University*;
Zachary Taylor, *UCLA*

13:20 KB2-1
THZ MEDICAL IMAGING: CURRENT STATUS AND FUTURE OUTLOOKS
Zachary D. Taylor*[1,2,3], Shijun Sung[1], James Garritano[2], Neha Bajwa[2], Bryan Nowroozi[2,3], Warren Grundfest[1,2,3]
[1]*Dept. of Electrical Engineering, University of California Los Angeles, Los Angeles, CA*
[2]*Dept. of Bioengineering, University of California Los Angeles, Los Angeles, CA*
[3]*Center for Advanced Surgical and Interventional Technology, University of California Los Angeles, Los Angeles, CA*

13:40 KB2-2
HUMAN TISSUE CHARACTERIZATION AND CANCER MARGIN ASSESSMENT: TOWARD REAL-TIME THZ IMAGING FOR CLINICAL APPLICATIONS
Woon-Gi Yeo*[1], Niru K. Nahar[1], Charles L. Hitchcock[2], Kubilay Sertel[1]
[1]*Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH*
[2]*Wexner Medical Center, The Ohio State University, Columbus, OH*

14:00 KB2-3
LIMITED ANGLE THZ COMPUTED TOMOGRAPHY FOR TISSUE IMAGING
Georgios C. Trichopoulos*, Kubilay Sertel
Dept. of Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

14:20 KB2-4
IMAGING AND ANALYSIS OF HETEROGENEOUS BREAST CANCER TISSUE USING PULSED TERAHERTZ SYSTEM
Tyler Bowman*, Magda El-Shenawee
Dept. of Electrical Engineering, University of Arkansas, Fayetteville, AR

14:40 KB2-5
THZ HYDRATION SENSITIVITY: DIELECTRIC SUBSTRATE WINDOW CONSIDERATIONS
James M. Garritano*[1], Shijun Sung[2], Neha Bajwa[1], Bryan Nowroozi[1,3], Warren S. Grundfest[1,2,3], Zachary D. Taylor[1,2,3]

[1]*Dept. of Bioengineering, University of California Los Angeles, Los Angeles, CA*
[2]*Dept. of Electrical Engineering, University of California Los Angeles, Los Angeles, CA*
[3]*Center for Advanced Surgical and Interventional Technology, Department of Surgery, University of California Los Angeles, Los Angeles, CA*

15:00 Break

15:20 KB2-6
THZ IMAGING OBJECTIVE DESIGN WITH FIXED BACK FOCAL DISTANCE FOR MEDICAL APPLICATIONS
Shijun Sung*[1], James M. Garritano[2], Nuria Llombart[3], Neha Bajwa[2], Priyamvada Tewari[2], Bryan N. Nowroozi[2,4], Warren S. Grundfest[1,2,4], Zachary D. Taylor[1,2,4]
[1]*Dept. of Electrical Engineering, University of California Los Angeles, Los Angeles, CA*
[2]*Dept. of Bioengineering, University of California Los Angeles, Los Angeles, CA*
[3]*Faculty of Electrical Engineering, Mathematics, and Computer Science, Delft University of Technology, Delft, NETHERLANDS*
[4]*Dept. of Surgery, David Geffen School of Medicine, Los Angeles, CA*

15:40 KB2-7
SINGLE PIXEL TERAHERTZ IMAGING: TOWARDS BIO-MEDICINE APPLICATIONS
Berardi Sensale-Rodriguez*[1], Huili G. Xing[2]
[1]*University of Utah, Salt Lake City, UT*
[2]*University of Notre Dame, Notre Dame, IN*

16:00 KB2-8
DIAGNOSIS OF BURN SEVERITY USING TERAHERTZ SPECTROSCOPY
M. Hassan Arbab*[1], Sam Henry[2], Adelaide Warsen[3], Dale Winebrenner[1], Nicholas Shubin[3], Anne Hocking[3], Saman Arbabi[3]
[1]*Applied Physics Laboratory, University of Washington, Seattle, WA*
[2]*Institute of Technology, University of Washington, Tacoma, WA*
[3]*Dept. of Surgery, Harborview Medical Center, University of Washington, Seattle, WA*

16:20 KB2-9
THZ IMPULSE RADAR FOR MEDICAL IMAGING
Elliott R. Brown*[1], Shijun Sung[2], Warren W. Grundfest[3,4,2], Zachary Z. Taylor[3,4,2]
[1]*Dept. of Electrical Engineering, Wright State University, Dayton, OH*
[2]*Dept. of Electrical Engineering, University of California Los Angeles, Los Angeles, CA*
[3]*Dept. of Bioengineering, University of California Los Angeles, Los Angeles, CA*
[4]*Dept. of Surgery, University of California Los Angeles, Los Angeles, CA*

SATURDAY MORNING, 11 January 2014

06:30 – 08:00 USNC-URSI Executive Council, Breakfast Meeting, Millennium Hotel

Author Index

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Y

Z