USNC–URSI National Radio Science Meeting

The National Academies of
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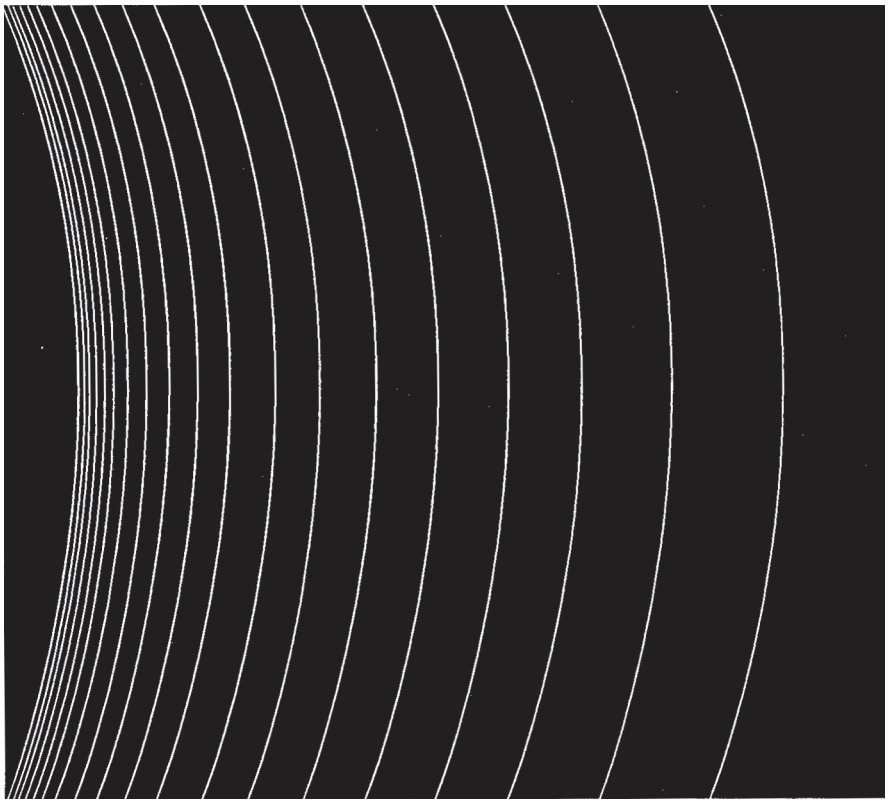

4-7 January 2018

Boulder, Colorado, USA

Sponsored by the US National Committee for the

International Union of Radio Science

and CU Conference Services,

University of Colorado Boulder

www.nrsmboulder.org

2018 USNC-URSI National Radio Science Meeting
Meeting Overview: Technical Program and Commission Business Meetings

Room	105	135	150	151	155	200	245	265	1B40	1B51
Thursday 4 January 08:20-12:00	A1 - Antennas A2 - Calibration Techniques	F1 - Surface and Sub-Surface Sensing F3 - Soil Moisture and Land Cover Sensing	K1 - Implantable and Textile Antennas for Medical Applications	GH1 - Meteors, Orbital Debris and Dusty Plasmas	F2 - Atmospheric and Precipitation Sensing	B2 Scattering	H1 - Physics of the Radiation Belts I	J1 - New Telescopes, Techniques and Technology I	B1 - Adv. Theory & Applications of Metamaterials	H2 - Non-Earth Magnetospheres
Lunch										
Thursday 4 January 13:20-17:00	A3 - Measurement of Materials and EM Fields B6 - Emerging Applications of Phased Arrays	F4 - Random and Complex Media	K2 - Interaction of Electromagnetic Waves with Biological Systems B7 - Wearable Antennas and Electronics	G1 - New Horizons in Active and Passive Radio Techniques for Geospace Remote Sensing G2 - New RF Data Networks for Global Space Plasma Imaging	F5 - Remote Sensing from Small Satellites I	B4 - Antenna Systems: Design and Measurements B5 - Advances in Computational Electromagnetics on Modern Computers	H3 - Physics of the Radiation Belts II	J2 - New Telescopes, Techniques and Technology II	B3 - Complex Media and Metamaterials	
17:00		Commission E 17:00			Commission F 17:00					
18:00	Commission A 18:00		Commission C 18:00					Commission J 18:00		
Reception	**Reception for all Attendees in Engineering Center Lobby from 18:30 to 21:00**									
Friday 5 January 08:20-12:00	**Plenary Session (Math 100):** **Ernest K. Smith USNC-URSI Student Paper Competition** ***Meeting Highlight Plenary Talks: (1) The Wonderful World of Waves in the Near Earth Environment; (2) Radio Navigation Systems - New Challenges and Opportunities***									
Lunch	**Lunch Provided for All Students, USNC Officers and Commission Chairs (Atrium at Koelbel - Business Schnool)**									
Friday 5 January 13:20-17:00	K3 - Imaging and Monitoring in Medical Applications K4 - Therapeutic and Treatment Monitoring Applications	CDE1 - Spectrum Issues, Developments, and Solutions	B10 - Nonmagnetic and Nonreciprocal Devices	G3 - Ionospheric Effects of the Solar Eclipse	F6 - Remote Sensing from Small Satellites II F7 - RF Propagation Modeling and Measurements	B9 - 3D Printed Antennas	H4 - Waves and Turbulence in Space and Laboratory Plasmas I	J3 - ALMA 2030	B8 - Advanced Analysis, Design & Applications of Waveguiding Structures	D1 - Active Microwave Circuits From RF to THz
17:00				Commission G 17:00					Commission B 17:00	
18:00	Commission K 18:00						Commission H 18:00			Commission D 18:00
Saturday 6 January 08:20-12:00	B12 - Microstrip and Printed Devices and Antennas B14- Antennas for Specialized Platforms: SmallSats, UAVs, and UUVs	B13 - Electromagnetic Materials and Devices	FGH1 - GNSS and Radio Beacon Remote Sensing	G4 - Space-Based Ionospheric Measurements GH2- Ionospheric Modification	F8 - RF Propagation Utilizing Numerical Weather Prediction	J5 - New Telescopes, Techniques and Technology III	H5 - Waves and Turbulence in Space and Laboratory Plasmas II	J4 - The VLBA at 25: Recent Accomplishments and Future Directions	B11 - Numerical Methods	D2 - Filters and Tunable Microwave Circuits
Lunch	**Special Event: Fifth Hans Liebe Lecture (Math 100)**									
Saturday 6 January 13:20-17:00	B16 - Antenna Development using Additive Manufacturing B18 - Guided Waves and Wireless Propagation	BGH1 - Techniques for Modeling of Waves in Plasmas	C1 - Advances in Signal Processing and Distributed Sensor Arrays	G5 - Space Plasma Measurement Techniques	FEJ1 - RFI Mitigation for Remote Sensing	B17 - Millimeter-Wave and 5G Antennas and Systems	HEG1 - Lightning and the Ionosphere	J6 - Spectral Line Cosmology and Low-Frequency Arrays	B15 - Antenna Arrays	

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 for URSI (USNC-URSI) is appointed by the National Academies of Sciences, Engineering, and Medicine, 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. This meeting is technically co-sponsored by the Antennas and Propagation Society of the Institute of Electrical and Electronics Engineers (IEEE/AP-S). The IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (RSM), co-sponsored by the IEEE/AP-S and USNC-URSI, 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 for URSI. The last NARSM was held in Vancouver, British Columbia, Canada on July 19-25, 2015.

The international URSI General Assembly and Scientific Symposium is held every three years in locations around the world. The 32nd URSI General Assembly and Scientific Symposium was held in Montreal, Quebec, Canada, on August 19-26, 2017. Over 1300 papers were presented by authors from over 50 countries in technical sessions covering the areas of all ten URSI Commissions. The 33rd URSI General Assembly and Scientific Symposium will be held in Rome, Italy, on August 29 - Sept. 5, 2020.

In addition to the General Assembly and Scientific Symposium, URSI holds two other flagship meetings every three years, the AT-RASC meeting and the AP-RASC meeting. The next AT-RASC meeting will be held May 28 - June 1, 2018 at the ExpoMeloneras Convention Center, Gran Canaria, Spain (www.at-rasc.org). The next AP-RASC meeting will be held March 5-9, 2019 at the India Habitat Centre, New Delhi, India (www.aprasc2019.com).

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

U.S. National Committee Leadership and Commission Chairs (2018-2020)

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

Sembiam Rengarajan
USNC Chair
Professor, Electrical and Computer Engineering,
California State University, Northridge
E-mail: srengarajan@csun.edu

David R. Jackson
USNC Immediate Past Chair
Professor, Electrical and Computer Engineering,
University of Houston
E-mail: djackson@uh.edu

Michael H. Newkirk
USNC Secretary and Chair-Elect
Principal Professional Staff, The Johns Hopkins University - Applied Physics Laboratory
E-mail: Michael.Newkirk@jhuapl.edu

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

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

Ana Ferreras
Senior Program Officer,
Board on International Scientific Organizations
The National Academies
E-mail: AFerreras@nas.edu

Jeanne Quimby
Chair, USNC Commission A
Electronics Engineer, National Institute of Standards and Technology
E-mail: jeanne.quimby@nist.gov

Jamesina Simpson
Chair, USNC Commission B
Associate Professor,
Electrical and Computer Engineering,
University of Utah
E-mail: jamesina.simpson@utah.edu

Eric L. Mokole
Chair, USNC Commission C
Principal, Mitre Corporation
E-mail: eric.mokole@outlook.com

Negar Ehsan
Chair, USNC Commission D
Electronics Engineer,
NASA Goddard Space Flight Center
E-mail: negar.ehsan@nasa.gov

Larry Cohen
Chair, USNC Commission E
Engineer, Naval Research Laboratory
E-mail: lawrence.cohen@nrl.navy.mil

Kamal Sarabandi
Chair, USNC Commission F
Professor and Directory of Radiation Laboratory,
Electrical and Computer Engineering, University of Michigan
E-mail: saraband@umich.edu

Attila Komjathy
Chair, USNC Commission G
Group Leader, Jet Propulsion Laboratory
E-mail: attila.komjathy@jpl.nasa.gov

Robert Moore
Chair, USNC Commission H
Associate Professor, Electrical and Computer Engineering, University of Florida
E-mail: moore@ece.ufl.edu

Jeff Mangum
Chair, USNC Commission J
Scientist, National Radio Astronomy Observatory
E-mail: jmangum@nrao.edu

Majid Manteghi
Chair, USNC Commission K
Associate Professor, Electrical and Computer Engineering, Virginia Tech
E-mail: manteghi@vt.edu

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UNITED STATES NATIONAL COMMITTEE
INTERNATIONAL UNION OF RADIO SCIENCE
TECHNICAL PROGRAM
National Radio Science Meeting
4-6 January 2018
University of Colorado Boulder
Sponsored by USNC–URSI

ROOM AND TIME SCHEDULE FOR SESSIONS

National Radio Science Meeting

4-6 January 2018

University of Colorado Boulder

Sponsored by USNC-URSI

WEDNESDAY EVENING, 3 January 2018

17:00 – 21:00 USNC-URSI Business Meeting, Marriott Hotel

THURSDAY MORNING, 4 January 2018

Session A1: Antennas
Room 105

Co-Chairs: Seth McCormick, *US Army Research Lab*; Mitchell Gregory, *US Army Research Lab*

08:20 A1-1
A WIDEBAND, BOW-TIE YAGI ANTENNA
Md Rakibul Islam*, Sungkyun Lim
Electrical Engineering, Georgia Southern University, Statesboro, GA

08:40 A1-2
PLANAR UWB MONOPOLE WITH IMPROVED PATTERN SHAPE
Seth A. McCormick*
ARL, Adelphi, MD

09:00 A1-3
A WIDEBAND TIGHTLY COUPLED DIPOLE ARRAY WITH NOVEL DIFFERENTIAL FEEDING NETWORK
Alexander D. Johnson*[1,2], Elias A. Alwan[1], John L. Volakis[1]
[1]*Florida International University, Miami, FL*
[2]*The Ohio State University, Columbus, OH*

09:20 A1-4
RECONFIGURABLE INTRA-CHIP ANTENNA FOR FUTURE WIRELESS COMMUNICATIONS
Yashika Sharma*[1], Junqiang Wu[1], Adnan Kantemur[1], Jinpil Tak[1], Avinash Kodi[2], Savas Kaya[2], Ahmed Louri[3], Hao Xin[1]
[1]*Electrical and Computer Engineering, University of Arizona, Tucson, AZ*
[2]*Electrical Engineering and Computer Science, Ohio University, Athens, OH*
[3]*Electrical and Computer Engineering, George Washington University, Washington, DC*

Session A2: Calibration Techniques
Room 105

Session Co-Chairs: Jeanne Quimby, *NIST*; Mitchell Gregory, *US Army Research Lab*

10:20 A2-1 LIMITATIONS OF ELECTRIC FIELD PROBES AND SENSORS: UPDATING CURRENT CALIBRATION METHODS
Ryan T. Jacobs*, Ryan Gillespie, Jason B. Coder, Daniel G. Kuester
Shared Spectrum Metrology, National Institute of Standards and Technology, Boulder, CO

10:40 A2-2
DIGITAL ARRAY PLANAR NEAR-FIELD CALIBRATION USING ELEMENT PLANE WAVE SPECTRA WITH ITERATIVE SEARCH
Nicholas Host*, Kenneth O'Haver
Johns Hopkins University - Applied Physics Laboratory, Laurel, MD

11:00 A2-3
AN AUTOMATIC MEASUREMENT SYSTEM OF ANTENNA PHASE CENTER USING THE BINARY SEARCH ALGORITHM
Yuzo Tamaki*[1], Takehiko Kobayashi[1], Atsushi Tomiki[2]
[1]*Wireless Systems Laboratory, Tokyo Denki University, Adachi-ku, Tokyo, JAPAN*
[2]*Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency, Sagamihara, Kanagawa, JAPAN*

11:20 A2-4
MICROSTRIP CIRCULATOR BANDWIDTH INVESTIGATION
Laila Marzall*, Mauricio Pinto, Andrea Ashley, Dimitra Psychogiou, Zoya Popovic
Electrical Engineering, University of Colorado - Boulder, Boulder, CO

11:40 A2-5
PLASMA CELL LOADED TRANSMISSION LINE TECHNOLOGIES FOR BROADBAND APPLICATIONS
Zach J. Vander Missen*, Abbas Semnani, Dimitrios Peroulis
Electrical and Computer Engineering, Purdue University, West Lafayette, IN

Session B1: Adv. Theory & Applications of Metamaterials (Special Session)
Room 1B40

Session Co-Chairs: Filippo Capolino, *University of California, Irvine*; John Volakis, *Florida International University*

08:20 B1-1
A HUYGENS' METASURFACE LENS FOR ENHANCING THE GAIN OF FREQUENCY-SCANNED SLOTTED WAVEGUIDE ANTENNAS
Michael Chen*[1], Ariel Epstein[2], George V. Eleftheriades[1]
[1]*The Edward S. Rogers Electrical and Computer Engineering, University of Toronto, Toronto, ON, CANADA*
[2]*Andrew and Erna Viterbi Faculty of Electrical Engineering, Technion - Israel Institute of Technology, Haifa, ISRAEL*

08:40 B1-2
CIRCUIT MODELING OF NANOANTENNA ENABLED DETECTORS
Salvatore Campione*, Larry K. Warne, Michael B. Sinclair, Michael D. Goldflam, David W. Peters
Sandia National Laboratories, Albuquerque NM

09:00 B1-3
GRADIENT METASURFACES AS PERFECT POLARIZATION TRANSFORMER
Hamidreza Kazemi Varnamkhasti*, Mohammad Albooyeh, Filippo Capolino
Electrical Engineering and Computer Science, University of California Irvine, Irvine, CA

09:20 B1-4
ANISOTROPIC METASCREEN: COUPLING BETWEEN TE AND TM MODES
Christopher L. Holloway*[1], Edward F. Kuester[2]
[1]*NIST, Boulder, CO*
[2]*University of Colorado, Boulder, CO*

09:40 B1-5
ASTERISK-SHAPED-APERTURE ARRAY OPTICAL METASURFACES AT TELECOMMUNICATIONS WAVELENGTHS
Mitchell Semple*[1], Aaron C. Hryciw[2], Ashwin K. Iyer[1]
[1]*Electrical and Computer Engineering, University of Alberta, Edmonton, AB, CANADA*
[2]*NanoFAB facility, University of Alberta, Edmonton, AB, CANADA*

10:00 Break

10:20 B1-6
USING COMPLEX FREQUENCY-PLANE BRANCH POINTS TO IDENTIFY EXCEPTIONAL POINTS OF DEGENERACY IN PARITY-TIME SYMMETRIC SYSTEMS
George W. Hanson*[1], Alexander B. Yakovlev[2], Alexander Holmes[1]
[1]*Electrical Engineering, University of Wisconsin Milwaukee, Milwaukee, WI*
[2]*Electrical Engineering, University of Mississippi, University, MS*

10:40 B1-7
PARITY-TIME SYMMETRIC WAVE TUNNELING AND TELEPORTATION USING DISPERSIVE NEGATIVE IMPEDANCE CONVERTERS
Zhicheng Xiao*, Younes Ra'di, Andrea Alu
Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX

11:00 B1-8
TOPOLOGICALLY-PROTECTED LEAKY-WAVE STRUCTURES
Ali Hassani*, Francesco Monticone
Cornell University, Ithaca, NY

11:20 B1-9
UNIVERSAL NEAR-FIELD SPIN PROPERTIES OF POLARIZED AND CHIRAL DIPOLES
Farid Kalhor*, Zubin Jacob
Electrical and Computer Engineering, Purdue University, West Lafayette, IN

Session B2: Scattering
Room 200
Session Co-Chairs: Danilo Erricolo, *University of Illinois at Chicago*; Marco Poort, *University of Illinois at Chicago*

10:20 B2-1
ULTIMATE INTRINSIC SIGNAL-TO-NOISE RATIO OF MRI SURFACE COILS FOR A LOSSY DIELECTRIC ELLIPTICAL CYLINDER MODEL
Yangqing Liu*, Danilo Erricolo
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

10:40 B2-2
SCATTERING BY A HEMISPHERE ON A METALLIC PLATE
Sahitya Singh, Marco D. Poort*, Piergiorgio L. E. Uslenghi
University of Illinois at Chicago, Chicago, Illinois

11:00 B2-3
FULL WAVE ANALYSIS OF TWO-DIMENSIONAL PERIODIC ARRAY OF DIELECTRIC-FILLED RECTANGULAR WINDOWS
Marco D. Poort*
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

11:20 B2-4
LOW POWER REFLECTION AMPLIFIER USING EXTRACTED S-PARAMETER OF TUNNEL DIODE IN RFID APPLICATION
Pejman Raisi*, Farhad Farzami, Seiran Khaledian, Omid Manoochehri, Danilo Erricolo
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

11:40 B2-5
ELECTROMAGNETIC SCATTERING BY SEVERAL 2-D SINGLE BIOLOGICAL CELL MODELS
Polat Goktas*[1,2], Ilya O. Sukharevsky[3], Ayhan Altintas[2]
[1]*Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School, Boston, MA*
[2]*Bilkent University, Ankara, TURKEY*
[3]*Technical University of Munich, Munchen, GERMANY*

Session F1: Surface and Sub-Surface Sensing
Room 135
Session Co-Chairs: Leung Tsang, *University of Michigan*; Jiefu Chen, *University of Houston*

08:20 F1-1
THE ULTRA-WIDEBAND SOFTWARE-DEFINED RADIOMETER (UWBRAD) FOR ICE SHEET INTERNAL TEMPERATURE SENSING: RESULTS FROM THE SEPTEMBER 2017 CAMPAIGN
Mark J. Andrews*[1], Alexandra Bringer[1], Joel T. Johnson[1], Kenneth C. Jezek[2], Domenic Belgiovane[1], Julie Miller[2], Michael Durand[2], Caglar Yardim[1], Chi-Chih Chen[1], Leung Tsang[3], Shurun Tan[3], Mohammedreza Sanamzadeh[3], Vladimir Leuski[4], Giovanni Macelloni[5], Marco Brogioni[5]
[1]*ElectroScience Laboratory, The Ohio State University, Columbus, OH*
[2]*Byrd Polar Research Center, The Ohio State University, Columbus, OH*
[3]*University of Michigan, Ann Arbor, MI*
[4]*Microwave Radiometers and Antennas, Inc., Louisville, CO*
[5]*Institute of Applied Physics, Florence, ITALY*

08:40 F1-2
LARGE AREA OBSERVATIONS OF THE OCEAN SURFACE WITH HF RADAR SCATTER TO SATELLITE AND AIRBORNE RECEIVERS
Paul A. Bernhardt*[1], Carl L. Siefring[1], Stan J. Briczinski[1], Mike McCarrick[2], Andrew Howard[3], Gordon James[3], Andrew Yau[3], William Bristow[4]
[1]*Plasma Physics, NRL, Washington, DC*
[2]*Information Technology, NRL, Washington, DC*
[3]*Physics and Astronomy, University of Calgary, Calgary, Alberta, CANADA*
[4]*Physics, University of Alaska, Fairbanks, AK*

09:00 F1-3
EXPERIMENTAL VALIDATION OF AN ENDFIRE SAR AMBIGUITY FUNCTION
Omkar Pradhan*, Albin J. Gasiewski
University of Colorado, Boulder, CO

09:20 F1-4
SURFACE CHARACTERIZATION UNCERTAINTY QUANTIFICATION: MONTE CARLO WITH COLLOCATION METHOD AND BAYESIAN INFERENCE METHOD
Qiuyang Shen*, Zhu Han, Jiefu Chen
Electrical and Computer Engineering, University of Houston, Houston, TX

09:40 F1-5
MCMC FOR LARGE-SCALE GEOSTEERING INVERSION WITH A SCALABLE MPI IMPLEMENTATION
Han Lu*[1], Qiuyang Shen[1], Xuqing Wu[2], Jiefu Chen[1], Xin Fu[1]
[1]*Electrical and Computer Engineering, University of Houston, Houston, TX*
[2]*Information and Logistics Technology, University of Houston, Houston, TX*

Session F2: Atmospheric and Precipitation Sensing
Room 155
Session Co-Chairs: Chandrasekar V Chandra, *Colorado State University*; Kamal Sarabandi, *University of Michigan*

08:20 F2-1
PASSIVE INFRARED RETREIVAL OF TROPOSPHERIC REFRACTIVITY, TEMPERATURE, AND WATER VAPOR PROFILES
Fredrick S. Solheim*
Dakota Ridge R & D, Boulder, CO

08:40 F2-2
ANALYSIS OF RAIN EFFECT ON WIND RETRIEVALS FROM PASSIVE SATELLITE MICROWAVE RADIOMETERS
Hamideh Ebrahimi*
University of Florida, Gainesville, FL

09:00 F2-3
ESTIMATION OF BACKGROUND ERROR COVARIANCE MATRIX FOR PRECIPITATION LOCKING FROM PASSIVE MICROWAVE SATELLITE
Jieying He*[1,2], Albin J. Gasiewski[1], Kun Zhang[1]
[1]*Center for Environmental Technology (CET),, University of Colorado Boulder, Boulder,CO*
[2]*Key Laboratory of Microwave Remote Sensing, National Space Science Center, Chinese Academy of Sciences, Beijing, CHINA*

09:20 F2-4
USING GROUND-BASED RADAR OBSERVATIONS TO ESTIMATE PRECIPITATION VARIABILITY ACROSS GPM SATELLITE RADAR FIELD-OF-VIEWS
Christopher R. Williams*[1], Walter Petersen[2], David Wolff[3], V. Chandrasekar[4]
[1]*University of Colorado Boulder, Boulder, CO*
[2]*NASA Marshall Space Flight Center, Huntsville, AL*
[3]*NASA Wallops Space Flight Center, Wallops Island, VA*
[4]*Colorado State University, Fort Collins, CO*

09:40 F2-5
AN ACTIVE SONDE FOR LOCAL REMOTE SENSING OF CLOUD AND PRECIPITATION DYNAMICS
Soumojit Bose*, Albin J. Gasiewski
NOAA-CU Center for Environmental Technology, University of Colorado, Boulder, CO

10:00 Break

10:20 F2-6
NOWCASTING OF AN X-BAND DUAL-POLARIZATION RADAR DURING SOUTHERN CHINA MONSOON RAINFALL FIELD CAMPAIGN
Zhao Shi*[1,2], V. Chandrasekar[3], Jianxin He[1,2], Lijuan Wang[1,2]
[1]*Chengdu University of Information Technology, Chengdu, SC, CHINA*
[2]*Key Laboratory of Atmosphere Sounding, CMA, Chengdu, SC, CHINA*
[3]*Colorado State University, Fort Collins, CO*

10:40 F2-7
NEURAL NETWORK RAINFALL ESTIMATION BASED ON GPM DUAL-FREQUENCY PRECIPITATION RADAR MEASUREMENTS
Haiming Tan*, V. Chandrasekar, Haonan Chen
Colorado State University, Fort Collins. CO

11:00 F2-8
EVALUATION OF A KU-BAND RADAR HYDROMETEOR CLASSIFIER BY COMPARISON WITH S-BAND RADAR AND AIRCRAFT DATA
Haonan Chen*, V. Chandrasekar
Colorado State University, Fort Collins, CO

11:20 F2-9
3D SHAPE RECONSTRUCTION OF WINTER PRECIPITATION PARTICLES BASED ON MULTI-ANGLE IMAGES OBTAINED BY TWO ADVANCED OPTICAL DISDROMETERS
Adam C. Hicks*, Marcus Benzel, V.N. Bringi, Branislav Notaros
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

11:40 F2-10
SIMULATIONS OF MULTI-STREAM POLARIMETRIC MICROWAVE RADIANCE USING THE UMRT MODEL BASED ON DDSCAT NONSPHERICAL HYDROMETEOR DATABASE
Kun Zhang*, Albin J. Gasiewski
ECEE, University of Colorado Boulder, Boulder, CO

Session F3: Soil Moisture and Land Cover Sensing
Room 135
Session Co-Chairs: Mehmet Kurum, *Mississippi State University*; Roger Lang, *George Washington University*

10:20 F3-1
COULD GNSS-REFLECTOMETRY SENSE CORN GROWTH STAGES?
Orhan Eroglu*, Mehmet Kurum
Electrical and Computer Engineering, Mississippi State University, Mississippi State, MS

10:40 F3-2
A SUPERVISED MACHINE LEARNING APPROACH FOR THE INVERSION PROCESS TO RETRIEVE SOIL MOISTURE
Himangi Srivastava*, Mehmet Kurum
Electrical and Computer Engineering, Mississippi State University, Mississippi State, MS

11:00 F3-3
L-BAND HIGH SPATIAL RESOLUTION SOIL MOISTURE MAPPING USING SMALL UNMANNED AERIAL SYSTEMS
Eryan Dai[1], Aravind Venkitasubramony*[1], Albin J. Gasiewski[1], Maciej Stachura[2], Jack Elston[2]
[1]*ECEE, University of Colorado Boulder, Boulder, CO*
[2]*Black Swift Technologies (BST) LLC, Boulder, CO*

11:20 F3-4
QUANTIFYING COLLABORATION IN THE EARTH SCIENCES AS A RESULT OF THE EARTHCUBE PROJECT
Ryan Gooch*[1], V Chandrasekar[1], Simon Goring[2]
[1]*Colorado State University, Fort Collins, CO*
[2]*University of Wisconsin, Madison, WI*

Session GH1: Meteors, Orbital Debris and Dusty Plasmas (Special Session)
Room 151
Session Co-Chairs: Eric Gillman, *Naval Research Laboratory*; Ed Thomas, *Auburn University*

08:20 GH1-1
STUDIES OF DUST PARTICLE CONFINEMENT AND TRANSPORT IN STRONGLY MAGNETIZED PLASMAS USING THE MAGNETIZED DUSTY PLASMA EXPERIMENT (MDPX) DEVICE
Edward Thomas*[1], Spencer LeBlanc[1], Taylor Hall[1], Uwe Konopka[1], Robert L. Merlino[2], Marlene Rosenberg[3]
[1]*Physics, Auburn University, Auburn, AL*
[2]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[3]*Electrical and Computer Engineering, University of California - San Diego, La Jolla, CA*

08:40 GH1-2
METHODS FOR THE CHARACTERIZATION OF IMPOSED, ORDERED STRUCTURES IN MDPX
Taylor Hall*, Edward Thomas
Auburn University, Auburn, AL

09:00 GH1-3
MEASUREMENTS OF DENSITY GRADIENTS AND DUSTY PLASMA ROTATION IN INDUCTIVELY COUPLED DISCHARGES AT HIGH MAGNETIC FIELDS
W. J. Birmingham*, C. A. Romero-Talamas, E. M. Bates
Mechanical Engineering, University of Maryland, Baltimore County, Baltimore, MD

09:20 GH1-4
DUSTY PLASMA ROTATION AND ACCELERATION IN INDUCTIVELY COUPLED DISCHARGES AT HIGH MAGNETIC FIELDS
Carlos A. Romero-Talamas*, William J. Birmingham, Evan M. Bates
Mechanical Engineering, University of Maryland, Baltimore County, Baltimore, MD

09:40 GH1-5
MEASUREMENTS OF THERMAL EFFECTS IN THE DISPERSION RELATION OF THE DUST ACOUSTIC WAVE
Jeremiah Williams*
Wittenberg University, Springfield, OH

10:00 Break

10:20 GH1-6
NON-INVASIVE IMPEDANCE MEASUREMENTS IN A COMPLEX PLASMA
Eric D. Gillman*, Bill E. Amatucci
Plasma Physics Division, Naval Research Laboratory, Washington, DC

10:40 GH1-7
EXPERIMENTAL CAPABILITIES AT IMPACT
Mihaly Horanyi*
LASP and Physics, University of Colorado Boulder, Boulder, Colorado

11:00 GH1-8
AMBIPOLAR ELECTRIC FIELD AND DIFFUSIVE COOLING OF ELECTRONS IN METEOR TRAILS
Victor P. Pasko*[1], Michael C. Kelley[2]
[1]*Penn State University, University Park, PA*
[2]*Cornell University, Ithaca, NY*

11:20 GH1-9
DEVELOPMENT OF AN ALL-SKY METEOR TRAIL INPUT FUNCTION
Freddy Galindo, Julio Urbina*
Electrical Engineering, Penn State University, University Park, PA

Session H1: Physics of the Radiation Belts I (Special Session)
Room 245
Session Co-Chairs: Christopher Crabtree, *Naval Research Laboratory*;
Craig Kletzing, *University of Iowa*

08:20 H1-1
SYSTEMATIC EVALUATION OF LOW-FREQUENCY PLASMASPHERIC HISS WAVE GENERATION AND ITS EFFECTS ON RADIATION BELT ELECTRON DYNAMICS
Wen Li*[1], Run Shi[1], Qianli Ma[2]
[1]*Boston University, Boston, MA*
[2]*University of California, Los Angeles, Los Angeles, CA*

08:40 H1-2
STATISTICAL PROPERTIES OF PLASMASPHERIC HISS FROM VAN ALLEN PROBES
David P. Hartley*[1], Craig A. Kletzing[1], Ondrej Santolik[2,3], Lunjin Chen[4], Richard B. Horne[5]
[1]*University of Iowa, Iowa City, IA*
[2]*Institute of Atmospheric Physics, Prague, CZECH REPUBLIC*
[3]*Charles University, Prague, CZECH REPUBLIC*
[4]*University of Texas at Dallas, Dallas, TX*
[5]*British Antarctic Survey, Cambridge, UNITED KINGDOM*

09:00 H1-3
LANDAU DAMPING AND LINEAR GROWTH OF WHISTLER MODE WAVES WITH THE INCLUSION OF FINITE ELECTRON AND ION TEMPERATURE
Ashanthi S. Maxworth*[1], Mark Golkowski[1], David Malaspina[2], Allison Jaynes[2]
[1]*Electrical Engineering, University of Colorado Denver, Denver, CO*
[2]*Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO*

09:20 H1-4
A STATISTICAL ANALYSIS OF CONJUGATE LIGHTNING-INDUCED ELECTRON PRECIPITATION EVENTS
Dooyoung Kim*, Robert C. Moore
Electrical and Computer Engineering, University of Florida, Gainesville, FL

09:40 H1-5
OBSERVATIONS OF LIGHTNING INDUCED WHISTLER TRIGGERED UPPER BAND CHORUS
Poorya Hosseini, Mark Golkowski*
Electrical Engineering, University of Colorado Denver, Denver, CO

10:00 Break

10:20 H1-6
DUCTING OF THE WHISTLER-MODE WAVES BY MAGNETIC FIELD-ALIGNED DENSITY ENHANCEMENTS IN THE MAGNETOSPHERE
Anatoly V. Streltsov*[1,2], Miles Bengtson[3], Dylan English[2], Maxx Miller[2], Logan Turco[2]
[1]*Space Vehicles Directorate, Air Force Research Laboratory/RVBXC, Albuquerque, NM*
[2]*Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL*
[3]*Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*

10:40 H1-7
NONLINEAR PLASMA WAVES AT INJECTION FRONTS IN THE INNER MAGNETOSPHERE - A CENSUS
David M. Malaspina*[1], Alexander Ukhorskiy[2], Xiangning Chu[3]
[1]*Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO*
[2]*Applied Physics Laboratory, Johns Hopkins University, Laurel, MD*
[3]*University of California, Los Angeles, Los Angeles, CA*

11:00 H1-8
NONLINEAR WAVE-PARTICLE AND WAVE-WAVE INTERACTIONS IN THE OUTER RADIATION BELT: PHYSICAL MECHANISMS AND OBSERVATIONAL EFFECTS
Oleksiy Agapitov*[1], Anton Artemyev[2], Ivan Vasko[1], Didier Mourenas[3], James Drake[4], Forrest S. Mozer[1]
[1]*Space Science Laboratory, University of California, Berkeley, Berkeley, CA*
[2]*University of California, Los Angeles, Los Angeles, CA*
[3]*CEA, DAM, DIF, Arpajon, FRANCE*
[4]*Unversity of Maryland, MD*

Session H2: Non-Earth Magnetospheres (Special Session)
Room 1B51
Session Co-Chairs: William Kurth, *University of Iowa*;
George Hospodarsky, *University of Iowa*

08:20 H2-1
THE INTERPRETATION OF ~1 HZ WAVES IN MERCURY'S MAGNETOSPHERE AS DOPPLER SHIFTED ION BERNSTEIN MODE WAVES?
Scott A. Boardsen*[1,2], Daniel J. Gershman[2], James M. Raines[3], Eun-Hwa Kim[4], James A. Slavin[3]
[1]*Goddard Planetary and Heliophysics Institute, University of Maryland, Baltimore County, Greenbelt, MD*
[2]*Heliophysics, NASA/GSFC, Greenbelt, MD*
[3]*Atmospheric, Oceanic and Space Sciences, University of Michigan, Ann Arbor, MI*
[4]*Princeton Plasma Physics Laboratory, Princeton University, Princeton, NJ*

08:40 H2-2
THE CASE FOR VENUS LIGHTNING
Christopher T. Russell*
University of California, Los Angeles, Los Angeles, CA

09:00 H2-3
LIGHTNING HUNT IN VENUS WITH LAC ONBOARD AKATSUKI SPACECRAFT
Yukihiro Takahashi*, Mitsuteru Sato, Masataka Imai
Hokkaido University, Sapporo, JAPAN

09:20 H2-4
IMPACT OF IONOSPHERIC CHEMISTRY IN THE MARTIAN DYNAMO REGION USING MULTIFLUID MHD MODELING
Morgan M. Matheny*[1], Jeremy Riousset[2], Heidi K. Nykyri[1]
[1]*Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL*
[2]*Physical Sciences, Florida Institute of Technology, Melbourne, FL*

09:40 H2-5
JUNO WAVES INVESTIGATION OBSERVATIONS AT JUPITER
George B. Hospodarsky*[1], William S. Kurth[1], Masafumi Imai[1], Sadie S. Tetrick[1], Donald A. Gurnett[1], Shengyi Ye[1], Philippe Zarka[2], Ivana Kolmasova[3,4], Ondrej Santolik[3,4], Philippe Louarn[5], Frederic Allegrini[6], Phil Valek[6], Barry H. Mauk[7], George B. Clark[7], Scott J. Bolton[6], Jack E. P. Connerney[8,9], Steven M. Levin[10]
[1]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[2]*LESIA, Observatoire de Paris, Paris, FRANCE*
[3]*Upper Atmosphere, Institute of Atmospheric Physics CAS, Prague, CZECH REPUBLIC*
[4]*Faculty of Mathematics and Physic, Charles University, Prague, CZECH REPUBLIC*
[5]*IRAP, Toulouse, FRANCE*
[6]*Southwest Research Institute, San Antonio, TX*
[7]*Applied Physics Laboratory Johns Hopkins, Laurel, MD*
[8]*NASA Goddard Space Flight Center, Greenbelt, MD*
[9]*Space Research Corporation, Annapolis, MD*
[10]*Jet Propulsion Laboratory, Pasadena, CA*

10:00 Break

10:20 H2-6
PITCH ANGLE SCATTERING OF ENERGETIC ELECTRONS BY WHISTLER-MODE HISS IN THE JOVIAN POLAR CAP REGIONS: OBSERVATIONS FROM THE JUNO SPACECRAFT
Sadie S. Tetrick*[1], Donald A. Gurnett[1], William S. Kurth[1], George Clark[2], Barry H. Mauk[2], Scott J. Bolton[3], Jack Connerney[4], Steven M. Levin[5]
[1]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[2]*The Johns Hopkins University Applied Physics Laboratory, Laurel, MD*
[3]*Southwest Research Institute, San Antonio, TX*
[4]*Goddard Space Flight Center, Greenbelt, MD*
[5]*Jet Propulsion Laboratory, Pasadena, CA*

10:40 H2-7
JUNO DIRECTION-FINDING MEASUREMENTS OF JUPITER'S NARROWBAND KILOMETRIC RADIATION
Masafumi Imai*[1], William S. Kurth[1], George B. Hospodarsky[1], Scott J. Bolton[2], John E. P. Connerney[3], Steven M. Levin[4]
[1]*University of Iowa, Iowa City, IA*
[2]*Southwest Research Institute, San Antonio, TX*
[3]*NASA Goddard Space Flight Center, Greenbelt, MD*
[4]*Jet Propulsion Laboratory, Pasadena, CA*

11:00 H2-8
PROPERTIES OF JOVIAN LIGHTNING WHISTLERS DETECTED BY THE JUNO WAVES INSTRUMENT
Ivana Kolmasova*[1,2], Masafumi Imai[3], Ondrej Santolik[1,2], William S. Kurth[3], George B. Hospodarsky[3], Donald A. Gurnett[3], Scott J. Bolton[4], John E. P. Connerney[5]
[1]*Institute of Atmospheric Physics CAS, Prague, CZECH REPUBLIC*
[2]*Charles University, Prague, CZECH REPUBLIC*
[3]*University of Iowa, Iowa City, IA*
[4]*Southwest Research Institute, San Antonio, TX*
[5]*NASA/Goddard Space Flight Center, Greenbelt, MD*

11:20 H2-9
ROTATIONAL MODULATION OF SATURN RADIO EMISSIONS DURING THE CASSINI MISSION
S. Y. Ye*[1], G. Fischer[2], W. S. Kurth[1], J. D. Menietti[1], D. A. Gurnett[1]
[1]*University of Iowa, Iowa City, IA*
[2]*Austrian Academy of Sciences, Graz, AUSTRIA*

11:40 H2-10
CASSINI GRAND FINALE : NEW INSIGHTS ON THE SOURCE OF SATURN KILOMETRIC RADIATION
Laurent Lamy[1], Philippe Zarka[1], Baptiste Cecconi[1], William S. Kurth*[2], George B. Hospodarsky[2], Michiko Morooka[3], Jan-Erik Wahlund[3]
[1]*LESIA, Observatoire de Paris, Meudon, FRANCE*
[2]*University of Iowa, Iowa City, IA*
[3]*IRF-U, Uppsala, SWEDEN*

Session J1: New Telescopes, Techniques and Technology I (Special Session)
Room 265
Session Co-Chairs: Daniel C. Jacobs, *Arizona State University*; David DeBoer, *University of California*

08:20 J1-1
THE SCIENCE PROGRAM FOR THE NEXT GENERATION VERY LARGE ARRAY
Chris Carilli*, Eric Murphy, Rob Selina
NRAO, Socorro, NM

08:40 J1-2
ANTENNA CONCEPT FOR THE NEXT GENERATION VERY LARGE ARRAY
James M. Jackson*, Robert Selina, Wes Grammer
National Radio Astronomy Observatory, Socorro, NM

09:00 J1-3
SEARCHING FOR COSMIC DAWN FROM THE SUB-ANTARCTIC
Liju Philip*
School of Chemistry and Physics, University of KwaZulu-Natal, Durban, KZN, SOUTH AFRICA

09:20 J1-4
BASELINE RECEIVER CONCEPT FOR A NEXT GENERATION VERY LARGE ARRAY
Wes Grammer*[1], Silver Sturgis[1], Sivasankaran Srikanth[2], Rob Selina[1]
[1]*Electronics, NRAO, Socorro, NM*
[2]*Central Development Lab, NRAO, Charlottesville, VA*

09:40 J1-5
THE BREAKTHROUGH LISTEN SEARCH FOR INTELLIGENT LIFE BEYOND EARTH
Andrew P. V. Siemion*[1], Steve Croft[1], David DeBoer[1], Emilio Enriquez[1,2], Griffin Foster[1,3], Vishal Gajjar[1], Greg Hellbourg[1], Jack Hickish[1], Brian Lacki[1], Matt Lebofsky[1], David MacMahon[1], Danny Price[1,4], Dan Werthimer[1], Gerry Zhang[1]
[1]*University of California, Berkeley, Berkeley, CA*
[2]*Radboud University, Nijmegen, NETHERLANDS*
[3]*University of Oxford, Oxford, UNITED KINGDOM*
[4]*Swinburne University, Melbourne, AUSTRALIA*

10:00 Break

10:20 J1-6
SEPARATING THE GLOBAL 21-CM SIGNAL FROM STRONG FOREGROUNDS AND INSTRUMENT SYSTEMATICS USING AN SVD/MCMC PIPELINE
Keith Tauscher*[1], Jack O. Burns[1], David Rapetti[1,2], Eric R. Switzer[3]
[1]*Astrophysical and Planetary Sciences, University of Colorado, Boulder, CO*
[2]*NASA Ames Research Center, Mountain View, CA*
[3]*NASA Goddard Space Flight Center, Greenbelt, MD*

10:40 J1-7
A JOINT DECONVOLUTION ALGORITHM TO COMBINE SINGLE DISH AND INTERFEROMETER DATA FOR WIDEBAND MULTI-TERM IMAGING
Urvashi Rau*[1], Nikhil Naik[2]
[1]*National Radio Astronomy Observatory, Socorro, NM*
[2]*Indian Institute of Technology, KGP, Kharagpur, West Bengal, INDIA*

11:00 J1-8
COMPARING REDUNDANT AND SKY MODEL BASED INTERFEROMETRIC CALIBRATION: A FIRST LOOK WITH PHASE II OF THE MWA
Wenyang Li*
Physics, Brown University, Providence, RI

11:20 J1-9
OPTIMIZING LOW FREQUENCY ARRAY DESIGN
Matthew Kolopanis*, Daniel C. Jacobs
Arizona State University, Tempe, AZ

11:40 J1-10
A RESISTIVE WIDEBAND BEAM-SPLITTER SCREEN
Nivedita Mahesh*[1], Ravi Subrahmanyan[2], Uday N. Shankar[2], Agaram Raghunathan[2]
[1]*School of Earth & Space Exploration, Arizona State University, Tempe, AZ*
[2]*Raman Research Institute, Bangalore, Karnataka, INDIA*

Session K1: Implantable and Textile Antennas for Medical Applications
Room 150
Session Co-Chairs: Magda El-Shenawi, *University of Arkansas*; Erdem Topsakal, *Virginia Commonwealth University*

10:20 K1-1
IMPLANTABLE ANTENNAS USING BIOCOMPATIBLE TINITE (TIN)
Jon Dyke*[1], Ryan Green[1], Natalia Izioumskaia[1], Vitaliy Avrutin[1], Umit Ozgur[1], Martin Mangino[2], Erdem Topsakal[1]
[1]*Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA*
[2]*Surgery, Virginia Commonwealth University School of Medicine, Richmond, VA*

10:40 K1-2
HIGH GAIN IMPLANTABLE DUAL-BAND PATCH ANTENNA
John Blauert*, Asimina Kiourti
Electrical and Computer Engineering, The Ohio State University, Columbus, OH

11:00 K1-3
SURFACE RESISTIVITY STUDY OF TWO E-TEXTILES IN HARSH ENVIRONMENTS
Bin Xu*[1], Allyson Cliett[2], Ling Ni[2], Rachel Eike[2], Rinn Cloud[2], Yang Li[1]
[1]*Electrical and Computer Engineering, Baylor University, Waco, TX*
[2]*Family and Consumer Science, Baylor University, Waco, TX*

11:20 K1-4
A NOVEL FLEXIBLE ELECTRO-TEXTILE 3T MRI RF COIL ARRAY FOR STROKE PREVENTION: DESIGN, CHARACTERIZATION AND PROTOTYPING
Daisong Zhang*, Yahya Rahmat-Samii
Electrical Engineering, University of California, Los Angeles, Los Angeles, CA

11:40 K1-5
A DUAL BAND IMPLANTABLE ANTENNA FOR WIRELESS MEDICAL TELEMETRY SERVICE (WMTS) AND ISM BAND COMMUNICATION
Ryan B. Green*, Madeline R. Hays, Erdem Topsakal
Virginia Commonwealth University, Richmond, VA

THURSDAY AFTERNOON, 4 January 2018

Session A3: Measurement of Materials and EM Fields
Room 105
Session Co-Chairs: Jeanne Quimby, *NIST*;
Steven Weiss, *US Army Research Lab*

13:20 A3-1
UNCERTAINTIES IN RF ELECTRIC FIELD METROLOGY BASED ON RYDBERG ATOM SPECTROSCOPY
Matt T. Simons*[1], Marcus D. Kautz[1], Joshua A. Gordon[1], David A. Anderson[2], Georg Raithel[2,3], Christopher L. Holloway[1]
[1]*CTL, NIST, Boulder, CO*
[2]*Rydberg Technologies, Ann Arbor, MI*
[3]*Physics, University of Michigan, Ann Arbor, MI*

13:40 A3-2
PRECISION PORTABLE CRYOGENIC BLACKBODY TARGET FOR MICROWAVE/MILLIMETER WAVE RECEIVER CALIBRATION
Fredrick S. Solheim*
Dakota Ridge R & D, Boulder CO

14:00 A3-3
SPATIAL K-MEANS CLUSTERING OF HF NOISE TRENDS IN SOUTHERN CALIFORNIA WATERS
Kristopher R. Buchanan*, Daniel Gaytan, Lu Xu, Chris Dilay, David Hilton
Electromagnetics Technology Branch, Space and Naval Warfare Systems Center Pacific (SSC Pacific), San Diego, CA

14:20 A3-4
NONDESTRUCTIVE ELECTRICAL PROPERTY MEASUREMENTS BY MULTIREFLECT THRU TO 110 GHZ
Nina B. Popovic*[1,2], Jasper A. Drisko[1], Sean E. Shaheen[2], Edward Garboczi[1], Chris J. Long[1], Nathan D. Orloff[1]
[1]*CTL, National Institute of Standards and Technology, Boulder, CO*
[2]*Electrical Engineering, University of Colorado Boulder, Boulder, CO*

Session B3: Complex Media and Metamaterials
Room 1B40
Session Co-Chairs: Edward Kuester, *University of Colorado*;
George Eleftheriades, *University of Toronto*

13:20 B3-1
DISPERSION ENGINEERING FOR SLOW-WAVE STRUCTURES USING QUAD COUPLED TRANSMISSION LINES
Shubhendu Bhardwaj*[1], Muhammed Zuboraj[2], John L. Volakis[1]
[1]*Florida International University, Miami, FL*
[2]*Los Alamos National Laboratory, Los Alamos, NM*

13:40 B3-2
MODELING OF LAYERED AND CORRUGATED SURFACES USING HIGHER ORDER GENERALIZED IMPEDANCE BOUNDARY CONDITIONS
Shubhendu Bhardwaj*, John Volakis
Florida International University, Miami, FL

14:00 B3-3
IMPROVING THE RADIATION CHARACTERISTICS OF AN ANTIPODAL VIVALDI ANTENNA USING A SPATIALLY VARIANT METAMATERIAL LENS
John Blauert*[1], Joseph M. Faia[2], Yujie He[2], Sun K. Hong[3], Benjamin S. Cook[4], Edward Wheeler[2]
[1]*Electroscience Laboratory, Ohio State University, Columbus, OH*
[2]*Electrical and Computer Engineering, Rose-Hulman Institute of Technology, Terre Haute, IN*
[3]*School of Electronics Engineering, Soongsil University, Seoul, SOUTH KOREA*
[4]*Kilby Labs, Texas Instruments, Dallas, TX*

14:20 B3-4
TRANSMISSION THROUGH AN INHOMOGENEOUS DIELECTRIC-LOADED SLOT IN AN INFINITE METALLIC SHIELD OF FINITE THICKNESS
Abdulaziz Haddab*, Edward Kuester
Electrical, Computer & Energy Engineering, University of Colorado Boulder, Boulder, CO

14:40 B3-5
AN INFINITE ARRAY OF DIELECTRIC-LOADED SLOTS IN A METALLIC SHIELD OF FINITE THICKNESS
Abdulaziz Haddab*, Edward Kuester
Electrical, Computer & Energy Engineering, University of Colorado Boulder, Boulder, CO

15:00 Break

15:20 B3-6
ALL-PASS CHARACTERISTICS OF A HUYGENS' UNIT CELL
Ayman H. Dorrah*, George V. Eleftheriades
The Edward S. Rogers Sr. Electrical & Computer Engineering, University of Toronto, Toronto, Ontario, CANADA

15:40 B3-7
PHASE RESPONSE AT RESONANCE FREQUENCY FOR METAMATERIAL-INSERT MEDIUMS
Quang Nguyen*, Amir I. Zaghloul, Steven J. Weiss
US Army Research Laboratory, Adelphi, MD

16:00 B3-8
PT-SYMMETRIC LEAKY-WAVE METASURFACES
Mehdi Hajizadegan*, Pai-Yen Chen
ECE, Wayne State University, Detroit, MI

16:20 B3-9
EQUIVALENT CIRCUIT MODEL OF DIFFERENT CONFIGURATIONS OF MULTILAYER LOOP ELEMENTS USING VECTOR-FITTING
Payal Majumdar*[1], Zhiya Zhao[2], Chunlin Ji[2], Ruopeng Liu[2]
[1]*EE, CONLEY ROSE P.C., Houston, TX*
[2]*Kuang-Chi Institute of Advanced Technology, Shenzhen, Guangdong, CHINA*

16:40 B3-10
ORIGAMI-INSPIRED FREQUENCY SELECTIVE SURFACE
Deanna Sessions*[1], Gregory Huff[1], Philip Buskohl[2], Kazuko Fuchi[3]
[1]*Texas A&M University, College Station, TX*
[2]*Air Force Research Laboratory, Dayton, OH*
[3]*University of Dayton Research Institute, Dayton, OH*

Session B4: Antenna Systems: Design and Measurements
Room 200
Session Co-Chairs: Dejan Filipovic, *University of Colorado Boulder*; John Swoboda, *MIT Haystack Observatory*

13:20 B4-1
COUPLED TRANSMIT SIGNAL AND NOISE CANCELLATION AT THE RF FRONT END IN SIMULTANEOUS TRANSMIT/RECEIVE SYSTEM
Satheesh Bojja Venkatakrishnan*, Elias Alwan, John L. Volakis
Electrical Engineering, Florida International University, Miami, FL

13:40 B4-2
MEASUREMENT OF RADIO ARRAY ANTENNA PATTERNS USING UNMANNED AERIAL VEHICLES AND SOFTWARE DEFINED RADIOS
John P. Swoboda*, Frank D. Lind, Philip J. Erickson
Atmospheric Sciences Group, MIT Haystack Observatory, Westford, MA

14:00 B4-3
A NOVEL, SIZE-REDUCED LOG-PERIODIC DIPOLE ARRAY USING SPHERICAL TOP-LOADING
James C. Howell*, Sungkyun Lim
Electrical Engineering, Georgia Southern University, Statesboro, GA

14:20 B4-4
WIDEBAND CIRCULARLY POLARIZED HORN ANTENNA DESIGN AND EFFECT OF THE POLARIZATION ON BASIC DIRECTION FINDING (DF)
Mustafa Asili*, Adnan Orduyilmaz, Mahmut Serin, Alper Yildirim
Advanced Technologies Research Institute, TUBITAK, Ankara, TURKEY

14:40 B4-5
HIGHLY EFFICIENT HYBRID PLASMONIC LEAKY-WAVE OPTICAL ANTENNA WITH CONTROLLING SLOT'S SHAPES
Zahra Manzoor*[1], Mohammad Ali Panahi[2]
[1]*Electrical Engineering, MST University, Rolla, MO*
[2]*Electrical Engineering, University of Wisconsin, Madison, WI*

Session B5: Advances in Computational Electromagnetics on Modern Computers
(Special Session)
Room 200
Session Co-Chairs: Zhen Peng, *University of New Mexico*; Ali Yilmaz, *University of Texas at Austin*

15:20 B5-1
ACCURACY STUDY OF SINGULARITY EXTRACTION METHOD FOR NEAR-SINGULAR AND NEAR-HYPERSINGULAR SURFACE INTEGRALS IN HIGHER ORDER METHOD OF MOMENTS
Sanja B. Manic*, Ana B. Manic, Branislav M. Notaros
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

15:40 B5-2
DIRECT DOMAIN DECOMPOSITION METHODS (D3M) FOR ELECTROMAGNETIC COMPUTATIONS
Javad Moshfegh, Marinos N. Vouvakis*
Electrical & Computer Engineering, University of Massachusetts Amherst, Amherst, MA

16:00 B5-3
PARALLEL-IN-TIME COMPUTATION FOR MAXWELL'S EQUATIONS
Shu Wang, Zhen Peng*
University of New Mexico, Albuquerque, NM

16:20 B5-4
THE IMPLEMENTATION AND APPLICATION OF THE ADAPTIVE CROSS APPROXIMATION IN THE METHOD OF MOMENTS CODE EIGER
Joseph Kotulski*
Sandia National Labs, Albuquerque, NM

16:40 B5-5
EXTENDING PROTO-BENCHMARKS TO CREATE BENCHMARKS FOR QUANTIFYING MODERN COMPUTATIONAL ELECTROMAGNETICS PERFORMANCE
Jon T. Kelley[1], Jackson W. Massey[2], Ali E. Yilmaz*[2]
[1]*Physics, The University of Texas at Austin, Austin, TX*
[2]*Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX*

Session B6: Emerging Applications of Phased Arrays
(Special Session)
Room 105
Session Co-Chairs: Elias Alwan, Florida International University
Karl Warnick, *Brigham Young University*

15:20 B6-1
WIDEBAND, SCANNING SPIRAL ARRAY FOR SIMULTANEOUS TRANSMIT AND RECEIVE (STAR)
Alexander Hovsepian*, Satheesh Bojja Venkatakrishnan, Elias A. Alwan, John L. Volakis
Electrical and Computer Engineering, Florida International University, Miami, FL

15:40 B6-2
ULTRA-WIDEBAND PHASED ARRAY OPTIMIZATION IN MIMO CONFIGURATION FOR INCREASED CHANNEL CAPACITY
Samuel S. Mensah*[1,2], Abe A. Akhiyat[1,2], Elias A. Alwan[2], John L. Volakis[2]
[1]*Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Electrical and Computer Engineering, Florida International University, Miami, OH*

16:00 B6-3
ANALYSIS OF 3-D PHASED ARRAYS BASED ON SWARM APERTURE
Junming Diao*, Yuanxun E. Wang
Electrical Engineering, University of California, Los Angeles, Los Angeles, CA

16:20 B6-4
ADAPTIVE WIRELESS BEAMFORMING FOR SWARM ARRAY
J. Diao*[1], M. Hedayati[1], Y. Huang[1], Y. Wang[1]
[1]*Electrical Engineering, University of California, Los Angeles, Los Angeles, CA*

16:40 B6-5
CODE - MODULATED BEAMFORMING FOR MOBILE DISTRIBUTED ARRAY
M. Hedayati*[1], Y. Huang[1], Y. Wang[1]
[1]*Electrical Engineering, University of California, Los Angeles, Los Angeles, CA*

17:00 B6-6
HYPER SPECTRAL FFT IMAGER
Deepthi Gorthi*[1], David DeBoer[1], Jack Hickish[1], Aaron Parsons[1], Kathryn Rosie[2], Dan Werthimer[1]
[1]*Astronomy, University of California, Berkeley, Berkeley, CA*
[2]*Square Kilometre Array, Cape Town, SOUTH AFRICA*

17:20 B6-7
ANALYSIS OF ANTENNA LOSS AND RECEIVING EFFICIENCY FOR HIGH-SENSITIVITY SCANNED PHASED ARRAYS
Junming Diao*[1], Karl F. Warnick[2]
[1]*Electrical Engineering, University of California, Los Angeles, Los Angeles, CA*
[2]*Electrical and Computer Engineering, Brigham Young University, Provo, UT*

Session B7: Wearable Antennas and Electronics (Special Session)
Room 150
Session Co-Chairs: Asimina Kiourti, *The Ohio State University*; Bashir Morshed, *The University of Memphis*

15:20 B7-1
SMART WEARABLE ANTENNAS ON FABRIC SUBSTRATES
Umar Hasni*, Erdem Topsakal
Electrical and Computer Engineering, School of Engineering, Virginia Commonwealth University, Richmond, VA

15:40 B7-2
PATCH ANTENNA BENDING EFFECTS FOR WEARABLE APPLICATIONS: GUIDELINES AND DESIGN CURVES
Lingnan Song*, Yahya Rahmat-Samii
Electrical and Computer Engineering, University of California, Los Angeles, Los Angeles, CA

16:00 B7-3
SCALABLE POWER GENERATION FOR WEARABLE ELECTRONICS USING FABRIC ELECTROCHEMISTRY
Raman Vilkhu*[1], Cody O'Connor[1], Wesley Thio[2], Piya D. Ghatak[3], Anne Co[2], Chandan K. Sen[3], Asimina Kiourti[1]
[1]*Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio*
[2]*Chemistry, The Ohio State University, Columbus, OH*
[3]*Surgery, The Ohio State University, Columbus, OH*

16:20 B7-4
WIRELESS RESISTIVE ANALOG PASSIVE TEMPERATURE SENSORS FOR SMART & CONNECTED COMMUNITY
Bashir I. Morshed*
The University of Memphis, Memphis

16:40 B7-5
WEARABLE SENSING DEVICES FOR HUMAN-MACHINE INTERACTION SYSTEMS
Karla C. Welch*, Anand S. Kulkarni, Alan M. Jimenez, Benjamin Douglas
Electrical and Computer Engineering, University of Louisville, Louisville, KY

17:00 B7-6
COIL DISTANCE AND ANGLE MISALIGNMENT EFFECTS ON THE MUTUAL INDUCTANCE FOR 13.56 MHZ WRAP SENSORS
Babak Noroozi, Bashir I. Morshed*
Electrical and Computer Engineering, The University of Memphis, Memphis, TN

17:20 B7-7
INTERMODULATION FMCW (IM-FMCW) RADAR FOR NON-LINEAR WEARABLE TARGETS DETECTION
Zhengyu Peng*, Changzhi Li
Electrical and Computer Engineering, Texas Tech University, Lubbock, TX

Session F4: Random and Complex Media (Special Session)
Room 135
Session Co-Chairs: Saba Mudaliar, *Air Force Research Laboratory*; Akira Ishimaru, *University of Washington*

13:20 F4-1
THE SINGLE SCATTERING SUBTRACTION METHOD FOR MULTI-FREQUENCY SURFACES
Kevin Diomedi
ECE, Virginia Polytechnic Institute & State University, Blacksburg, VA

13:40 F4-2
A PHYSICS-BASED MODEL FOR THE AMPLITUDE DISTRIBUTION OF BISTATIC SEA CLUTTER
Ahmed M. Balakhder*, Hongkun Li, Joel T. Johnson
Electroscience Laboratory, The Ohio State University, Columbus, OH

14:00 F4-3
MODELING EM WAVE SCATTERING FROM TREE BRANCHES AND LEAVES
Ben Walborn*, Max Bright, Yasuo Kuga, Akira Ishimaru
Electrical Engineering, University of Washington, Seattle, WA

14:20 F4-4
JUNO RADIO SCIENCE OBSERVATIONS AND GRAVITY SCIENCE CALIBRATIONS OF IO PLASMA TORUS
Yu-Ming Yang*[1], Dustin Buccino[1], William F. Folkner[1], Kamal Oudrhiri[1], Phillip H. Phipps[2], Marzia Parisi[1], Daniel S. Kahan[1]
[1]*Jet Propulsion Laboratory-NASA, Pasadena, CA*
[2]*Boston University, Boston, MA*

14:40 F4-5
IMPROVING THE ANGULAR RESOLUTION IN THE EARLY-TIME DIFFUSION IMAGING THROUGH RANDOM MEDIA
Elizabeth Bleszynski*, Marek Bleszynski, Thomas Jaroszewicz
Monopole Research, Thousand Oaks, CA

15:00 Break

15:20 F4-6
HIGH ORDER SCATTERING FROM UNDULATIONS ON A CYLINDRICAL SURFACE
Saba Mudaliar*[1], Prabavathi Chidambaram[2]
[1]*Sensors Directorate, Air Force Research Laboratory, Dayton, OH*
[2]*P.O. Box 24467, Independent Researcher, Huber Heights, OH*

15:40 F4-7
SCATTERING FROM A DISTRIBUTION OF ROUGH PLATES
Max Bright*, Yasuo Kuga, Akira Ishimaru
Electrical Engineering, University of Washington, Seattle, WA

16:00 F4-8
STUDY OF SMAP HIGH RESOLUTION DATA OVER HURRICANES USING EMPIRICAL AND PHYSICS-BASED MODELING
Shanka N. Wijesundara*, Joel T. Johnson
ElectroScience Laboratory, The Ohio State University, Columbus, OH

16:20 F4-9
ENSEMBLE DETECTION ANALYSIS FOR CHARACTERIZING NON-STATIONARY PROCESSES
Mustafa Aksoy*[1], Paul E. Racette[2]
[1]*University at Albany, SUNY, Albany, NY*
[2]*NASA Goddard Space Flight Center, Greenbelt, MD*

Session F5: Remote Sensing from Small Satellites I (Special Session)
Room 155
Session Co-Chairs: Steven Reising, *Colorado State University*; Albin Gasiewski, *University of Colorado Boulder*

13:20 F5-1
WIDE-BAND MILLIMETER AND SUB-MILLIMETER WAVE RADIOMETER INSTRUMENT TO MEASURE TROPOSPHERIC WATER AND CLOUD ICE (TWICE)
Pekka Kangaslahti*[1], Erich Schlecht[1], Jonathan Jiang[1], Anders Skalare[1], Joelle Cooperrider[1], Richard Cofield[1], William Deal[2], Alex Zamora[2], Kevin Leong[2], Steven Reising[3], Xavier Bosch[1], Mehmet Ogut[3], Yuriy Goncharenko[3], Braxton Kilmer[3]
[1]*Jet Propulsion Laboratory, Pasadena, CA*
[2]*Northrop Grumman Corporation, Redondo Beach, CA*
[3]*Colorado State University, Fort Collins, CO*

13:40 F5-2
A DIRECT DETECTION RECEIVER AT 660 GHZ
William R. Deal*[1], Alexis Zamora[1], Kevin Leong[1], Gerry Mei[1], Pekka Kangaslahti[2], Erich Schlecht[2], Steven C. Reising[3]
[1]*Northrop Grumman Corporation, Redondo Beach, CA*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[3]*Colorado State University, Fort Collins, CO*

14:00 F5-3
DESIGN AND ANALYSIS OF COMMAND AND DATA HANDLING SUBSYSTEM FOR TROPOSPHERIC WATER AND CLOUD ICE (TWICE) 6U-CLASS SATELLITE INSTRUMENT
Mehmet Ogut*[1], Xavier Bosch-Lluis[2], Steven C. Reising[1], Yuriy V. Goncharenko[1], Braxton Kilmer[1], Pekka Kangaslahti[2], Erich Schlecht[2], Anders Skalare[2], Richard Cofield[2], Sharmila Padmanabhan[2], William R. Deal[3], Alex Zamora[3]
[1]*Microwave Systems Laboratory, Colorado State University, Fort Collins, CO*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[3]*Northrop Grumman Aerospace Systems, Redondo Beach, CA*

14:20 F5-4
DESIGN, FABRICATION, AND TESTING OF AN AMBIENT CALIBRATION TARGET FOR THE TROPOSPHERIC WATER VAPOR AND CLOUD ICE (TWICE) MILLIMETER- AND SUB-MILLIMETER-WAVE RADIOMETER INSTRUMENT
Braxton Kilmer*[1], Steven C. Reising[1], Yuriy Goncharenko[1], Mehmet Ogut[1], Pekka Kangaslahti[2], Anders Skalare[2], Erich Schlecht[2], Richard Cofield[2], Joelle Cooperrider[2], William Deal[3], Alex Zamora[3]
[1]*Microwave Systems Laboratory, Colorado State University, Fort Collins, CO*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[3]*Northrop Grumman Corporation, Redondo Beach, CA*

14:40 F5-5
ICECUBE 883-GHZ CLOUD RADIOMETER EXPERIMENT
Dong L. Wu*
NASA Goddard Space Flight Center, Greenbelt, MD

15:00 Break

15:20 F5-6
TEMPORAL EXPERIMENT FOR STORMS AND TROPICAL SYSTEMS TECHNOLOGY DEMONSTRATION (TEMPEST-D) MISSION FOR GLOBAL OBSERVATIONS OF CLOUDS AND PRECIPITATION FROM CUBESAT CONSTELLATIONS
Steven C. Reising*[1], Todd C. Gaier[2], Sharmila Padmanabhan[2], Boon H. Lim[2], Cate Heneghan[2], Christian D. Kummerow[1], V. Chandrasekar[1], Wesley Berg[1], Shannon T. Brown[2], Matthew Pallas[3], C Radhakrishnan[1]
[1]*Colorado State University, Fort Collins, CO*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[3]*Blue Canyon Technologies, Boulder, CO*

15:40 F5-7
THE NASA TROPICS CUBESAT RADIOMETERS
William Blackwell*
MIT Lincoln Laboratory, Lexington, MA

16:00 F5-8
PRELAUNCH PERFORMANCE OF THE 118 GHZ POLARCUBE 3U CUBESAT TEMPERATURE SOUNDING RADIOMETER
Lavanya Periasamy*[1], Al Gasiewski[1], Brian Sanders[1], David Gallaher[2], Robert Belter[1], Joaquin Castillo[1], David Kraft[1], Josua Gordon[3], Michael Hurowitz[4]
[1]*Electrical Engineering, University of Colorado Boulder, Boulder, CO*
[2]*National Snow and Ice Data Center, Boulder, Colorado*
[3]*National Institute of Standards and Technology, Boulder, CO*
[4]*Orbital Micro Systems, Boulder, CO*

16:20 F5-9
DEVELOPMENT AND TESTING OF THE CUBESAT RADIOMETER RADIO FREQUENCY INTERFERENCE TECHNOLOGY VALIDATION (CUBERRT) SYSTEM
Christopher D. Ball*[1], Chi-Chih Chen[1], Andrew J. O'Brien[1], Christa J. McKelvey[1], Graeme E. Smith[1], Mark Andrews[1], J. Landon Garry[1], Joel T. Johnson[1], Sidharth Misra[2], Rudi M. Bendig[2], Carl Felten[2], Shannon T. Brown[2], Robert F. Jarnot[2], Jonathon Kocz[3], Damon C. Bradley[4], Priscilla N. Mohammed[4], Jared F. Lucey[4], Kevin A. Horgan[4], Quenton Bonds[4], Carlos Duran-Aviles[4], Michael A. Solly[4], Matthew A. Fritts[4], Jeffrey R. Piepmeier[4], Matthew Pallas[5], Ervin Krauss[5], Doug Laczkowski[5]
[1]*The Ohio State University, Columbus, OH*
[2]*NASA Jet Propulsion Laboratory, Pasadena, CA*
[3]*California Institute of Technology, Pasadena, CA*
[4]*NASA Goddard Space Flight Center, Greenbelt, MD*
[5]*Blue Canyon Technologies, Boulder, CO*

Session G1: New Horizons in Active and Passive Radio Techniques for Geospace Remote Sensing (Special Session)
Room 151
Session Co-Chairs: Philip Erickson, *MIT Haystack Observatory*; Scott Palo, *University of Colorado*; Julio Urbina, *Penn State University*

13:20 G1-1
TOWARD IONOSPHERE FORECAST USING COSMIC-2
Charles Lin*[1], Chia-Hung Chen[1], P. K. Rajesh[1], Tomoko Matsuo[2]
[1]*Earth Sciences, National Cheng Kung University, Tainan, TAIWAN*
[2]*Ann and H. J. Smead Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*

13:40 G1-2
EXPLORING THE IONOSPHERE WITH RADIO TELESCOPES AND LIGHTNING STRIKES
Joseph B. Malins*[1], Kenneth S. ObenBerger[2], Gregory B. Taylor[1]
[1]*Physics and Astronomy, University of New Mexico, Albuquerque, NM*
[2]*Space Vehicle Branch, Air Force Research Lab, Kirtland Air Force Base, Albuquerque, NM*

14:00 G1-3
ON THE USE OF SYNTHETIC APERTURE RADAR (SAR) AS A TOOL FOR IONOSPHERIC IRREGULARITY CHARACTERIZATION
James P. Conroy*[1], James P. Conroy[2], Jason Hodkin[2], Mark Strother[2], Kshitija Deshpande[3]
[1]*Virginia Tech, Blacksburg, VA*
[2]*Johns Hopkins Applied Physics Lab, Laurel, MD*
[3]*Embry-Riddle Aeronautical University, Daytona Beach, FL*

14:20 G1-4
SATELLITE-BEACON IONOSPHERIC-SCINTILLATION GLOBAL MODEL OF THE UPPER ATMOSPHERE (SIGMA): GNSS SIGNAL PROPAGATION MODELING AND CHANNEL MISMATCH ANALYSIS
James P. Conroy*[1], James P. Conroy[2], Kshitija Deshpande[3]
[1]*Virginia Tech, Blacksburg, VA*
[2]*Johns Hopkins Applied Physics Lab, Laurel, MD*
[3]*Embry-Riddle Aeronautical University, , Daytona Beach, FL*

14:40 G1-5
VALIDATION OF AN INVERSE TECHNIQUE TO RETRIEVE INTERMEDIATE-SCALE STRUCTURE STATISTICS FROM TIME SERIES OF IONOSPHERIC SCINTILLATION
Charles S. Carrano*[1], Charles Rino[1], Tatsuhiro Yokoyama[2]
[1]*Institute for Scientific Research, Boston College, Chestnut Hill, MA*
[2]*Space Environment Laboratory, National Institute of Information and Communications Technology, Tokyo, JAPAN*

15:00 G1-6
JUNE SOLSTICE EQUATORIAL SPREAD-F IN THE AMERICAN SECTOR: A NUMERICAL ASSESSMENT OF LINEAR STABILITY AIDED BY INCOHERENT SCATTER RADAR MEASUREMENTS
Weijia Zhan*, Fabiano S. Rodrigues
Physics, The University of Texas at Dallas, Richardson, TX

Session G2: New RF Data Networks for Global Space Plasma Imaging
(Special Session)
Room 151
Session Co-Chairs: Gary Bust, *JHUAPL*;
Roy Calfas, *ARL:UT*

15:20 G2-1
IONOSPHERIC IRREGULARITY DRIFT VELOCITY ESTIMATION USING MULTI-GNSS SPACED-RECEIVER ARRAY DURING HIGH LATITUDE PHASE SCINTILLATION
Jun Wang*[1], Jade Morton[2]
[1]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*Smead Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*

15:40 G2-2
INVESTIGATIONS OF PLASMA INSTABILITIES USING GNSS OBSERVATIONS AND A COMBINATION OF PROPAGATION MODEL AND A FIRST PRINCIPLES PLASMA MODEL
Kshitija B. Deshpande*, Matt Zettergren
Physical Sciences, EMBRY RIDDLE AERONAUTICAL UNIV, DAYTONA BEACH

16:00 G2-3
ON IMAGING LOW-LATITUDE F-REGION IONOSPHERIC STRUCTURES USING A SMALL, LOW-POWER COHERENT BACKSCATTER RADAR INTERFEROMETER
Fabiano Rodrigues*
W. B. Hanson Center for Space Sciences, The University of Texas at Dallas, Richardson, TX

16:20 G2-4
NEW DIRECTIONS IN DETECTING NATURAL HAZARDS USING GROUND-BASED AND SPACEBORNE MEASUREMENTS
Attila Komjathy*[1], Giorgio Savastano[2], Xing Meng[1], Olga Verkhoglyadova[1], Anthony Mannucci[1]
[1]*Jet Propulsion Laboratory, Pasadena, CA*
[2]*University of Rome, Rome, ITALY*

16:40 G2-5 ASSIMILATION OF GLOBALLY DISTRIBUTED GNSS AND FABRY-PEROT INTERFEROMETER DATA PRODUCTS FOR ANALYSIS OF THE SEPTEMBER 8TH, 2017 GEOMAGNETIC STORM
Daniel Miladinovich*[1], Seebany Datta-Barua[1], Uriel Ramirez[1], Gary Bust[2]
[1]*Mechanical, Materials and Aerospace Engineering, Illinois Institute of Technology, Chicago, IL*
[2]*Applied Physics Laboratory, Johns Hopkins University, Laurel, MD*

17:00 G2-6
NEW PERSPECTIVE OF THE IONOSPHERE AND PLASMASPHERE FROM GNSS CONSTELLATIONS
Rebecca L. Bishop*, Paul R. Straus, Lynette J. Gelinas
Space Science Application Laboratory, The Aerospace Corporation, El Segundo, CA

17:20 G2-7
DATA ASSIMILATION OF GROUND-BASED GPS AND RADIO OCCULTATION TOTAL ELECTRON CONTENT FOR GLOBAL IONOSPHERIC SPECIFICATION
Chi-Yen Lin[1], Tomoko Matsuo*[2], Tiger Liu[1], Charles Lin[3]
[1]*National Central University, Taoyuan, TAIWAN*
[2]*University of Colorado Boulder, Boulder, CO*
[3]*National Cheng Kung University, Tainan, TAIWAN*

Session H3: Physics of the Radiation Belts II
(Special Session)
Room 245
Session Co-Chairs: Craig Kletzing, *University of Iowa*;
Christopher Crabtree, *Naval Research Laboratory*

13:20 H3-1
THE TURBULENT PLASMASPHERE BOUNDARY LAYER AND THE OUTER RADIATION BELT BOUNDARY
Evgeny V. Mishin*[1], Vladimir Sotnikov[2]
[1]*Space Vehicles Directorate, Air Force Research Laboratory, Albuquerque, NM*
[2]*Sensors Directorate, Air Force Research Laboratory, Dayton, OH*

13:40 H3-2
COMPUTATIONAL MODELING OF DIPOLARIZATION FRONT ASSOCIATED WAVES AND PARTICLE ENERGIZATION
Wayne Scales*, Dong Lin
Virginia Tech, Blacksburg, VA

14:00 H3-3
FAST DIFFUSION OF ULTRA-RELATIVISTIC ELECTRONS IN THE OUTER RADIATION BELT: 17 MARCH 2015 STORM EVENT
Allison N. Jaynes*[1], Ashar Ali[2], Scot R. Elkington[2], David M. Malaspina[2], Daniel N. Baker[2], Xinlin Li[2], Shri G. Kanekal[3], Craig A. Kletzing[1], John R. Wygant[4]
[1]*Physics & Astronomy, University of Iowa, Iowa City, IA*
[2]*LASP, University of Colorado Boulder, Boulder, CO*
[3]*Goddard Space Flight Center, Greenbelt, MD*
[4]*University of Minnesota, Minneapolis, MN*

14:20 H3-4
INVESTIGATION OF THE FREQUENCY STRUCTURE OF THE FAST MAGNETOSONIC MODE
Scott A. Boardsen*[1,2], George B. Hospodarsky[3], Mei-Ching Fok[2], Craig A. Kletzing[3], William S. Kurth[3], Robert F. Pfaff[2]
[1]*Goddard Planetary and Heliophysics Institute, University of Maryland, Baltimore County, Greenbelt, MD*
[2]*Heliophysics Division, NASA/GSFC, Greenbelt, MD*
[3]*Phyiscs and Astronomy, University of Iowa, Iowa City, IA*

14:40 H3-5
VAN ALLEN PROBES OBSERVATIONS OF ELECTROMGAGNETIC ION CYCLOTRON (EMIC) WAVE RISING TONES
Kristine Sigsbee*[1], Craig A. Kletzing[1], Ondrej Santolik[2], Charles W. Smith[3]
[1]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[2]*Faculty of Mathematics and Physics, Charles University, Prague, CZECH REPUBLIC*
[3]*Institute for Earth, Oceans and Space, University of New Hampshire, Durham, NH*

15:00 Break

15:20 H3-6
EXCITATION OF WHISTLER-MODE CHORUS WAVES IN A LABORATORY PLASMA
Xin An*[1], Bart Van Compernolle[2], Jacob Bortnik[1], Viktor Decyk[2], Richard M. Thorne[1]
[1]*Atmospheric and Oceanic Sciences, University of California, Los Angeles, Los Angeles, CA*
[2]*Physics and Astronomy, University of California, Los Angeles, Los Angeles, CA*

15:40 H3-7
HAMILTONIAN SINGLE WAVE MODELS TO INVESTIGATE THE NONLINEAR SELF-CONSISTENT INTERACTION OF WHISTLER WAVES AND ELECTRONS
Christopher Crabtree*, Gurudas Ganguli, Erik Tejero
Naval Research Laboratory, Washington

16:00 H3-8
CHORUS WAVES MODULATION OF LANGMUIR WAVES IN THE RADIATION BELTS
Jinxing Li*[1], Jacob Bortnik[1], Xin An[1], Wen Li[2], Richard M. Thorne[1], Meng Zhou[3], William S. Kurth[4], George B. Hospodarsky[4], Herbert O. Funsten[5], Harlan E. Spence[6]
[1]*Atmospheric and Oceanic Sciences, University of California, Los Angeles, Los Angeles, CA*
[2]*Center for Space Physics, Boston University, Boston, MA*
[3]*Astronomy and Physics, University of California, Los Angeles, Los Angeles*
[4]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[5]*MS-D466, PO Box 1663, Los Alamos National Laboratory, Los Alamos, NM*
[6]*Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, NC*

Session J2: New Telescopes, Techniques and Technology II (Special Session)
Room 265
Session Co-Chairs: Danny Jacobs, *Arizona State University*; David DeBoer, *University of California, Berkeley*

15:20 J2-1
DEPLOYMENT OF A NOVEL INTERFEROMETER ARCHITECTURE ON THE LWA-SEVILLETA STATION
Nithyanandan Thyagarajan*[1], Adam P. Beardsley[2], Judd D. Bowman[2], Greg B. Taylor[3], Jayce Dowell[3], Miguel F. Morales[4]
[1]*National Radio Astronomy Observatory, Socorro, NM*
[2]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[3]*Physics and Astronomy, University of New Mexico, Albuquerque, NM*
[4]*Physics, University of Washington, Seattle, WA*

15:40 J2-2
ADVANCES IN AN 8 TO 50 GHZ CRYOGENIC LOW NOISE AMPLIFIER FOR THE NEXT GENERATION VERY LARGE ARRAY
Andrew Janzen*, Ezra Long, Lorene Samoska, Jose Velazco
Jet Propulsion Laboratory, Pasadena, CA

16:00 J2-3
PRELIMINARY TEST RESULTS OF JPL's ULTRAWIDEBAND RECEIVER PACKAGE FOR THE ngVLA
Jose E. Velazco*, Andrew W. Janzen, Daniel J. Hoppe, Lorene A. Samoska, Ezra M. Long, James G. Bowen, Larry R. D'Addario, Melissa A. Soriano, Joseph Lazio
Jet Propulsion Laboratory, Pasadena, CA

16:20 J2-4
HYPER SPECTRAL FFT IMAGER
Deepthi Gorthi*[1], David DeBoer[1], Jack Hickish[1], Aaron Parsons[1], Kathryn Rosie[2], Dan Werthimer[1]
[1]*Astronomy, University of California, Berkeley, Berkeley, CA*
[2]*Square Kilometre Array, Cape Town, SOUTH AFRICA*

16:40 J2-5
THE BREAKTHROUGH LISTEN SEARCH FOR INTELLIGENT LIFE: 1.1-1.9 GHZ OBSERVATIONS OF 692 NEARBY STARS
Jesus E. Enriquez*[1,2], Andrew Siemion[1,2], Griffin Foster[1,3], Vishal Gajjar[1], Greg Hellbourg[1], Jack Hickish[1], Howard Isaacson[1], Danny C. Price[1,4], Steve Croft[1], David DeBoer[1], Matt Lebofsky[1], David MacMahon[1], Dan Werthimer[1]
[1]*University of California, Berkeley, Berkeley, CA*
[2]*Radboud University Nijmegen, Nijmegen, NETHERLANDS*
[3]*University of Oxford, Oxford, UNITED KINGDOM*
[4]*Swinburne University, Melbourne, AUSTRIA*

17:00 J2-6
PROGRESS ON HIRAX, THE HYDROGEN INTENSITY AND REAL-TIME ANALYSIS EXPERIMENT
Emily R. Kuhn*
Physics, Yale University, New Haven, CT

Session K2: Interaction of Electromagnetic Waves with Biological Systems
Room 150
Session Co-Chairs: Tyler Bowman, *University of Arkansas*; Charles Baylis, *Baylor University*

13:20 K2-1
EFFECTS DUE TO EXPOSURE OF BIOLOGICAL SYSTEMS TO LOW FREQUENCY AND HIGH FREQUENCY ELECTROMAGNETIC FIELDS
Sahithi Kandala*
Electrical Engineering, University of Colorado Boulder, Boulder, CO

13:40 K2-2
EFFECT OF A LOW INTENSITY STATIC MAGNETIC FIELD ON DIFFERENT BIOLOGICAL PARAMETERS THAT CHARACTERIZE THE CELLULAR STRESS
Hakki Gurhan*, Rodolfo Bruzon, Yanyu Xiong, Frank Barnes
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

14:00 K2-3
DIELECTRIC PROPERTIES OF HONEY BEE BODY TISSUE FOR INSECT TRACKING APPLICATIONS
Omar Alzaabi*[1], Julio Urbina[1], James K. Breakall[1], Michael Lanagan[2]
[1]*Electrical Engineering, Pennsylvania State University, University Park, PA*
[2]*Engineering Science and Mechanics, Pennsylvania State University, University Park, PA*

Commission Business Meetings

17:00	Commission E	Room 135
17:00	Commission F	Room 155
18:00	Commission A	Room 105
18:00	Commission C	Room 150
18:00	Commission J	Room 265

THURSDAY EVENING, 4 January 2018

The Reception will be held in the lobby of the Engineering Center (ECCR) from 18:30 to 21:00. All registrants are welcome to attend the Reception. Guests are also welcome to attend, as long as the registrants have indicated on their registration form that they are bringing a guest. Beer & wine are included.

FRIDAY MORNING, 5 January 2018

Plenary Session
Mathematics Auditorium (Math 100)

Ernest K. Smith USNC-URSI Student Paper Competition

Chair: Erdem Topsakal, *Virginia Commonwealth University*

8:20 Announcements

8:30 Rules and Guidelines of the Competition

8:40 Student Paper Presentations

9:40 Break

Meeting Highlight Plenary Talks:

(1) The Wonderful World of Waves in the Near Earth Environment

(2) Radio Navigation Systems - New Challenges and Opportunities

Co-Chairs: Attila Komjathy, *Jet Propulsion Laboratory;*
Robb Moore, *University of Florida*

10:00 P1-1
THE WONDERFUL WORLD OF WAVES IN THE NEAR EARTH ENVIRONMENT
Paul A. Bernhardt *
Plasma Physics Division, Naval Research Laboratory

10:50 P1-2
RADIO NAVIGATION SYSTEMS - NEW CHALLENGES AND OPPORTUNITIES
Jade Morton*
Smead Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO

11:40 Awards Ceremony for Student Paper Competition

12:00 Lunch for All Students, USNC Officers and Commission Chairs
Atrium of Koelbel - Business School

FRIDAY AFTERNOON, 5 January 2018

Session B8: Advanced Analysis, Design & Applications of Waveguiding Structures
(Special Session)
Room 1B40
Session Co-Chairs: Michael Havrilla, *Air Force Institute of Technology*;
Edward Rothwell, *Michigan State University*

13:20 B8-1
PARTIAL OVERLAY TECHNIQUE FOR THE WAVEGUIDE CHARACTERIZATION OF CONDUCTOR-BACKED ABSORBERS
Edward J. Rothwell*
Electrical and Computer Engineering, Michigan State University, East Lansing, MI

13:40 B8-2
BIANISOTROPIC SCALAR POTENTIAL FORMULATION WITH BIASED GRAPHENE LAYER
Michael J. Havrilla*
Air Force Institute of Technology, Wright-Patterson AFB, OH

14:00 B8-3
SCATTERING BY CYLINDRICAL POSTS OF VARIOUS CROSS SECTIONS LOCATED INSIDE A PARALLEL-PLATE WAVEGUIDE
Akshaj Arora, Marco D. Poort*, Piergiorgio L. E. Uslenghi
University of Illinois at Chicago, Chicago, IL

14:20 B8-4
A COMPARISON OF UN-ROTATED UNIAXIAL AND ROTATED UNIAXIAL PARALLEL PLATE GREEN'S FUNCTIONS
Alexander G. Knisely*, Michael J. Havrilla
Electrical and Computer Engineering, Air Force Institute of Technology (AFIT), Wright-Patterson AFB, OH

14:40 B8-5
ANALYSIS OF PERIODIC WAVEGUIDES IN LAYERED MEDIA
David R. Jackson*[1], Donald R. Wilton[1], Dawei Li[2], Wiliam A. Johnson[3]
[1]*Electrical and Computer Engineering, University of Houston, Houston, TX*
[2]*Synopsys Inc., Mountain View, CA*
[3]*Consultant, Albuquerque, NM*

15:00 Break

15:20 B8-6
MICROWAVE MICROFLUIDICS
Nathan D. Orloff*, James Booth, Christian Long
NIST, Boulder, CO

15:40 B8-7
COMMUTATED MULTIPATH NETWORKS: MINIATURIZED NON-RECIPROCAL DELAY LINES WITH BROAD BANDWIDTH AND GIANT PHASE VELOCITY
Mykhailo Tymchenko*, Dimitrios Sounas, Andrea Alu
Electrical and Computer Engineering, University of Texas at Austin, Austin, TX

16:00 B8-8
NEW PARADIGM IN COHERENT RADIATING OSCILLATORS BASED ON WAVEGUIDES WITH EXCEPTIONAL POINTS OF DEGENERACY
Mohamed Othman*, Filippo Capolino
Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA

16:20 B8-9
PHOTONIC TOPOLOGICAL INSULATOR: CREATION OF A SPONTANEOUS LATERAL ATOMIC RECOIL FORCE
George W. Hanson*[1], Mario Silveirinha[2], Mauro Antezza[3], Ali Hassani Gangaraj[4], Frencesco Monticone[4]
[1]*Electrical Engineering, University of Wisconsin Milwaukee, Milwaukee, WI*
[2]*Telecommunications, Instituto Superior Tecnico, Lisbon, PORTUGAL*
[3]*Physics, Universitity of Montpellier, Montpellier, FRANCE*
[4]*Electrical Engineering, Cornell University, Ithica, NY*

16:40 B8-10
DRESSED STATE APPROACH TO QUANTUM ELECTROMAGNETICS
Aiyin Liu*[1], Weng C. Chew[2]
[1]*ECE, University of Illinois at Urbana-Champaign, Urbana, IL*
[2]*ECE, Purdue university, West Lafayette, IN*

Session B9: 3D Printed Antennas
(Special Session)
Room 200
Session Co-Chairs: Jacob Adams, *North Carolina State University*; Hao Xin, *University of Arizona*

13:20 B9-1
ADDITIVE MANUFACTURING OF LUNEBURG LENS ANTENNAS USING SPACE-FILLING CURVES AND FUSED FILAMENT FABRICATION
Zachary Larimore*, Sarah Jensen, Austin Good, Mark Mirotznik
Electrical and Computer Engineering, University of Delaware, Newark, DE

13:40 B9-2
MULTIFUNCTIONAL GRADED DIELECTRICS FABRICATED USING DRY POWDER PRINTING
Austin J. Good*[1], David Roper[2], Brandon Good[2], Shridhar Yarlagadda[3]
[1]*Electrical Engineering, University of Delaware, Newark, DE*
[2]*Carderock Division, Naval Surface Warfare Center, Bethesda, MD*
[3]*Center for Composite Materials, University of Delaware, Newark, DE*

14:00 B9-3
LIQUID METAL 3D PRINTED MICROFLUIDIC CHANNEL RECONFIGURABLE PATCH ANTENNA WITH SWITCHABLE SLOTS
Lingnan Song*, Wuran Gao, Chi On Chui, Yahya Rahmat-Samii
Electrical and Computer Engineering, University of California, Los Angeles, Los Angeles, CA

14:20 B9-4
3D PRINTED MONOLITHIC W-BAND SLOTTED WAVEGUIDE ARRAY ANTENNA
Adnan Kantemur*, Yashika Sharma, Jinpil Tak, Hao Xin
ECE, University of Arizona, Tucson, AZ

14:40 B9-5
ON THE USE OF 3D PRINTING TECHNOLOGY FOR ELECTRICALLY SMALL ANTENNAS
Myeongjun Kong, Geonyeong Shin, Su-Hyeon Lee, Ick-Jae Yoon*
Electrical Engineering, Chungnam National University, Daejeon, SOUTH KOREA

15:00 Break

15:20 B9-6
3D PRINTED ANTENNAS: ENABLING COMPLEX ANTENNA STRUCTURE
Junyu Shen*, Morteza Abbasi, David S. Ricketts
Electrical and Computer Engineering, North Carolina State University, Raleigh, NC

15:40 B9-7
LIQUID METAL PATCH ARRAYS WITH INTEGRATED FEEDING NETWORK AND 3D TRANSITIONS
Vivek Bharambe*[1], Dishit P. Parekh[2], Collin Ladd[2], Michael D. Dickey[2], Jacob J. Adams[1]
[1]*Electrical and Computer Engineering, North Carolina State University, Raleigh, NC*
[2]*Chemical and Biomolecular Engineering, North Carolina State University, Raleigh, NC*

16:00 B9-8
X-BAND CONFORMAL ANTENNA FABRICATION USING DIRECT DIGITAL MANUFACTURING
Merve Kacar*[1], Casey Perkowski[2], Paul Deffenbaugh[2], Kenneth Church[2], Thomas Weller[1], Gokhan Mumcu[1]
[1]*Electrical Engineering, University of South Florida, Tampa, FL*
[2]*Sciperio, Orlando, FL*

16:20 B9-9
STRUCTURALLY EMBEDDED VASCULAR ANTENNAS (SEVA) IN BOTH MULTI-LAYER AND COMPLEX CURVED COMPOSITES
Gregory H. Huff*[1], Amrita Bal[1], Darren J. Hartl[1], Jeffery W. Baur W. Baur[2], Geoffrey J. Frank[2,3], Robyn Bradford Bradford[2,4], David Phillips Phillips[4], Thao Gibson Gibson[4], Daniel R. Rapking[4]
[1]*Texas A & M University, College Station, TX*
[2]*Air Force Research Lab, WBAFB, OH*
[3]*Universal Technology Corporation, Beavercreek, OH*
[4]*University of Dayton Research Institute, Dayton, OH*

Session B10: Nonmagnetic and Nonreciprocal Devices
Room 150
Session Co-Chairs: Andrea Alu, *University of Texas at Austin*; Yuanxun Wang, *University of California, Los Angeles*

13:20 B10-1
NON-RECIPROCAL OPTICAL MANIPULATION USING DYNAMIC MODULATION
Yu Shi*[1], Momchil Minkov[1], Qian Lin[2], Shanhui Fan[1]
[1]*Electrical Engineering, Stanford University, Stanford, CA*
[2]*Applied Physics, Stanford University, Stanford, CA*

13:40 B10-2
MAGNETLESS NONRECIPROCAL DEVICES BASED ON ANGULAR MOMENTUM BIASING
Dimitrios Sounas*, Ahmed Kord, Andrea Alu
The University of Texas at Austin, Austin, TX

14:00 B10-3
MAGNETIC-FREE RF CIRCULATORS USING MEMS RESONATORS
Sunil A. Bhave*
Purdue University, West Lafayette, IN

14:20 B10-4
A4-4 **TIME** VARYING NON-RECIPROCAL SYSTEMS: A TRUE PATH TO OUTPERFORM MAGNETIC NONRECIPROCAL DEVICES
Songbin Gong*
University of Illinois at Urbana Champaign, Urbana, IL

14:40 B10-5
NONRECIPROCAL EXPONENTIAL AMPLIFICATION IN TIME-VARYING TRANSMISSION LINE (TVTL)
Xiating Zou*, Qianteng Wu, Yuanxun E. Wang
Electrical and Computer Engineering, University of California, Los Angeles, Los Angeles, CA

15:00 Break

15:20 B10-6
MAGNETIC-FREE RADIO FREQUENCY CIRCULATOR BASED ON SPATIOTEMPORAL COMMUTATION OF MEMS RESONATORS
Yao Yu[1], Ahmed Kord[2], Dimitrios Sounas[2], Zhenyun Qian[1], Giuseppe Michetti[1], Andrea Alu[2], Matteo Rinaldi*[1]
[1]*Northeastern University, Boston, MA*
[2]*University of Texas at Austin, Austin, TX*

15:40 B10-7
MAGNETLESS NON-RECIPROCAL COMPONENTS BASED ON SPATIO-TEMPORAL CONDUCTIVITY-MODULATION
Aravind Nagulu, Negar Resikarimian, Tolga Dinc, Harish Krishnaswamy*
Electrical Engineering, Columbia University, New York, NY

Session CDE1: Spectrum Issues, Developments, and Solutions
(Special Session)
Room 135
Session Co-Chairs: Charles Baylis, *Baylor University*; Eric Mokole, *The MITRE Corporation*; Zoya Popovic, *University of Colorado Boulder*

13:20 CDE1-1
SUMMARY OF RECENT RADAR SPECTRUM ACTIVITIES
Eric L. Mokole[1], Lawrence Cohen*[2]
[1]*Signal Proc & Comm Analysis / Elec Sys & Tech, The MITRE Corporation, McLean, VA*
[2]*Radar Division, US Naval Research Laboratory, Washington, DC*

13:40 CDE1-2
SUGGESTED R&D AREAS FOR RADAR-COMMUNICATION CO-EXISTENCE AND CO-DESIGN
Eric L. Mokole*[1], Lawrence Cohen[2]
[1]*Signal Proc & Comm Analysis / Elec Sys & Tech, The MITRE Corporation, McLean, VA*
[2]*Radar Division, US Naval Research Laboratory, Washington, DC*

14:00 CDE1-3
ADAPTIVE AND RECONFIGURABLE RADAR FOR OPTIMUM SHARING
Charles Baylis*[1], Dimitrios Peroulis[2]
[1]*Baylor University, Waco, TX*
[2]*Purdue University, West Lafayette, IN*

14:20 CDE1-4
MULTI-DIMENSIONAL COEXISTENCE: EXTENDING THE CONCEPT OF THE SPECTRAL MASK TO INCLUDE TRANSMITTER TRANSMISSION PATTERN FOR SPECTRUM SHARING
Austin S. Egbert*[1], Casey Latham[1], Pedro Rodriguez-Garcia[1], Charles Baylis[1], Lawrence Cohen[2], Robert J. Marks[1]
[1]*Electrical & Computer Engineering, Baylor University, Waco, TX*
[2]*Naval Research Laboratory, Washington, DC*

14:40 CDE1-5
FREQUENCY-AGILE POWER AMPLIFIER MATCHING NETWORK RECONFIGURATION USING A HYBRID REAL-TIME SEARCH
Christopher D. Kappelmann*[1], Lucilia Lamers[1], Zachary Hays[1], Sarvin Rezayat[1], Charles Baylis[1], Robert J. Marks[1], Ed Viveiros[2], Mohammad Abu Khater[3], Abbas Semnani[3], Dimitrios Peroulis[3]
[1]*Baylor University, Waco TX*
[2]*Army Research Laboratory, Adelphi MD*
[3]*Purdue University, West Lafayette IN*

15:00 Break

15:20 CDE1-6
COEXISTENCE OF LTE AND RADAR SYSTEM: METHODOLOGY AND ASSESSMENT OF RADAR RECEIVERS
Darren McCarthy*
Aerospace & Defense Technical Marketing, Rohde & Schwarz America, Beaverton, OR

15:40 CDE1-7
ON THE SUSCEPTIBILITY OF CODED OFDM TO INTERFERENCE: A SIMULATION STUDY
Jason B. Coder*, Yao Ma
Communications Technology Laboratory, National Institute of Standards and Technology, Boulder, CO

16:00 CDE1-8
ON THE IMPACTS OF IN-BAND LTE EMISSIONS
Aziz Kord*, Jason B. Coder
Communications Technology Laboratory, National Institute of Standards and Technology, Boulder, CO

16:20 CDE1-9
UNMANNED AERIAL VEHICULAR ANTENNA RECEPTION TESTER FOR SPECTRUM UTILIZATION
Conor J. Ferguson*, Aaron D. Shepard, Austin D. Ratcliffe, Dylan J. Neal, Dylan R. Boyd, Mehmet Kurum
Mississippi State University, Mississippi State, MS

16:40 CDE1-10
A METHOD FOR TRIGGERING DISPARATE TYPES OF SCIENTIFIC INSTRUMENTATION AND LTE NETWORK EQUIPMENT
Noel C. Hess*, Aziz Kord, Jason Coder, Ryan Jacobs
Communications Technology Laboratory, National Institute of Standards and Technology, Boulder, CO

Session D1: Active Microwave Circuits from RF to THz
Room 1B51
Session Co-Chairs: Leonardo Ranzani, *Raytheon BBN Technologies*; Jonathan Chisum, *University of Notre Dame*

13:20 D1-1
LOW-INTERFERENCE HARMONIC TRANSPONDER SENSORS USING GRAPHENE ELECTRONICS
Liang Zhu*, Pai-Yen Chen
Electrical and Computer Engineering, Wayne State University, Detroit, MI

13:40 D1-2
NONLINEAR CHARACTERIZATION OF PHASE-CHANGE SWITCHES FOR RECONFIGURABLE MILLIMETER-WAVE FRONT-ENDS
N. J. Estes, Jonathan D. Chisum*
Electrical Engineering, University of Notre Dame, Notre Dame, IN

14:00 D1-3
ASSESSMENT OF VO2 PHASE-CHANGE MATERIALS FOR PROGRAMMABLE MICROWAVE CIRCUITS
David A. Connelly, Jonathan D. Chisum*
Electrical Engineering, University of Notre Dame, South Bend, IN

14:20 D1-4
REAL-TIME TRANSISTOR STABILITY MEASUREMENTS USING THE ACCELERATION OF THE GAIN FOR THE NEXT GENERATION RADAR
Lucilia R. Hays*[1], Charles Baylis[1], Robert Marks[1], Edward Viveiros[2]
[1]Baylor University, Waco, TX
[2]Army Research Laboratory, Adelphi, MD

14:40 D1-5
DESIGN OF UNGROUNDED CPW GAN-ON-SI CIRCUIT COMPONENTS FOR HIGH-EFFICIENCY POWER AMPLIFIER MMICS
Philip Zurek*, Myles Foreman, Zoya Popovic
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

15:00 Break

15:20 D1-6
FIELD-PROGRAMMABLE JOSEPHSON AMPLIFIER
Leonardo M. Ranzani*[1], Florent Lecocq[2], Gabe A. Peterson[2], Katarina Cicak[2], Raymond W. Simmonds[2], John D. Teufel[2], Jose Aumentado[2]
[1]Raytheon BBN Technologies, Cambridge, MA
[2]National Institute of Standards and Technology, Boulder, CO

15:40 D1-7
W-BAND MMIC POWER AMPLIFIERS USING 90-NM GAN-ON-SIC TECHNOLOGY
Mauricio E. Pinto*, Zoya Popovic
ECEE, University of Colorado Boulder, Boulder, CO

16:00 D1-8
A 4K-PIXEL SINGLE-BIT, SINGLE-PIXEL COMPRESSIVE SENSING CAMERA FOR THZ IMAGING APPLICATIONS
Syed An Nazmus Saqueb*, Kubilay Sertel
The Ohio State University, Columbus, OH

16:20 D1-9
FIRST AND HIGHER-ORDER PT-SYMMETRIC TELEMETRIC SENSING SYSTEMS
M. Sakhdari[1], P.-Y. Chen[1]
[1]Electrical and Computer Engineering, Wayne State University, Detroit, MI

16:40 D1-10
RF HARVESTING CIRCUIT WITH APPLICATION IN WIRELESS SENSOR NODES
S. Khaledain[1], B. Smida[1]
[1]Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

Session F6: Remote Sensing from Small Satellites II (Special Session)
Room 155
Session Co-Chairs: Albin Gasiewski, *University of Colorado Boulder*; Steven Reising, *Colorado State University*

13:20 F6-1
RAINCUBE, A KA-BAND PRECIPITATION RADAR MISSION LAUNCHING IN 2018
Eva Peral*[1], Shannon Statham[1], Simone Tanelli[1], Doug Price[1], Jonathan Sauder[1], Nacer Chahat[1], Travis Imken[1], Austin Williams[2]
[1]Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA
[2]Tyvak Nano-Satellite Systems, Inc, Irvine, CA

13:40 F6-2
ROLE OF GPSRO CALIBRATION IN AN OPERATIONAL CAPACITY FOR MIRATA
Bobby Holden*[1], Kerri Cahoy[1], Greg Allan[1], Erin Main[1], Thomas Murphy[1], William Blackwell[2], Dan Cousins[2], Michael Shields[2]
[1]Massachusetts Institute of Technology, Boston, MA
[2]MIT Lincoln Laboratory, Lexington, MA

14:00 F6-3
ATOMMS: A CM AND MM WAVELENGTH SATELLITE TO SATELLITE OCCULTATION SYSTEM FOR WEATHER & CLIMATE
Emil R. Kursinski*[1], Dale Ward[2], Angel Otarola[2]
[1]*Space Sciences and Engineering, Golden, CO*
[2]*Atmospheric Sciences, University of Arizona, Tucson, AZ*

14:20 F6-4
IN-SITU IONOSPHERE MEASUREMENTS FROM THE COMPACT IONOSPHERE PROBE ON INSPIRESAT-1
Amal Chandran*[1,2], Loren Chang[3], Priyadarshan Hari[4], Kaustubh Kandi[4], Duann Yi[3], William Evonosky[1]
[1]*Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO*
[2]*School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, SINGAPORE*
[3]*Graduate Institute for Space Science, National Central University, Jongli, Taiwan, TAIWAN*
[4]*Avionics, Indian Institute of Space Science and Technology, Trivandrum, INDIA*

Session F7: RF Propagation Modeling and Measurements
Room 155
Session Co-Chairs: Michael Newkirk, *JHU/APL*; Nicholas DeMinco, *Institute for Telecommunication Sciences*

15:20 F7-1
USING SIX SIGMA MODELING TECHNIQUES TO VALIDATE AND GENERALIZE IN-BUILDING PATH LOSS MODELS
Mark A. McFarland*, Bob Johnk
Telecommunications Theory Division, Institute for Telecommunication Sciences, Boulder, CO

15:40 F7-2
USING STATISTICAL LEARNING TO CLASSIFY SIX IN-BUILDING PROPAGATION ENVIRONMENTS
Mark A. McFarland*, Bob Johnk
Telecommunications Theory Division, Institute for Telecommunication Sciences, Boulder, CO

16:00 F7-3
EXPERIMENTAL STUDY OF DVB MULTIPATH BEHAVIOR
Zhiyan Cui*, Yikun Huang
Electric and Computer Engineer, University of California, Los Angeles, Los Angeles, CA

16:20 F7-4
AN ANALYTICAL STUDY OF THE EFFECT OF PARAMETER VARIATION ON RADIO-WAVE PROPAGATION LOSS
Nicholas N. DeMinco*
Institute for Telecommunication Sciences, Boulder, CO

16:40 F7-5
EXTRACTION OF DOPPLER OBSERVABLES FROM OPEN-LOOP RECORDINGS FOR THE JUNO RADIO SCIENCE INVESTIGATION
Dustin R. Buccino*, Daniel S. Kahan, Oscar Yang, Kamal Oudrhiri
Jet Propulsion Lab, Pasadena, CA

Session G3: Ionospheric Effects of the Solar Eclipse (Special Session)
Room 151
Session Chair: Terry Bullett, *University of Colorado Boulder*

13:20 G3-1
THE GREAT AMERICAN SOLAR ECLIPSE OF AUGUST 21, 2017; UNDERSTANDING THE RESPONSE OF THE IONOSPHERE
Douglas P. Drob*[1], Joseph D. Huba[2], Aaron J. Ridley[3], Gregory D. Earle[4], Lee Kordella[4]
[1]*Space Science Division, U.S. Naval Research Laboratory, Washington, DC*
[2]*Plasma Physics Division, U.S. Naval Research Laboratory, Washington, DC*
[3]*Climate and Space Sciences, The University of Michigan, Ann Arbor, MI*
[4]*Center for Space Science and Engineering Research, VA Polytechnic Institute and State University, Blacksburg, VA*

13:40 G3-2
MODELING AND ANALYSIS OF THE D-REGION RESPONSE TO THE 2017 TOTAL SOLAR ECLIPSE
Wei Xu*[1], Robert A. Marshall[1], Douglas Drob[2], Daniel Marsh[3], Jan Sojka[4], Don Rice[4]
[1]*Colorado Center for Astrodynamics Research, University of Colorado Boulder, Boulder, CO*
[2]*Space Science Division, Naval Research Laboratory, Washington, DC*
[3]*National Center for Atmospheric Research, Boulder, CO*
[4]*Physics, Utah State University, Logan, UT*

14:00 G3-3
SOLAR ECLIPSE EFFECTS ON VLF WAVE PROPAGATION AND LWPC MODELING
James R. Bittle*, Mark Golkowski, Chad Renick
Electrical Engineering, University of Colorado Denver, Denver, CO

14:20 G3-4
E-POP RRI RADIO SCIENCE DURING THE AUGUST 21, 2017 ECLIPSE
Gareth W. Perry*[1], Paul A. Bernhardt[2], Robert A. Farrow[3], H G. James[1], Andrew D. Howarth[1], Andrew W. Yau[1]
[1]*Physics and Astronomy, University of Calgary, Calgary, Alberta, CANADA*
[2]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*
[3]*Unaffiliated*

14:40 G3-5
FIRST-LOOK ANALYSIS OF ECLIPSEMOB CROWDSOURCED DATA COLLECTION
Kiersten C. Kerby-Patel*[1], Jill K. Nelson[2], William C. Liles[3], Laura A. Lukes[2]
[1]*Engineering, Univ. of Mass. Boston, Boston, MA*
[2]*Geroge Mason Univ., Fairfax, VA*
[3]*Independent Consultant, Reston, VA*

15:00 Break

15:20 G3-6
MEASUREMENTS OF THE IMPACT OF THE SOLAR ECLIPSE ON THE IONOSPHERE USING HF WAVES
Paul A. Bernhardt*[1], Joe D. Huba[1], Stan J. Briczinski[1], Carl L. Siefring[1], Kevin Sterne[2], Mike Ruohoniemi[2], Simon Shepherd[3], Ethan Miller[4], Gareth Perry[5], Robert Farrow[6]
[1]*NRL, Washington, DC*
[2]*Electical and Computer Eng., Virginia Tech, Blacksburg, VA*
[3]*Engineering, Dartmouth, Hanover, MA*
[4]*Applied Physics Lab, Johns Hopkins University, Laurel, MD*
[5]*Physics and Astronomy, University of Calgary, Calgary, Alberta, CANADA*
[6]*Amateur Radio, Ammon, ID*

15:40 G3-7
OBLIQUE AND VERTICAL INCIDENCE SOUNDING OF THE IONOSPHERE DURING THE 2017 SOLAR ECLIPSE
Terence W. Bullett*, Justin E. Mabie, Nikolay A. Zabotin
University of Colorado Boulder, Boulder, CO

16:00 G3-8
DYNASONDE ANALYSIS OF THE LUSK, WI - BOULDER, CO AUGUST 2017 TOTAL SOLAR ECLIPSE EXPERIMENT DATA
Nikolay Zabotin*[1], Huan Song[1,2], Terence Bullett[3,4], Justin Mabie[3,4]
[1]*ECEE, University of Colorado Boulder, Boulder, CO*
[2]*Wuhan University, Wuhan, CHINA*
[3]*NCEI, NOAA, Boulder, CO*
[4]*CIRES, University of Colorado Boulder, Boulder, CO*

16:20 G3-9
MEASURING WAVES GENERATED BY SOLAR TERMINATOR WITH DYNASONDE TECHNIQUES
Nikolay Zabotin*[1], Huan Song[1,2], Terence Bullett[3]
[1]*ECEE, University of Colorado Boulder, Boulder, CO*
[2]*Wuhan University, Wuhan, CHINA*
[3]*NCEI, NOAA, Boulder, CO*

Session H4: Waves and Turbulence in Space and Laboratory Plasmas I
(Special Session)
Room 245
Session Co-Chairs: Stephen Vincena, *University of California, Los Angeles*;
Bill Amatucci, *Naval Research Laboratory*

13:20
H4-1 **RADIO** AND PLASMA WAVE OBSERVATIONS AT SATURN AND JUPITER
William S. Kurth*[1], D A. Gurnett[1], G B. Hospodarsky[1], S Ye[1], J D. Menietti[1], A M. Persoon[1], A Sulaiman[1], M Imai[1], S Tetrick[1], P Zarka[2], L Lamy[2], B Cecconi[2], C Louis[2], A Lecacheux[2], W M. Farrell[3], G Fischer[4], J E. Wahlund[5], M Morooka[5], L Hadid[5], S J. Bolton[6], J E. P. Connerney[3], S M. Levin[7], P Valek[6], F Allegrini[6], P Louarn[8], B H. Mauk[9]
[1]*University of Iowa, Iowa City, IA*
[2]*Observatoire de Paris, Meudon, FRANCE*
[3]*NASA/Goddard Space Flight Center, Greenbelt, MD*
[4]*Austrian Academy of Sciences, Graz, AUSTRIA*
[5]*IRF-U, Uppsala, SWEDEN*
[6]*Southwest Research Institute, San Antonio, TX*
[7]*Jet Propulsion Laboratory, Pasadena, CA*
[8]*IRAP, Toulouse, FRANCE*
[9]*Applied Physics Lab, Johns Hopkins University, Laurel, MD*

13:40 H4-2
MMS ANALYSIS OF EMIC WAVES IN THE MAGNETOSHEATH
Scott A. Boardsen*[1,2], Adolfo F. Vinas[2], Frederick D. Wilder[3], Alex Glocer[2], William R. Paterson[2], Alex C. Barrie[2], Dan J. Gershman[2], Barbara L. Giles[2], Thomas E. Moore[2], D. A. Roberts[2], Christopher T. Russell[4]
[1]*Goddard Planetary and Heliophysics Institute, UMBC, Greenbelt, MD*
[2]*Heliophysics Division, NASA/GSFC, Greenbelt, MD*
[3]*Laboratory of Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO*
[4]*Earth, Planetary and Space Sciences, University of California, Los Angeles, Los Angeles, CA*

14:00 H4-3
USING FIELD-PARTICLE CORRELATIONS TO DIAGNOSE PARTICLE ENERGIZATION BY ELECTROMAGNETIC WAVES IN SPACE AND LABORATORY PLASMAS
Gregory G. Howes*
Physics and Astronomy, University of Iowa, Iowa City, IA

14:20 H4-4
LOW-ALTITUDE ION HEATING, BBELF WAVES, AND DOWNFLOWING IONS IN THE RETURN CURRENT REGION
Yangyang Shen*[1], David J. Knudsen[1], Johnathan K. Burchill[1], Andrew Howarth[1], Andrew Yau[1], Gareth Perry[1], Gordon James[1], David Miles[2], Leroy Cogger[1]
[1]*University of Calgary, Calgary, AB, CANADA*
[2]*University of Iowa, Iowa City, IA*

14:40 H4-5
INFLUENCE OF THE INHOMOGENEOUS STRUCTURE OF THE IONOSPHERIC PLASMA ON THE ULF NOISE SPECTRA
Dmitry S. Kotik*, Elena N. Ermakova, Alexander V. Pershin, Alexander V. Ryabov
Radiophysical Research Institute,, Nizhny Novgorod State University, Nizhny Novgorod, RUSSIAN FEDERATION

15:00 Break

15:20 H4-6
FORMATION OF ALFVENIC DOUBLE LAYERS AND AURORAL PARTICLE ACCELERATION
Yan Song*, Robert L. Lysak
University of Minnesota, Minneapolis, MN

15:40 H4-7
A STUDY OF AURORAL ELECTRON ACCELERATION BY ALFVEN WAVES IN THE LAPD
J. W. R. Schroeder*[1], G. G. Howes[1], F. Skiff[1], C. A. Kletzing[1], T. A. Carter[2], S. Vincena[2], S. Dorfman[2]
[1]Physics and Astronomy, University of Iowa, Iowa City, IA
[2]Physics and Astronomy, University of California, Los Angeles, Los Angeles, CA

16:00 H4-8
IONOSPHERIC FEEDBACK INSTABILITY IN THE ALFVEN RESONATOR AT HIGH LATITUDES: 3D MODELING
Beket Tulegenov*, Anatoly V. Streltsov
Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL

16:20 H4-9
SUPPRESSION OF THE IONOSPHERIC FEEDBACK INSTABILITY BY ION FLOW VELOCITY SHEAR IN THE E-LAYER
Dmytro Sydorenko*, Robert Rankin
Physics, University of Alberta, Edmonton, Alberta, CANADA

16:40 H4-10
LABORATORY STUDIES ON THE NONLINEAR INTERACTIONS OF KINK-UNSTABLE FLUX ROPES AND SHEAR ALFVEN WAVES
Stephen Vincena*, Shreekrishna K. Tripathi, Walter Gekelman, Timothy DeHaas, Patrick Pribyl
Physics and Astronomy, UCLA, Los Angeles, CA

Session J3: ALMA 2030
(Special Session)
Room 265
Session Co-Chairs: Henry Wootten, *NRAO/University of Virginia*; Arielle Moullet, *NRAO*

13:20 J3-1
SUSTAINING ALMA SCIENCE THROUGH 2030 A NORTH AMERICAN PERSPECTIVE
Henry A. Wootten*
NRAO/University of Virginia, Charlottesville, Virginia

13:40 J3-2
UPGRADE TO THE 64-ANTENNA ALMA CORRELATOR
Rodrigo Amestica*[1], Richard J. Lacasse[1], Raymond P. Escoffier[2], Joseph H. Greenberg[1], Alejandro F. Saez[1], Alain Baudry[3], John C. Webber[2]
[1]National Radio Astronomy Observatory, Charlottesville, VA
[2]National Radio Astronomy Observatory (retired), Charlottesville, VA
[3]Laboratoire d?Astrophysique de Bordeaux, OASU, Universite de Bordeaux, Bordeaux, Nouvelle-Aquitaine, FRANCE

14:00 J3-3
THE NEXT GENERATION ALMA CORRELATOR
Jonathan Weintroub*
Submillimeter Array, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA

14:20 J3-4
THE ALMA PHASING PROJECT PHASE 2: EXTENDING AND ENHANCING THE VLBI SCIENCE CAPABILITIES OF ALMA
Lynn D. Matthews*[1], Geoffrey B. Crew[1], Michael H. Hecht[1], Sheperd S. Doeleman[2], Vincent L. Fish[1], Walter Alef[3], Richard Lacasse[4], Ivan Marti-Vidal[5], Neil M. Nagar[6], Helge Rottmann[3], Alan L. Roy[3], Alejandro F. Saez[7]
[1]Haystack Observatory, Massachusetts Institute of Technology, Westford, MA
[2]Harvard-Smithsonian Center for Astrophysics, Cambridge, MA
[3]Max-Planck-Institut fur Radioastronomie, Bonn, GERMANY
[4]NRAO Technology Center, National Radio Astronomy Observatory, Charlottesville, VA
[5]Onsala Space Observatory, Chalmers University of Technology, Onsala, SWEDEN
[6]Universidad de Concepcion, Concepcion, CHILE
[7]Joint ALMA Observatory, Santiago, CHILE

14:40 J3-5
THE ALMA BAND 1 RECEIVER: BUILDING THE LOWER FREQUENCY END OF ALMA
Oscar Morata*
Academia Sinica Institute of Astronomy and Astrophysics (ASIAA), Taipei, TAIWAN

15:00 Break

15:20 J3-6
SUPERCONDUCTING PARAMETRIC AMPLIFIERS: THE NEXT BIG THING IN (SUB)MILLIMETER-WAVE RECEIVERS
Omid Noroozian*[1], Anthony R. Kerr[1], Jeffrey G. Mangum[1], Peter K. Day[2], Henry G. LeDuc[2], David P. Woody[3], Jonas Zmuidzinas[3], Arthur W. Lichtenberger[4], Michael E. Cyberey[4], Robert M. Weikle[4]
[1]National Radio Astronomy Observatory, Charlottesville, VA
[2]Jet Propulsion Laboratory, NASA, Pasadena, CA
[3]California Institute of Technology, Charlottesville, VA
[4]University of Virginia, Charlottesville, VA

15:40 J3-7
PLANS FOR AN ALMA BAND-6 RECEIVER UPGRADE
Anthony R. Kerr[1], Omid Noroozian*[1], Sivasankaran Srikanth[1], Arthur W. Lichtenberger[2], Joel Schleeh[3], Neal R. Erickson[4]
[1]Central Development Laboratory, NRAO, Charlottesville, VA
[2]EECS, University of Virginia, Charlottesville, VA
[3]Low Noise Factory, Gothenburg, SWEDEN
[4]Astronomy, University of Massachusetts, Amherst, MA

16:00 J3-8
DISCOVERY FROM HYPERSPECTRAL ALMA IMAGERY WITH NEUROSCOPE
Erzsébet Merényi*[1,2], Andrea Isella[3], Joshua Taylor[1]
[1]*Statistics, Rice University, Houston, TX*
[2]*Electrical and Computer Engineering, Rice University, Houston, TX*
[3]*Physics and Astronomy, Rice University, Houston, TX*

16:20 J3-9
FULL-MUELLER MOSAIC IMAGING WITH ALMA
Sanjay Bhatnagar*
National Radio Astronomy Observatory, Socorro, NM

16:40 J3-10
THE SPECTRUM LANDSCAPE: PROSPECTS FOR RADIO ASTRONOMY
Harvey S. Liszt*
National Radio Astronomy Observatory, Charlottesville, VA

Session K3: Imaging and Monitoring in Medical Applications
Room 105
Session Co-Chairs: Branislav Notaros, *Colorado State University*; Farnaz Foroughian, *The University of Tennessee*

13:20 K3-1
CLASSIFICATION OF HUMAN HEAD MOTION PATTERNS USING TRANSMISSION COEFFICIENT OF ON-NECK ANTENNAS
Drew G. Bresnahan*[1], Yang Li[1], Youngwook Kim[2]
[1]*Electrical and Computer Engineering, Baylor University, Waco, TX*
[2]*Electrical and Computer Engineering, California State University, Fresno, Fresno, CA*

13:40 K3-2
THZ IMAGING COMPARISON OF XENOGRAFT AND TRANSGENIC MURINE BREAST CANCER TUMORS
Tyler Bowman*[1], Narasimhan Rajaram[2], Keith Bailey[3], Magda El-Shenawee[1]
[1]*Electrical Engineering, University of Arkansas, Fayetteville, AR*
[2]*Biomedical Engineering, University of Arkansas, Fayetteville, AR*
[3]*Oklahoma Animal Disease Diagnostic Laboratory, Oklahoma State University, Stillwater, OK*

14:00 K3-3
USING SLOTTED WAVEGUIDES FOR RF EXCITATION IN MAGNETIC RESONANCE IMAGING AT 7 T
Pranav S. Athalye*[1], Milan M. Ilic[1,2], Branislav M. Notaros[1]
[1]*Electrical & Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*School of Electrical Engineering, University of Belgrade, Belgrade, Serbia, YUGOSLAVIA*

14:20 K3-4
THE WAVELENGTH SELECTION FOR CALIBRATING NON-CONTACT DETECTION OF BLOOD OXYGEN SATURATION USING IMAGING PHOTOPLETHYSMOGRAPHY
Farnaz Foroughian*[1], Chandler J. Bauder[1], Paul T. Theilmann[2], Aly E. Fathy[1]
[1]*Electrical Engineering and Computer Science, The University of Tennessee, Knoxville, TN*
[2]*MaXentric Technologies LLC, San Diego, CA*

Session K4: Therapeutic and Treatment Monitoring Applications
Room 105
Session Co-Chairs: John Stang, *University of Southern California*; Nader Behdad, *University of Wisconsin*

15:20 K4-1
A BALUN-FREE HYBRID HELIX/MONOPOLE ANTENNA FOR MICROWAVE ABLATION
Yahya Mohtashami*, Nader Behdad, Susan C. Hagness
Electrical and Computer Engineering, University of Wisconsin-Madison, Madison, WI

15:40 K4-2
3D MICROWAVE TRACKING OF TREATMENT PROBE IN THERMAL THERAPY
Guanbo Chen, John Stang*, Pratik Shah, Mahta Moghaddam
University of Southern California, Los Angeles, CA

16:00 K4-3
FEASIBILITY STUDY OF INTEGRATED PULSED MICROWAVE ABLATION AND THERMOACOUSTIC MONITORING
James F. Sawicki*, Audrey L. Evans, Hung Luyen, Yahya Mohtashami, Nader Behdad, Susan C. Hagness
Electrical and Computer Engineering, University of Wisconsin-Madison, Madison, WI

16:20 K4-4
DIELECTRIC CHARACTERIZATION OF PORCINE MODEL FOR SUBCUTANEOUS WIRELESS TELEMETRY
Madeline R. Hays*[1], Ryan Green[2], Martin Mangino[3], Erdem Topsakal[2]
[1]*Biomedical Engineering, Virginia Commonwealth University, Richmond, VA*
[2]*Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA*
[3]*Surgery, VCU School of Medicine, Richmond, VA*

Commission Business Meetings

17:00	Commission B	Room 1B40
17:00	Commission G	Room 151
18:00	Commission D	Room 1B51
18:00	Commission H	Room 245
18:00	Commission K	Room 105

Session B11: Numerical Methods
Room 1B40
Session Co-Chairs: Branislav Notaros, *Colorado State University*;
Yahya Rahmat-Samii, *University of California, Los Angeles*

08:20 B11-1
SHAPED-PROFILED AND MATERIAL-ENGINEERED INHOMOGENEOUS LENS ANTENNAS: GO CURVED RAY TRACING AND APERTURE FIELDS
Jordan F. Budhu*, Yahya Rahmat-Samii
University of California, Los Angeles, Los Angeles, CA

08:40 B11-2
EM SIMULATION AND CHARACTERIZATION OF UNDERGROUND MINES USING RAY TRACING, VECTOR PARABOLIC EQUATION, AND HYBRID APPROACHES
Cam Key*[1], Blake Troksa[1], Slobodan Savić[1,2], Milan M. Ilić[1,2], Branislav M. Notaros[1]
[1]Electrical & Computer Engineering, Colorado State University, Fort Collins, CO
[2]School of Electrical Engineering, University of Belgrade, Belgrade, Serbia, YUGOSLAVIA

09:00 B11-3
SEEING THE INVISIBLE: IMAGING HIDDEN FEATURES WITH MULTIPLE-SCATTERING RECONSTRUCTIONS
Mert Hidayetoglu*[1], Wen-Mei Hwu[1], Weng C. Chew[2]
[1]Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL
[2]Electrical and Computer Engineering, Purdue University, West Lafayette, IN

09:20 B11-4
AN UNCONDITIONALLY STABLE TIME-DOMAIN SOLVER UNIFYING ELECTRODYNAMICS AND MICROMAGNETICS
Zhi (Jackie) Yao*, Rustu U. Tok, Yuanxun Ethan Wang
Electrical Engineering, University of California, Los Angeles, Los Angeles, CA

09:40 B11-5
FAST DESIGN OF TERAHERTZ PLASMONIC DEVICES USING UNCONDITIONALLY STABLE FINITE DIFFERENCE TIME-DOMAIN METHODS
Shubhendu Bhardwaj*
Florida International University, Miami, FL

10:00 Break

10:20 B11-6
SPHERICAL FDTD NUMERICAL DISPERSION ANALYSIS
Ravi C. Bollimuntha*[1], Mohammed F. Hadi[1,2], Melinda J. Piket-May[1], Atef Z. Elsherbeni[2]
[1]ECEE, University of Colorado Boulder, Boulder, CO
[2]EE, Colorado School of Mines, Golden, CO

10:40 B11-7
A FINITE VOLUMES-BASED FDTD MATERIAL DISPERSION MODELING
Neeti P. Sonth*[1], Ravi C. Bollimuntha[1], Mohammed F. Hadi[1,2], Melinda J. Piket-May[1], Atef Z. Elsherbeni[2]
[1]ECEE, University of Colorado Boulder, Boulder, CO
[2]Electrical Engineering, Colorado School of Mines, Golden, CO

11:00 B11-8
ELECTRICAL SCIENCES AT SANDIA NATIONAL LABORATORIES
Lorena I. Basilio*, Joseph P. Castro
Sandia National Laboratories, Albuquerque NM

11:20 B11-9
CHARACTERISTIC MODE ANALYSIS OF KNOT WIRE-SCATTERERS
Md Khadimul Islam*[1], Ahmed M. Hassan[1], Fernando Vargas-Lara[2], Jack F. Douglas[2], Edward J. Garboczi[3]
[1]Computer Science and Electrical Engineering, University of Missouri-Kansas City, Kansas City, MO
[2]Materials Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD
[3]Applied Chemicals and Materials Division, National Institute of Standards and Technology, Boulder, CO

Session B12: Microstrip and Printed Devices and Antennas
Room 105
Session Co-Chairs: Sembiam Rengarajan, *California State University*;
Aly Fathy, *University of Tennessee*

08:20 B12-1
ON THE CONDUCTOR LOSS IN MICROSTRIP REFLECTARRAYS
Sembiam R. Rengarajan*[1], Richard E. Hodges[2]
[1]Electrical and Computer Engineering, California State University, Northridge, CA
[2]Jet Propulsion Laboratory, Pasadena, CA

08:40 B12-2 A 360⁰ Scanning Lens Design
Tuan M. Nguyen*, Ozlem Kilic
EECS, The Catholic University of America, Washington DC

09:00 B12-3
A COMPACT FEED NETWORK FOR WIDEBAND CIRCULARLY POLARIZED 2´2 SPIRAL ARRAY ANTENNA FOR GPS APPLICATIONS
Farshid Tamjid*[1], Chris M. Thomas[2], Aly E. Fathy[1]
[1]Electrical Engineering and Computer Science, University of Tennessee Knoxville, Knoxville, TN
[2]MaXentric Technologies LLC, La Jolla, CA

Session B13: Electromagnetic Materials and Devices (Special Session)
Room 135
Session Co-Chairs: Filippo Capolino, *University of California, Irvine*;
Jacob Adams, *North Carolina State University*

08:20 B13-1
PLASMA VARACTOR FOR RECONFIGURABLE RF/ MICROWAVE SYSTEMS
Abbas Semnani*, Sergey O. Macheret, Dimitrios D. Peroulis
Purdue University, West Lafayette, IN

08:40 B13-2
HIGH-POWER MICROWAVE TUNABLE RESISTOR BASED ON LOW-TEMPERATURE PLASMA TECHNOLOGY
Abbas Semnani*, Sergey O. Macheret, Dimitrios Peroulis
Purdue University, West Lafayette, IN

09:00 B13-3
EXPERIMENTALLY CHARACTERIZED 3D MAPS OF CARBON NANOTUBE DISTRIBUTIONS: TESTBEDS FOR ACCURATE ELECTROMAGNETIC MODELING OF NANOCOMPOSITES
Md Khadimul Islam*[1], Spencer On[1], Ahmed M. Hassan[1], Bharath Natarajan[2], Itai Y. Stein[3], Estelle Cohen[3], Brian L. Wardle[3], Renu Sharma[4], J. Alexander Liddle[4], Edward J. Garboczi[5]
[1]*Computer Science and Electrical Engineering, University of Missouri-Kansas City, Kansas City, MO*
[2]*Materials Science and Engineering Division, National Institute of Standards and Technology, Gaithersburg, MD*
[3]*Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, MA*
[4]*Center for Nanoscale Science and Technology, National Institute of Standards and Technology, Gaithersburg, MD*
[5]*Applied Chemicals and Materials Division, National Institute of Standards and Technology, Boulder, CO*

09:20 B13-4
TWO-SCALE CONCEPT FOR FIELD ENHANCEMENT AT OPTICAL FREQUENCY: COMBINATION OF RAYLEIGH ANOMALY AND PLASMONIC RESONANCES
Mahsa Darvishzadeh Varcheie*, Filippo Capolino
Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA

09:40 B13-5
DETECTION AND CHARACTERIZATION OF CHIRAL NANO-SAMPLES USING PHOTO-INDUCED FORCE
Mohammad Kamandi*, Mohammad Albooyeh, Filippo Capolino
Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA

10:00 Break

10:20 B13-6
OVER THE AIR VALIDATION OF AN HF BROADBAND DIRECT ANTENNA MODULATION TRANSMITTER
Kurt R. Schab*, Danyang Huang, Jacob J. Adams
Electrical and Computer Engineering, North Carolina State University, Raleigh, NC

10:40 B13-7
UHF SATCOM ANTENNA USING A MAGNETICALLY LOADED ARTIFICIAL MAGNETIC CONDUCTOR
Katherine J. Duncan[1], Frank A. Vassallo*[2], Daniel T. Bennett[1], Juan C. Correa[3], Thomas P. Ketterl[4], Thomas M. Weller[4]
[1]*ELectrical Engineering and Computer Science, United States Military Academy, West Point, NY*
[2]*TECOMSYS, Clearwater, FL*
[3]*Defense, Baltimore MD*
[4]*EECS, University of South Florida, Tampa, FL*

Session B14: Antennas for Specialized Platforms: SmallSats, UAVs, and UUVs
(Special Session)
Room 105
Session Co-Chairs: Reyhan Baktur, *Utah State University*; David Jackson, *University of Houston*

10:20 B14-1
CONFORMAL INTEGRATED SOLAR PANEL ANTENNAS FOR CUBESATS
Benjamin B. Oborn*, Reyhan Baktur
Electrical and Computer Engineering, Utah State University, Logan UT

10:40 B14-2
DEPLOYABLE MICROWAVE ANTENNA FOR CUBESATS, NANOSATS, AND SMALLSATS
Tristen C. Hohman*
Boulder Environmental Sciences and Technology, Boulder, CO

11:00 B14-3
UMBRELLA REFLECTOR CHARACTERIZATION FOR CUBESATS: ANALYTICAL FORMULATION FOR BORESIGHT GAIN LOSS
Vignesh Manohar*, Yahya Rahmat-Samii
Electrical and Computer Engineering, University of California, Los Angeles, Los Angeles, CA

11:20 B14-4
PLANAR ANTENNAS FOR CIRCULAR POLARIZATION IN A CONSTRAINED SPACE
William O. Coburn*, Seth A. McCormick
RF and Electronics Div., US Army Research Laboratory, Adelphi, MD

11:40 B14-5
DUAL-MODE MICROSTRIP ANTENNAS WITH INCREASED BANDWIDTH
Xinyu Liu*[1], David R. Jackson[1], Ji Chen[1], Murilo H. Seko[2]
[1]*Electrical and Computer Engineering, University of Houston, Houston, TX*
[2]*Electronic Systems Engineering, University of Sao Paulo, Sao Paulo, BRAZIL*

Session D2: Filters and Tunable Microwave Circuits
(Special Session)
Room 1B51
Session Co-Chairs: Dimitra Psychogiou, *University of Colorado Boulder*; Zoya Popovic, *University of Colorado Boulder*

08:20 D2-1
BALANCED MICROWAVE RF FILTERS WITH QUASI-ELLIPTIC-TYPE DIFFERENTIAL-MODE PASSBAND AND MULTI-NOTCH COMMON-MODE SUPPRESSION
Dakotah J. Simpson*, Dimitra Psychogiou
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

08:40 D2-2
QUASI-REFLECTIONLESS BANDPASS FILTERS WITH FLAT IN-BAND GROUP DELAY
Alexander J. Rosner*[1], Roberto Gomez-Garcia[2], Jose-Maria Munoz-Ferreras[2], Dimitra Psychogiou[1]
[1]Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO
[2]Dpt. of Signal Theory and Communications, University of Alcala, Alcala de Henares, Madrid, SPAIN

09:00 D2-3
A 3.5/5.8-GHZ DUAL-BAND EFFICIENCY-OPTIMIZED POWER AMPLIFIER
Allison Y. Duh*, Taylor Barton, Zoya Popovic
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

09:20 D2-4
DIRECT TUNING OF CAVITY POSITION NUMBERS FOR CIRCUIT OPTIMIZATION USING AN EVANESCENT-MODE CAVITY TUNER DESIGNED FOR RECONFIGURABLE RADAR TRANSMISSION
Lucilia R. Hays*[1], Sarvin Rezayat[1], Zachary Hays[1], Austin Egbert[1], Christopher Kappelmann[1], Charles Baylis[1], Robert J. Marks[1], Edward Viveiros[2], Dimitrios Peroulis[3], Mohammad Abu-Khater[3], Abbas Semnani[3]
[1]Electrical and Computer Engineering, Baylor University, Waco, TX
[2]Army Research Laboratory, Adelphi, MD
[3]Electrical and Computer Engineering, Purdue University, West Lafayette, IN

09:40 D2-5
3D FAST PAE OPTIMIZATION USING AN EVANESCENT-MODE CAVITY TUNER
Zachary Hays*[1], Charles Baylis[1], Mohammad Khater[2], Edward Viveiros[3]
[1]Baylor University, Waco, TX
[2]Purdue University, West Lafayette, IN
[3]Army Research Laboratory, Adelphi, MD

10:00 Break

10:20 D2-6
REAL-TIME MULTI-VARIABLE AMPLIFIER OPTIMIZATION USING A NONLINEAR TUNABLE VARACTOR MATCHING NETWORK IN THE POWER SMITH TUBE
Sarvin Rezayat*[1], Charles Baylis[1], Ed Viverios[2], John Penn[2], Robert J. Marks II[1]
[1]Baylor University, Waco, TX
[2]Army Research Labratory, Adelphi, MD

10:40 D2-7
AN EVANESCENT-MODE CAVITY-BASED HIGH-POWER IMPEDANCE TUNER FOR ADAPTIVE RADAR APPLICATIONS
Abbas Semnani*[1], Mohammad Abu Khater[1], Dimitrios Peroulis[1], Charles Charles Baylis[2], Lucilia Hays[2], Christopher Kappelmann[2], Zachary Hays[2]
[1]Purdue University, West Lafayette, IN
[2]Baylor University, Waco, TX

11:00 D2-8
RECONFIGURABLE PLANAR DIPOLE USING LIQUID-METAL NODES FOR FREQUENCY-TUNING APPLICATIONS
Anthony W. Combs*, Kent J. Sarabia, Kareem S. B. Elassy, Aaron T. Ohta, Wayne A. Shiroma
Electrical Engineering, University of Hawaii at Manoa, Honolulu, HI

Session F8: RF Propagation Utilizing Numerical Weather Prediction
(Special Session)
Room 155
Session Co-Chairs: Tracy Haack, *Naval Research Laboratory*; Thomas Hanley, *Johns Hopkins University Applied Physics Lab*; Katherine Horgan, *Naval Surface Warfare Center Dahlgren Division*

08:20 F8-1
USING CLIMATOLOGY TO SUPPORT EM PROPAGATION MODELING
Thomas R. Hanley*, Jonathan Z. Gehman, Nathaniel S. Winstead
Johns Hopkins University Applied Physics Lab, Laurel, MD

08:40 F8-2
PRELIMINARY STUDY ON USE OF ENSEMBLE WEATHER PREDICTION DATA FOR INVERSELY DETERMINING ATMOSPHERIC REFRACTIVITY IN SURFACE DUCTING CONDITIONS
Daniel P. Greenway[1], Tracy Haack[2], Erin E. Hackett*[3]
[1]Geography and Computer Science, Ball State University, Muncie, IN
[2]Marine Meteorology Division, Naval Research Laboratory, Monterey, CA
[3]Coastal and Marine Systems Science, Coastal Carolina University, Conway, SC

09:00 F8-3
AN EVALUATION OF SURFACE LAYER MODELS AND THE EVAPORATION DUCTS USING RADIO FREQUENCY LOSS INVERSIONS
Tracy Haack*[1], Andrew Kammerer[2], Robert Burkholder[3], Qi Wang[3], Caglar Yardim[3], Luyao Xu[3], Paul Frederickson[4]
[1]Marine Meteorology Division, Naval Research Laboratory - Marine Meteorology Division, Monterey, CA
[2]ONR Naval Research Enterprise Internship Program, Washington DC
[3]Electircal and Computer Engineering, The Ohio State University, Electroscience Laboratory, Columbus, OH
[4]Meteorology/Oceanography, Naval Postgraduate School, Monterey, CA

09:20 F8-4
FURTHER IMPROVEMENTS AND VALIDATION FOR THE NAVY ATMOSPHERIC VERTICAL SURFACE LAYER MODEL (NAVSLAM)
Paul A. Frederickson*
Meteorology, Naval Postgraduate School, Monterey, CA

09:40 F8-5
A TECHNIQUE TO ESTIMATE OUTER SCALE OF TURBULENCE FROM NUMERICAL WEATHER PREDICTION IN THE ATMOSPHERIC BOUNDARY LAYER
Matt C. Wilbanks*, Victor R. Wiss, William D. Thornton, Katherine Katherine, Jordan McCammon
Naval Surface Warfare Center Dahlgren Division, Dahlgren, VI

10:00 Break

10:20 F8-6
OVERVIEW OF CASPER-WEST FIELD CAMPAIGN
Qing Wang*
Naval Postgraduate School, Monterey, CA

10:40 F8-7
COMPRESSIVE TWO DIMENSIONAL BEAMFORMING OF MIMO DATA COLLECTED IN A REFRACTIVE ENVIRONMENT
Mark A. Wagner*, Santosh Nannuru, Peter Gerstoft
Electrical Engineering, University of California San Diego, La Jolla, CA

Session FGH1: GNSS and Radio Beacon Remote Sensing (Special Session)
Room 150
Session Co-Chairs: Carl Siefring, *Naval Research Laboratory*; Clara Chew, *NASA Jet Propulsion Laboratory*; John Swoboda, *MIT Haystack Observatory*

08:20 FGH1-1
FGH1-1 FORWARD MODELING OF CYGNSS GNSS-R LAND REFLECTION MEASUREMENTS
Andrew J. O'Brien*, Mohammad Al-Khaldi, Joel T. Johnson
The Ohio State University, Columbus, OH

08:40 FGH1-2
AN ANALYSIS OF CYGNSS REFLECTIONS OVER LAND
Mohammad Al-Khaldi*, Joel Johnson, Jeonghwan Park, Andrew O›Brien
ElectroScience Lab, The Ohio State University, Columbus, OH

09:00 FGH1-3
A THEORETICAL STUDY OF THE RELATIONSHIP BETWEEN BISTATIC SCATTERING CROSS SECTIONS AND GPS REFLECTOMETRY DELAY-DOPPLER MAPS OVER VEGETATED LAND IN SUPPORT OF SOIL MOISTURE RETRIEVAL
Amir Azemati*[1], Mahta Moghaddam[1], Arvind Bhat[2]
[1]*Ming Hsieh Electrical Engineering, University of Southern California, Los Angeles, CA*
[2]*Intelligent Automation, Inc. (IAI), Rockville, MD*

09:20 FGH1-4
RESULTS FROM A WETLANDS GNSS-R AIRCRAFT CAMPAIGN
Stephen T. Lowe*[1], Clara C. Chew[2], Jesal Shah[1], Michael Kilzer[1], Son Nghiem[1]
[1]*Jet Propulsion Laboratory, Pasadena, CA*
[2]*UCAR, Boulder, CO*

09:40 FGH1-5
GPS STOCHASTIC TEC AND PHASE SCINTILLATION
Charles L. Rino*[1], Brian Breitsch[1], Yu Morton[1], Charles Carrano[2]
[1]*Smead Aerospace Engineering Sciences Department, University of Colorado Boulder, Boulder, CO*
[2]*Institute of Scientific Research, Boston College, Boston, MA*

10:00 Break

10:20 FGH1-6
COMPARISON OF SIMULATED AND REAL-WORLD DIFFRACTION EFFECTS IN GNSS PHASE MEASUREMENTS USING THE GEOMETRY-IONOSPHERE-FREE COMBINATION
Brian Breitsch*[1], Charles Rino[2], Jade Morton[1]
[1]*Aerospace / Remote-Sensing, University of Colorado Boulder, Boulder, CO*
[2]*Institute for Scientific Research, Boston College, Boston, MA*

10:40 FGH1-7
CHARACTERIZATION OF GNSS SCINTILLATIONS OVER THREE NIGERIAN STATIONS; NSUKKA, ILE-IFE AND ILORIN DURING 2010-2012
Andrew Akala*[1], Patricia Doherty[2], Keith Groves[2], Charles Carrano[2], Christopher Bridgwood[2]
[1]*University of Lagos, Lagos, NIGERIA*
[2]*ISR, Boston College, Boston, MA*

11:00 FGH1-8
BEACON DATA PROCESSING FOR THE 2017 RAPID DEPLOYMENT TO JICAMARCA
John P. Swoboda*, Ryan Volz, Anthea J. Coster, Frank D. Lind
Atmospheric Sciences Group, MIT Haystack Observatory, Westford, MA

11:20 FGH1-9
PRELIMINARY SIMULTANEOUS OBSERVATIONS OF THE IONOSPHERE WITH BEACONS, IN-SITU HF RECEIVER AND INCOHERENT SCATTER RADAR IN THE POLAR CAP
Carl L. Siefring*[1], Paul A. Bernhardt[1], H. Gordon James[2], Andrew W. Yau[2], Roger H. Varney[3]
[1]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*
[2]*Physics and Astronomy, University of Calgary, Calgary, AB, CANADA*
[3]*Center for GeoSpace Studies, SRI International, Menlo Park, CA*

Session G4: Space-Based Ionospheric Measurements (Special Session)
Room 151
Session Co-Chairs: Y. Jade Morton, *University of Colorado Boulder*; Nicolas Lee, *Stanford University*

08:20 G4-1
A NEW TECHNIQUE TO RETRIEVE GLOBAL D- AND E-REGION ELECTRON DENSITY FROM GPS RO
Dong L. Wu*
NASA Goddard Space Flight Center, Greenbelt, MD

08:40 G4-2
ASSESSMENT OF THE IMPACT OF FORMOSAT-7/COSMIC-2 GNSS RO OBSERVATIONS ON MID- AND LOW-LATITUDE IONOSPHERE SPECIFICATION AND FORECASTING USING OBSERVING SYSTEM SIMULATION EXPERIMENTS
Chih-Ting Hsu*[1], Tomoko Matsuo[2], Xinan Yue[3], Tzu-Wei Fang[4], Timothy Fuller-Rowell[4], Kayo Ide[5], Jann-Yenq Liu[1]
[1]*Institute of Space Science, National Central University of Taiwan, Taoyuan, TAIWAN*
[2]*Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*
[3]*Chinese Academy of Sciences, Beijing, CHINA*
[4]*Space Weather Prediction Center, National Oceanic and Atmospheric Administration, Boulder, CO*
[5]*Atmospheric and Oceanic Science, University of Maryland, College Park, MD*

09:00 G4-3
MEASUREMENT OF IONOSPHERIC SCINTILLATION PARAMETERS FROM SYNTHETIC APERTURE RADAR AND THEIR COMPARISON
Shradha Mohanty*[1], Charles S. Carrano[2], Gulab Singh[1]
[1]*CSRE, Indian Institute of Technology Bombay, Mumbai, Maharastra, INDIA*
[2]*ISR, Boston College, Boston, MA*

09:20 G4-4
COLLABORATIVE SPACE AND GROUND-BASED OBSERVATIONS USING THE PUERTO RICO CUBESAT, THE AGUADILLA RADIO ARRAY, AND ARECIBO OBSERVATORY
Brett Isham*[1], Jan Bergman[2], Alireza Mahmoudian[1], Amilcar Rincon-Charris[1], Fredrik Bruhn[3], Peter Funk[3], Bjorn Gustavsson[4], Terence Bullett[5], Linda Krause[6]
[1]*Interamerican University of Puerto Rico, Bayamon, PR*
[2]*Swedish Institute of Space Physics, Uppsala, SWEDEN*
[3]*Malardalen University, Vasteras, SWEDEN*
[4]*University of Tromso, Tromso, NORWAY*
[5]*University of Colorado, Boulder, CO*
[6]*NASA Marshall Space Flight Center, Huntsville, AL*

09:40 G4-5
MULTI-DIAGNOSTIC OBSERVATIONS OF EQUATORIAL IONOSPHERIC TURBULENCE
Rezy Pradipta, Endawoke Yizengaw, Patricia H. Doherty*
Institute for Scientific Research, Boston College, Chestnut Hill, MA

Session GH2: Ionospheric Modification (Special Session)
Room 151
Session Co-Chairs: Robert Moore, *University of Florida*; Eliana Nossa, *SRI*

10:20 GH2-1
RECENT RESULTS OF STIMULATED ELECTROMAGNETIC EMISSION MEASUREMENTS AT HAARP
Wayne Scales*[1], Augustine Yellu[1], Alireza Mahmoudian[2], Carl Siefring[3], Paul Bernhardt[3]
[1]*Virginia Tech, Blacksburg, VA*
[2]*Interamerican University, Puerto Rico*
[3]*Naval Research Laboratory, Washington, DC*

10:40 GH2-2
RECENT OBSERVATIONS AND MODELING OF IONOSPHERIC STIMULATED ELECTROMAGNETIC EMISSIONS
Alireza A. Mahmoudian*[1], Brett Isham[1], Wayne Scales[2], Paul Bernhardt[3], Eliana Nossa[4], Stan Briczinski[3]
[1]*Electrical and Computer Engineering, InterAmerican University of Puerto Rico, Bayamon, Puerto Rico*
[2]*Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA*
[3]*Plasma Physics Division, Naval Research Laboratory, Washington, D.C*
[4]*Arecibo Observatory, Arecibo, PR*

11:00 GH2-3
FDTD MODELING OF IONOSPHERIC HF HEATING
Anthony J. Erdman*, Robert C. Moore
Electrical and Computer Engineering, University of Florida, Gainesville, FL

11:20 GH2-4
STATISTICAL ANALYSIS OF ULF SIGNALS GENERATED BY SURA FACILITY IN THE UPPER IONOSPHERE
Dmitry S. Kotik*, Alexander V. Ryabov, Elena N. Ermakova
Radiophysical Research Institute, Nizhny Novgorod State University, Nizhny Novgorod, RUSSIAN FEDERATION

11:40 GH2-5
RESULTS FROM FIRST CAMPAIGN FROM MODULATED HEATING OF THE IONOSPHERE AT USING THE NEW HF HEATER AT ARECIBO OBSERVATORY
Mark Golkowski*[1], Morris B. Cohen[2], Robert C. Moore[3], Ashanthi S. Maxworth[1], J. McCormick[2], James Bittle[1], Poorya Hosseini[1]
[1]*Electrical Engineering, University of Colorado Denver, Denver, CO*
[2]*School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA*
[3]*Electrical and Computer Engineering, University of Florida, Gainesville, FL*

12:00 GH2-6
E-REGION HF EXPERIMENTS AT ARECIBO OBSERVATORY
Eliana Nossa*[1], Mike Sulzer[1], Phil Perillat[1]
[1]*Arecibo Observatory, Arecibo, Puerto Rico, USA*

Session H5: Waves and Turbulence in Space and Laboratory Plasmas II
(Special Session)
Room 245
Session Co-Chairs: Stephen Vincena, *University of California, Los Angeles*;
Bill Amatucci, *Naval Research Laboratory*

08:20 H5-1
REVIEW OF GROUND-LEVEL INTERFEROMETRY APPLIED TO NATURAL AURORAL RADIO EMISSIONS
James W. LaBelle*, Adam Burnett
Dartmouth College, Hanover NH

08:40 H5-2
ANALYSIS OF ULF WAVES DURING SUBSTORMS OBSERVED IN THE IONOSPHERE FROM THE DAYSIDE GROUND MAGNETOMETER AND IN THE SOLAR WIND FROM THE SATELLITE
Mergen Alimaganbetov*, Anatoly V. Streltsov
Embry-Riddle Aeronautical University, Daytona Beach, FL

09:00 H5-3
STUDIES OF THE MODIFICATION OF LANGMUIR PROBE TRACES IN STRONGLY MAGNETIZED PLASMAS USING THE MAGNETIZED DUSTY PLASMA EXPERIMENT (MDPX) DEVICE
Edward Thomas*[1], Spencer LeBlanc[1], Taylor Hall[1], Uwe Konopka[1], Robert L. Merlino[2], Marlene Rosenberg[3]
[1]*Physics, Auburn University, Auburn, AL*
[2]*Physics and Astronomy, University of Iowa, Iowa City, IA*
[3]*Electrical and Computer Engineering, University of California - San Diego, La Jolla, CA*

09:20 H5-4
LOW FREQUENCY WAVE EMISSION AND TRANSPORT IN THE PRESENCE OF SINGLE AND MULTIPLE INTERACTING MAGNETIZED TEMPERATURE STRIATIONS
Richard Sydora*[1], Scott Karbashewski[1], Bart Van Compernolle[2], Matt Poulos[2], George Morales[2]
[1]*Physics, University of Alberta, Edmonton, Alberta, CANADA*
[2]*Physics and Astronomy, University of California, Los Angeles, CA*

10:00 Break

10:20 H5-5
DIRECT IN SITU OBSERVATIONS OF WHISTLER-MODE CHORUS MODULATION OF 500EV EDI ELECTRONS BY MMS
Kristoff Paulson*[1], Matthew Argall[1], Narges Ahmadi[2], Hiroshi Matsui[1], Charlie Farrugia[1], Terry Forbes[1], Roy Torbert[3], Hans Vaith[1], Olivier Le Contel[4], Hugo Breuillard[4]
[1]*Space Science Center, University of New Hampshire, Durham, NH*
[2]*LASP, University of Colorado Boulder, Boulder, CO*
[3]*Southwest Research Institute, Durham, NH*
[4]*Laboratory of Plasma Physics, Paris, FRANCE*

10:40 H5-6
ONSET OF WHISTLER CHORUS IN THE MAGNETOSPHERE
Ge Wang*, Herb L. Berk
Physics, University of Texas at Austin, TX

Session J4: The VLBA at 25: Recent Accomplishments and Future Directions
(Special Session)
Room 265
Session Co-Chairs: Greg Taylor, *University of New Mexico*;
Walter Brisken, *LBO*

08:20 J4-1
CONCEPTS FOR A NEXT-GENERATION VLBA
Jonathan D. Romney*
Long Baseline Observatory, Socorro, NM

08:40 J4-2
THE NEXT GENERATION VERY LARGE ARRAY LONG BASELINE OPTION
Robert J. Selina, Steven Durand*
National Radio Astronomy Observatory, Socorro, NM

09:00 J4-3
VLBA SCIENCE HIGHLIGHTS
Greg B. Taylor*
Physics and Astronomy, University of New Mexico, Albuquerque, NM

09:20 J4-4
VERY LONG BASELINE INTERFEROMETRY (VLBI) IN THE AGE OF FERMI AND GAIA
Frank K. Schinzel*[1], Leonid Petrov[2]
[1]*National Radio Astronomy Observatory, Socorro, NM*
[2]*Astrogeo Center, Falls Church, VA*

09:40 J4-5
POLARIZATION EVOLUTION OF PARSEC-SCALE JETS IN ACTIVE GALACTIC NUCLEI
Matthew L. Lister*
Physics and Astronomy, Purdue University, West Lafayette , IN

10:00 Break

10:20 J4-6
MASER OBSERVATIONS WITH VLBI
Ylva Pihlstrom*
Physics and Astronomy, University of New Mexico, Albuquerque, NM

10:40 J4-7
GRAVITATIONAL LENSES AS HIGH-RESOLUTION TELESCOPES
Anna Barnacka*
Harvard University, Cambridge, MA

11:00 J4-8
ASTROMETRY WITH VLBI
Robert T. Zavala*[1], Gregory B. Taylor[2]
[1]*US Naval Observatory Flagstaff Station, Flagstaff, AZ*
[2]*Astronomy, University of New Mexico, Albuquerque, NM*

11:20 J4-9
TOWARDS THE ICRF3: COMPARING USNO 2016A VLBI GLOBAL SOLUTION TO GAIA AND ICRF2
Megan C. Johnson*, Julien Frouard, Alan L. Fey, Bryan N. Dorland, Valeri Makarov
Astrometry, United States Naval Observatory, Washington, DC

Session J5: New Telescopes, Techniques and Technology III (Special Session)
Room 200
Session Co-Chairs: Danny Jacobs, *Arizona State University*; David DeBoer, *University of California, Berkeley*

08:20 J5-1
REAL-TIME BEAMFORMING FOR THE FOCAL-PLANE L-BAND ARRAY FEED ON THE GREEN BANK TELESCOPE (FLAG)
Mark W. Ruzindana*[1], Karl F. Warnick[1], Brian D. Jeffs[1], Richard A. Black[1], Mitchell Burnett[1], D.j. Pisano[2], Duncan R. Lorimer[2], Nicholas Pingel[2], Kaustubh Rajwade[2], Richard M. Prestage[3], Steve White[3], Bob Simon[3], Luke Hawkins[3], William Shillue[4], D A. Roshi[4]
[1]*Electrical/Computer Engineering, Brigham Young University, Provo, UT*
[2]*Physics and Astronomy, West Virginia University, Morgantown, WV*
[3]*Green Bank Observatory, Green Bank, WV*
[4]*National Radio Astronomy Observatory CDL, Charlottesville, VA*

08:40 J5-2
PERFORMANCE ESTIMATES FOR THE NEXT-GENERATION VERY LARGE ARRAY
Robert J. Selina*, Brian Butler, Eric J. Murphy
National Radio Astronomy Observatory, Socorro, NM

09:00 J5-3
A STUDY OF THE COMPACT WATER VAPOR RADIOMETER FOR THE KARL G. JANSKY VERY LARGE ARRAY
Ajay Gill*[1], Robert Selina[2], Bryan Butler[2]
[1]*Electrical and Computer Engineering, University of Toronto, Toronto, Ontario, CANADA*
[2]*National Radio Astronomy Observatory, Socorro, NM*

09:20 J5-4
NEXT GENERATION SETI AND CASPER EXPERIMENTS
Dan Werthimer*
Astronomy, University of California, Berkeley, Berkeley, CA

09:40 J5-5
21-CM POWER-SPECTRUM ANALYSES OF THE 3C196 FLANKING FIELD
Nivedita Mahesh*[1], Andre R. Offringa[2]
[1]*School of Earth & Space Exploration, Arizona State University, Tempe, AZ*
[2]*Netherlands Institute of Radio Astronomy, Dwingeloo, NETHERLANDS*

10:00 Break

10:20 J5-6
SCATTERING STUDY OF PULSARS BELOW 100 MHZ
Karishma Bansal*[1], Greg Taylor[1], Kevin Stovall[2]
[1]*Physics & Astronomy, University of New Mexico, Albuquerque, NM*
[2]*NRAO, Socorro, NM*

10:40 J5-7
COMPLEMENTARY STUDY OF JUNO/MWR INVESTIGATION OF JUPITER'S SYNCHROTRON EMISSION FROM GROUND-BASED OBSERVATIONS AT LOW FREQUENCIES
Daniel Santos-Costa*[1], Masafumi Imai[2], Scott J. Bolton[1], Steve M. Levin[3], Mike A. Janssen[3], Philippe Zarka[4], Julien Girard[5], Cyril Tasse[6], Hajime Kita[7], Fuminori Tsuchiya[7], Hiroaki Misawa[7], Jack E. Connerney[8]
[1]*Southwest Research Institute, San Antonio, TX*
[2]*University of Iowa, Iowa City, IA*
[3]*Jet Propulsion Laboratory / Caltech, Pasadena, CA*
[4]*LESIA, Observatoire de Paris, Meudon, FRANCE*
[5]*DSM/IRFU, CEA-Saclay, Gif sur Yvette, FRANCE*
[6]*GEPI, Observatoire de Paris, Meudon, FRANCE*
[7]*University of Tohoku, Sendai, JAPAN*
[8]*SRC & NASA GSFC, MD*

11:00 J5-8
SAMPLE VARIANCE IN REALISTIC 21 CM EOR SIMULATIONS
Adam E. Lanman*, Jonathan C. Pober
Brown University, Providence, RI

11:20 J5-9
FRB121102: FIRST DETECTIONS AT 8-GHZ AND BROADBAND PROPERTIES
Vishal Gajjar*
Space Science Laboratory, University of California, Berkeley, Berkeley, CA

11:40 J5-10
BUILDING CONFIDENCE IN EOR POWER SPECTRUM LIMITS
Miguel F. Morales*
Physics, University of Washington, Seattle, WA

SATURDAY NOON, 6 January 2018
Fifth Hans Liebe Lecture Event
Math 100

12:15 HL -1
SPECTROSCOPY AND REMOTE SENSING STUDIES WITH THE ATMOSPHERIC RADIATION MEASUREMENT (ARM) GROUND-BASED MICROWAVE AND MILLIMETER-WAVE RADIOMETERS: A REVIEW OF ACCOMPLISHMENTS AND RECENT CHALLENGES
Maria P. Cadeddu*
Argonne National Laboratory, Lemont, IL

SATURDAY AFTERNOON, 6 January 2018

Session B15: Antenna Arrays
Room 1B40
Session Co-Chairs: Randy Haupt, Colorado School of Mines; Dimitra Psychogiou, *University of Colorado Boulder*

13:20 B15-1
CONCENTRIC RING ARRAY OF CONNECTING SPIRALS WITH INTERLEAVED WAVES
Pedro Mendes Ruiz*[1], Israel Hinostroza[1], Regis Guinvarc'h[1], Randy Haupt[2]
[1]SONDRA, CentraleSupelec, Gif-sur-yvette, FRANCE
[2]Electrical Engineering, Colorado School of Mines, Golden, CO

13:40 B15-2
REVIEW OF MODERN THINNED ARRAY METHODS FOR OPTIMIZING RANDOMLY SCATTERED ELEMENTS
Alan L. O'Donnell*, Robert McGwier
Hume Center, Virginia Tech, Blacksburg, VA

14:00 B15-3
ASSUMPTIONS NEEDED FOR A VALID AVERAGE ELEMENT PATTERN IN A THREE DIMENSIONAL ARRAY
Alan L. O'Donnell*, Robert McGwier
Virginia Tech, Blacksburg, VA

14:20 B15-4
AVERAGE ELEMENT PATTERN FOR A THREE DIMENSIONAL ARRAY
Alan L. O'Donnell*, Robert McGwier
Virginia Tech, Blacksburg, VA

14:40 B15-5
WIDEBAND MONOSTATIC CO-POLARIZED CO-CHANNEL SIMULTANEOUS TRANSMIT AND RECEIVE OMNIDIRECTIONAL AND BROADSIDE ANTENNA ARRAYS
Ehab Etellisi*, Mohamed Elmansouri, Dejan Filipović
University of Colorado Boulder, Boulder, CO

15:00 Break

15:20 B15-6
BROADBAND ANTENNA ARRAYS USING FREQUENCY SELECTIVE FEEDING NETWORKS
Matthew Cullen, Christopher G. Gay*, Dimitra Psychogiou
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

15:40 B15-7
MM-WAVE BEAM-SCANNING FOCAL PLANE ARRAYS WITH MICROFLUIDICALLY SWITCHED FEED NETWORKS
Enrique J. Gonzalez*, Gokhan Mumcu
Electrical Engineering, University of South Florida, Tampa, FL

16:00 B15-8
ANALYTICAL EFFECTIVE LENGTH COMPARISONS OF CIRCULARLY DISTRIBUTED ANTENNA ARRAYS
Timi Adeyemi*, Kristopher Buchanan, Carlos Flores-Molina, Sara Wheeland, Drew Overturf
Electromagnetics Technology Branch, Space and Naval Warfare Systems Center Pacific, San Diego, CA

16:20 B15-9
SIDELOBE BEHAVIOR AND BANDWIDTH CHARACTERISTICS OF DISTRIBUTED ANTENNA ARRAYS
Kristopher R. Buchanan, Timi Adeyemi*, Carlos Flores-Molina, Sara Wheeland, Drew Overturf
Electromagnetics Technology Branch, Space and Naval Warfare Systems Center Pacific, San Diego, CA

16:40 B15-10
COMPACT WIDE-ANGLE CIRCULAR POLARIZED SEQUENTIAL ROTATED QUARTER SECTOR PATCH ANTENNA WITH NOTCHES FOR PHASED ARRAY APPLICATIONS
Ghanshyam Mishra*, Satish K. Sharma
Electrical and Computer Engineering, San Diego State University, San Diego, CA

Session B16: Antenna Development using Additive Manufacturing
Room 105
Session Co-Chairs: Steven Weiss, *US Army Research Lab*; Seth McCormick, *US Army Research Lab*

13:20 B16-1
LOW-DIELECTRIC CONSTANT MATERIALS IN ADDITIVE MANUFACTURING FOR IMPROVED AIR INTERFACE MATCHING IN HIGH FREQUENCY APPLICATIONS
Paul E. Parsons*[1], Zachary J. Larimore[2], Mark S. Mirotznik[2]
[1]Materials Science and Engineering, University of Delaware, Newark, DE
[2]Electrical and Computer Engineering, University of Delaware, Newark, DE

13:40 B16-2
STACKED PATCH APPROACH FOR INCREASED BANDWIDTH OF A DUAL-BAND AND DUAL-POLARIZATION ANTENNA
Gregory Mitchell*, Amir Zaghloul
U.S. Army Research Laboratory, Adelphi, MD

14:00 B16-3
MEASURED PERFORMANCE OF AN ELECTRICALLY THIN BROADBAND ANTENNA
Steven Weiss*
US Army Research Lab, Adelphi, MD

14:20 B16-4
ULTRA-LOW PROFILE WIDEBAND TIGHTLY COUPLED DIPOLE ARRAY
Alexander D. Johnson*, John L. Volakis
Florida International University, Miami, FL

Session B17: Millimeter-Wave and 5G Antennas and Systems
(Special Session)
Room 200
Session Co-Chairs: Shubhendu Bhardwaj, *Florida International University*;
Joshua Kovitz, *Georgia Tech Research Institute*

15:20 B17-1
ANTENNAS FOR 5G: TRENDS, CHALLENGES, AND POTENTIAL SOLUTIONS
Joshua M. Kovitz*[1], Shubhendu Bhardwaj[2]
[1]*Advanced Concepts Laboratory, Georgia Tech Research Institute, Atlanta, GA*
[2]*Electrical and Computer Engineering, Florida International University, Miami, FL*

15:40 B17-2
INTERFERENCE MITIGATION FOR 5G MILLIMETER WAVE COMMUNICATIONS
Dimitrios Siafarikas*, Elias A. Alwan, John L. Volakis
Electrical and Computer Engineering, Florida International University, Miami, FL

16:00 B17-3
WIRELESS ENERGY HARVESTING FROM 700-900 MHZ
Brock J. DeLong*[1], Cedric W. L. Lee[1], Asimina Kiourti[1], Satheesh Bojja Venkatakrishnan[2], John L. Volakis[2]
[1]*ECE, The Ohio State University, Columbus, OH*
[2]*CEC, Florida International University, Miami, FL*

16:20 B17-4
IMPACT OF MULTIPLE LENS REFLECTIONS ON THE PERFORMANCE OF LENS-INTEGRATED THZ ANTENNAS
Burak Ozbey*, Kubilay Sertel
ElectroScience Laboratory, The Ohio State University, Columbus, OH

16:40 B17-5
TUNED ZERO-BIAS SCHOTTKY DIODE DETECTORS FOR MICROWAVE RADIOMETERS
Colton R. Dunlap*
Boulder Environmental Sciences and Technology, Boulder, CO

17:00 B17-6
CIRCULARLY POLARIZED METAL ANTENNAS AND CHARACTERIZATION-METHODS FOR SUB-MM-WAVE AND TERAHERTZ FREQUENCIES
Shubhendu Bhardwaj*
Electrical and Computer Engineering, Florida International University, Miami, FL

Session B18: Guided Waves and Wireless Propagation
Room 105
Session Co-Chairs: Jiefu Chen, *University of Houston*;
Valery Zavorotny, *NOAA/Earth System Research Laboratory*

15:20 B18-1
MODAL ANALYSIS OF A PARALLEL-PLATE WAVEGUIDE CONTAINING AN INTERNAL PERFORATED SHEET
Nick J. Krull*, Edward F. Kuester
Electrical, Computer and Energy Engineering, CU Boulder, Boulder, CO

15:40 B18-2
GENERALIZED SCATTERING MATRIX COMPUTATION BASED ON 2-D AND 3-D HIGHER ORDER FEM AND MODE MATCHING FOR UNDERGROUND MINE TUNNEL MODELING
Sanja B. Manic*[1], Milan M. Ilic[1,2], Branislav M. Notaros[1]
[1]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*School of Electrical Engineering, University of Belgrade, Belgarde, Serbia, YUGOSLAVIA*

16:00 B18-3
DUAL-MODE WAVEGUIDE CAVITY FILTERS AND MULTIPLEXERS
Zheng Wang*
Boulder Environmental Sciences and Technology, Boulder, CO

16:20 B18-4
ULTRA-WIDEBAND RING-CAVITY POWER COMBINER
V. Foroutan[1], O. Manoochehri*[1], A. Darvazehban[2], F. Farzami[1] and D. Erricolo[1]
[1]Electrical and Computer Engineering, University of Illinois at Chicago
[2]Amirkabir University of Technology

16:40 B18-5
DOWNHOLE WIRELESS COMMUNICATION USING MAGNETIC INDUCTION TECHNIQUE
Li Yan*, Debing Wei, Miao Pan, Jiefu Chen
Electrical and Computer Engineering, University of Houston, Houston, TX

17:00 B18-6
ON CALCULATION OF THE ELECTROMAGNETIC FIELD IN THE VICINITY OF A TRANSMITTER LOCATED NEAR THE DIELECTRIC HALF-SPACE
Alexander G. Voronovich*, Valery U. Zavorotny
Physical Sciences Division, NOAA/Earth System Research Laboratory, Boulder, CO

Session BGH1: Techniques for Modeling of Waves in Plasmas
(Special Session)
Room 135
Session Co-Chairs: Mark Golkowski, *University of Colorado Denver*;
Robert Lysak, *University of Minnesota*

13:20 BGH1-1
NUMERICAL MODELING OF ULF WAVES IN EARTH'S MAGNETOSPHERE: IONOSPHERIC EFFECTS
Robert L. Lysak*[1], Yan Song[1], Colin L. Waters[2], Murray D. Sciffer[2]
[1]*University of Minnesota, Minneapolis, MN*
[2]*University of Newcastle, Callaghan, NSW, AUSTRALIA*

13:40 BGH1-2
3D SIMULATION OF PROPAGATION OF EMIC WAVES IN EARTH?S MAGNETOSPHERE AND IONOSPHERE
Dmytro Sydorenko, Robert Rankin*
Physics, University of Alberta, Edmonton, Alberta, CANADA

14:00 BGH1-3
FINITE DIFFERENCE SIMULATION OF MAGNETOSPHERIC EMIC AND WHISTLER MODE WAVES
Poorya Hosseini*, Mark Golkowski, Vijay Harid
Electrical Engineering, University of Colorado Denver, Denver, CO

14:20 BGH1-4
GRID-BASED METHODS FOR SIMULATING ELECTROMAGNETIC WAVES IN COLLISION FREE PLASMAS
Vijay Harid*
Electrical Engineering, University of Colorado Denver, Denver, CO

14:40 BGH1-5
HIGH-PERFORMANCE NUMERICAL SIMULATION OF RF WAVE HEATING AND SHEATH EFFECTS IN FUSION PLASMAS
Thomas G. Jenkins*
Tech-X Corporation, Boulder, CO

Session C1: Advances in Signal Processing and Distributed Sensor Arrays
Room 150
Session Co-Chairs: Gregory Huff, *Texas A & M University*; Jean-Francois Chamberland, *Texas A&M University*; Eric Mokole, *The MITRE Corporation*

13:20 C1-1
EXPLOITING INTER VOXEL CORRELATION IN COMPRESSED COMPUTATIONAL IMAGING
Naren Viswanathan*, Suresh Venkatesh, David Schurig
University of Utah, Salt Lake City, UT

13:40 C1-2
MULTI-ELEMENT COHERENT DISTRIBUTED ARRAY FOR IDENTIFYING AND GEO-LOCATING TRANSMITTERS
Chanci N. King*, Albin J. Gasiewski
ECEE, University of Colorado Boulder, Boulder, CO

14:00 C1-3
FAST SUCCESSIVE SPECTRAL ESTIMATION OF IRREGULARLY SAMPLED DATA
Peter A. Parker*
Los Alamos National Laboratory, Los Alamos, NM

14:20 C1-4
PHENOMENOLOGY OF SIGNALS DEGRADED BY PHASE NOISE
Roger P. Cutitta*, Charles R. Dietlein
U.S. Army Research Laboratory, Adelphi MD

14:40 C1-5
FORWARD-LOOKING SAR MOVING TARGET IMAGING VIA JOINT TIME-FREQUENCY TRANSFORM AND INTERFEROMETRIC PROCESSING
Matthew J. Burfeindt*
Air Force Research Laboratory, Eglin AFB, FL

15:00 Break

15:20 C1-6
SOFTWARE-DEFINED CONTROL OF PATTERN AND POLARIZATION RECONFIGURABLE ANTENNAS IN EDGE NETWORKS
Gregory H. Huff*, Abhay Anand Anand, Francisco Espinal, Rajarshi Bhattacharyya, Vasudev Gohil, Srinivas Shakkottai, Jean-Francois Chamberland
Texas A & M University, College Station, TX

15:40 C1-7
DIGITAL RF: A SOFTWARE PACKAGE TO IMPLEMENT EFFECTIVE RF DATA STRATEGIES USING SOFTWARE-DEFINED RADIO ARCHITECTURES
Frank D. Lind[1], Philip J. Erickson[1], William Rideout[1], Ryan Volz[1], John P. Swoboda*[1], Juha Vierinen[2]
[1]*Atmospheric Sciences Group, MIT Haystack Observatory, Westford, MA*
[2]*Physics, University of Tromso, Tromso, NORWAY*

16:00 C1-8
GPM AND WEATHER RADAR INTEGRATION IN COLOMBIA FOR PRECIPITATION MEASUREMENT
Ivan Arias*, V. Chandrasekar
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

16:20 C1-9
ENSEMBLE DETECTION ANALYSIS IN SPACE-BORNE DOPPLER MEASUREMENTS
Mustafa Aksoy*[1], Paul E. Racette[2], Lihua Li[2]
[1]*University at Albany, SUNY, Albany, NY*
[2]*NASA Goddard Space Flight Center, Greenbelt, MD*

16:40 C1-10
ARTIFICIAL NEURAL NETWORK POWER AMPLIFIER INPUT SIGNAL SYNTHESIS FOR RADAR JOINT CIRCUIT AND WAVEFORM OPTIMIZATION
Pedro A. Rodriguez-Garcia*[1], Casey Latham[1], Austin Egbert[1], Charles Baylis[1], Robert Marks II[1], Lawrence Cohen[2]
[1]*Electrical & Computer Engineering/Wireless and Microwave Circuits and Systems Program, Baylor University, Waco, TX*
[2]*Naval Research Laboratory, Washington DC*

Session FEJ1: RFI Mitigation for Remote Sensing (Special Session)
Room 155
Session Co-Chairs: David Kunkee, *The Aerospace Corporation*; Sidharth Misra, *Jet Propulsion Laboratory*

13:20 FEJ1-1
SMAP: ANALYSIS OF RESIDUAL RADIO FREQUENCY INTERFERENCE SOURCES
Alexandra Bringer*[1], Caglar Yardim[1], Joel T. Johnson[1], Priscilla Mohammed[2], Jeffrey R. Piepmeier[2]
[1]*ElectroScience Laboratory, The Ohio State University, Columbus, OH*
[2]*NASA's Goddard Space Flight Center, Greenbelt, MD*

13:40 FEJ1-2
A STUDY OF SPECTRAL KURTOSIS OF CROSS SPECTRA FOR RFI DETECTION AND MITIGATION IN CORRELATION RADIOMETRY
Aravind Venkitasubramony*[1], Albin J. Gasiewski[1], Eryan Dai[1], Maciej Stachura[2], Jack Elston[2]
[1]*Dept of ECEE, University of Colorado, Boulder*
[2]*Blackswift Technologies LLC, Boulder*

14:00 FEJ1-3
AN RFI MITIGATION STRATEGY TO IMPROVE PROTECTION OF GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) RADIO OCCULTATION (RO) MEASUREMENTS FOR EARTH OBSERVATION
David B. Kunkee*, David G. Lubar, Paul H. Kim
The Aerospace Corporation, Los Angeles, CA

14:20 FEJ1-4
A MINATURE NULLSTEERING GPS ANTENNA
Yue Zheng*, Yikun Huang, Yuanxun E. Wang
University of California, Los Angeles, Los Angeles, CA

14:40 FEJ1-5
AUTOMATED TUNING OF RFI IDENTIFICATION AND FLAGGING ALGORITHMS
Urvashi Rau*[1], Bruno J. Martins[2]
[1]*National Radio Astronomy Observatory, Socorro, New Mexico*
[2]*UNISUL, Tubarao,, BRAZIL*

15:00 Break

15:20 FEJ1-6
A PROTOTYPE FOR REAL-TIME RFI MITIGATION FOR SINGLE-DISH RADIO TELESCOPES
Nick Joslyn*[1], Emily Ramey[2], Richard Prestage[3], Tim Blattner[4], Cedric Viou[5], Jessica Masson[5], Luke Hawkins[3], Michael Lam[6], Mark Whitehead[3]
[1]*Simpson College, Indianola, IA*
[2]*Washington University in St. Louis, St. Louis, MO*
[3]*Green Bank Observatory, Green Bank, WV*
[4]*National Institute of Standards and Technology, Gaithersburg, MD*
[5]*Station de radioastronomie de Nancay, Nancay, FRANCE*
[6]*West Virginia University, Morgantown, WV*

15:40 FEJ1-7
RADIO FREQUENCY INTERFERENCE (RFI) DETECTION BASED ON CYCLIC SPECTRUM ANALYSIS
Gonzalo A. Cucho-Padin*[1], Lara Waldrop[1], Farzad Kamalabadi[1], Tian Zhi[2], Wang Yue[2]
[1]*Electrical and Computer Engineering, University of Illinois at Urbana Champaign, Champaign, IL*
[2]*Electrical and Computer Engineering, George Mason University, Fairfax, VA*

Session G5: Space Plasma Measurement Techniques (Special Session)
Room 151
Session Co-Chairs: Tom Gaussiran, *ARL:UT*; Terry Bullett, *University of Colorado Boulder*

15:20 G5-1
WHAT IS NEEDED TO FORECAST SPORADIC E?
Douglas P. Drob*[1], Joseph D. Huba[2], Katherine A. Zawdie[1], Clayton Coker[1], David E. Siskind[1]
[1]*Space Science Division, U.S. Naval Research Laboratory, Washington, DC*
[2]*Plasma Physics Division, U.S. Naval Research Laboratory, Washington, DC*

15:40 G5-2
THE IONOSPHERIC FORECAST SYSTEM BY ASSIMILATING GNSS OBSERVATIONS
Chia-Hung K. Chen*[1], Charles Lin[1], Tomoko Matsuo[2,3], Jann-Yenq Liu[4,5]
[1]*Earth Sciences, National Cheng Kung University, Tainan, TAIWAN*
[2]*Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder, Boulder, CO*
[3]*Space Weather Prediction Center, National Oceanic and Atmospheric Administration, CO*
[4]*Institute of Space Science, National Central University, Taoyuan, TAIWAN*
[5]*Center for Space and Remote Sensing Research, National Central University, Taoyuan, TAIWAN*

16:00 G5-3
ON THE MORPHOLOGY OF THE EQUATORIAL EVENING VORTEX
Samuel A. Shidler*[1], Fabiano S. Rodrigues[1], Bela G. Fejer[2]
[1]*Physics, University of Texas at Dallas, Plano, TX*
[2]*Utah State University, Logan, UT*

16:20 G5-4
IONOSPHERIC IMAGING USING RADIO OCCULTATION AND TOPSIDE TEC DATA FROM COMMERCIAL LOW EARTH ORBIT SATELLITES
Victoriya V. Forsythe, Donald Hampton*
University of Alaska Fairbanks, Geophysical Institute, Fairbanks, AK

16:40 G5-5
MAPPING THE D-REGION IONOSPHERE WITH A NETWORK OF VLF TRANSMITTERS AND RECEIVERS
Forrest W. Gasdia*, Robert A. Marshall
Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO

17:00 G5-6
ISR SPECTRA SIMULATIONS WITH ELECTRON-ION COULOMB COLLISIONS
William J. Longley*[1], Meers M. Oppenheim[1], Alex C. Fletcher[1,2], Yakov S. Dimant[1]
[1]*Center for Space Physics, Boston University, Boston, MA*
[2]*Physics, Massachusetts Institute of Technology, Cambridge, MA*

Session HEG1: Lightning and the Ionosphere (Special Session)
Room 245
Session Co-Chairs: Victor Pasko, *Penn State University*; Robert Marshall, *University of Colorado Boulder*

13:20 HEG1-1
TERRESTRIAL GAMMA-RAY FLASH (TGF) OBSERVATIONS WITH FERMI GBM
Michael S. Briggs*[1], Oliver J. Roberts[2], Matthew Stanbro[1], Eric S. Cramer[1], Robert H. Holzworth[3], J E. Grove[4], A Chekhtman[5], Shelia McBreen[6]
[1]*CSPAR, University of Alabama in Hunstville, Huntsville, AL*
[2]*USRA, USRA, Huntsville, AL*
[3]*Earth and Space Sciences, University of Washington, Seattle, WA*
[4]*Space Science Division, NRL, Washington, DC*
[5]*College of Science, George Mason University, Fairfax, VA*
[6]*School of Physics, University College Dublin, Dublin, IRELAND*

13:40 HEG1-2
MODELING OF X-RAY IMAGES AND ENERGY SPECTRA PRODUCED BY STEPPING LIGHTNING LEADERS
Wei Xu*[1], Robert A. Marshall[1], Sebastien Celestin[2], Victor P. Pasko[3]
[1]*Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*
[2]*Laboratory of Physics and Chemistry of the Environment and Space (LPC2E), University of Orleans, Orleans, FRANCE*
[3]*Communications and Space Sciences Laboratory, The Pennsylvania State University, University Park, PA*

14:00 HEG1-3
FIELD ENHANCEMENT AND RADIO EMISSIONS FROM HEAD-ON COLLISION OF STREAMERS
Feng Shi*, Ningyu Liu, Joseph R. Dwyer
Physics and Space Science Center (EOS), University of New Hampshire, Durham, NC

14:20 HEG1-4
VHF INTERFEROMETRIC IMAGING OF THE INITIATION AND PROPAGATION OF IN-CLOUD LIGHTNING LEADERS
Steven Cummer*[1], Fanchao Lyu[1], Zilong Qin[2], Mingli Chen[2]
[1]*Electrical and Computer Engineering, Duke University, Durham, NC*
[2]*Building Service Engineering, The Hong Kong Polytechnic University, Hung Hom, Hong Kong, CHINA*

14:40 HEG1-5
SECONDARY EFFECTS OF LIGHTNING-INDUCED ELECTRON PRECIPITATION: CHEMICAL EFFECTS, OPTICAL EMISSIONS, AND X-RAYS
Robert A. Marshall*[1], Wei Xu[1], Austin Sousa[2], Antti Kero[3]
[1]*Smead Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*
[2]*Aeronautics and Astronautics, Stanford University, Stanford, CA*
[3]*Sodankyla Geophysical Observatory, University of Oulu, Oulu, FINLAND*

15:00 Break

15:20 HEG1-6
LWPC MODELING OF VLF PERTURBATIONS FROM LIGHTNING INDUCED ENERGETIC ELECTRON PRECIPITATION ON OVERLAPPING PATHS OF PROPAGATION
Chad M. Renick*[1], Mark Golkowski[1], Sandeep Sarker[1], Morris Cohen[2]
[1]*Electrical Engineering, University of Colorado Denver, Denver, CO*
[2]*Electrical and Computer Engineering, Georgia Tech, Atlanta, GA*

15:40 HEG1-7
PROPAGATION ANALYSIS OF DAYTIME TWEEK ATMOSPHERICS ORIGINATING FROM EUROPEAN NORTH ATLANTIC WINTER THUNDERSTORMS
Ondrej Santolik*[1,2], Ivana Kolmasova[1,2]
[1]*Institute of Atmospheric Physics CAS, Prague, CZECH REPUBLIC*
[2]*Faculty of Mathematics and Physics, Charles University, Prague, CZECH REPUBLIC*

16:00 HEG1-8
REAL-TIME ESTIMATION OF IONOSPHERIC PARAMETERS FROM VLF ATMOSPHERICS USING MACHINE-LEARNED MODELS
Andre Lucas Antunes de Sa*, Robert A. Marshall
Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO

16:20 HEG1-9
IONOSPHERIC D-REGION REMOTE SENSING USING ELF SFERICS
Mark Golkowski*[1], Sandeep Sarker[1], Chad Renick[1], Robert C. Moore[2], Morris B. Cohen[3]
[1]*Electrical Engineering, University of Colorado Denver, Denver, CO*
[2]*Electrical and Computer Engineering, University of Florida, Gainesville, FL*
[3]*Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA*

Session J6: Spectral Line Cosmology and Low-Frequency Arrays
(Special Session)
Room 265
Session Co-Chairs: David DeBoer, *University of California, Berkeley*;
Greg Taylor, *University of New Mexico*

13:20 J6-1
PULSARS AT LOW FREQUENCIES
Kevin Stovall*
National Radio Astronomy Observatory, Socorro, NM

13:40 J6-2
21CM POWER SPECTRUM LESSONS: UPDATED RESULTS FROM THE PAPER EXPERIMENT
Carina Cheng*, Paper Collaboration
University of California, Berkeley, Berkeley CA

14:00 J6-3
THE VLA LOW BAND IONOSPHERE AND TRANSIENT EXPERIMENT (VLITE)
Tracy Clarke*[1], Namir Kassim[1], Simona Giacintucci[1], Wendy Peters[1], Emil Polisensky[1], Joseph Helmboldt[1], Emily Richards[2]
[1]*Naval Research Laboratory, Washington, DC*
[2]*National Research Council, Washington, DC*

14:20 J6-4
LATEST RESULTS FROM EDGES
Judd D. Bowman*[1], Alan E. E. Rogers[2], Raul A. Monsalve[3,1,4], Thomas J. Mozdzen[1], Nivedita Mahesh[1]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*
[3]*Center for Astrophysics and Space Astronomy, University of Colorado, Boulder, CO*
[4]*Facultad de Ingenieria, Universidad Catolica de la Santisima Concepcion, Concepcion, CHILE*

14:40 J6-5
THE LWA1 LOW FREQUENCY SKY SURVEY
Jayce Dowell*[1], Gregory B. Taylor[1], Frank Schinzel[2,1], Namir E. Kassim[3], Kevin Stovall[2,1]
[1]*Physics and Astronomy, University of New Mexico, Albuquerque, NM*
[2]*National Radio Astronomy Observatory, Socorro, NM*
[3]*Radio Astrophysics and Sensing Section, Naval Research Laboratory, Washington, DC*

15:00 Break

15:20 J6-6
HYPERION: A NOVEL APPROACH TO OBSERVING THE REIONIZATION GLOBAL SIGNAL
Kara Kundert*, Aaron Parsons
Astronomy, University of California, Berkeley, Berkeley, CA

15:40 J6-7
IMPROVED 21CM EPOCH OF REIONIZATION POWER SPECTRUM MEASUREMENTS WITH A HYBRID FOREGROUND SUBTRACTION AND AVOIDANCE TECHNIQUE
Joshua Kerrigan*
Brown University, Providence, RI

16:00 J6-8
STEREOSCOPIC OBSERVATIONS OF JUPITER'S DECAMETRIC RADIO BURSTS WITH JUNO, CASSINI, STEREO A, WIND AND EARTH-BASED RADIO OBSERVATORIES
Masafumi Imai*[1], William S. Kurth[1], George B. Hospodarsky[1], Scott J. Bolton[2], John E. P. Connerney[3], Steven M. Levin[4], Alain Lecacheux[5], Laurent Lamy[5], Philippe Zarka[5], Tracy E. Clarke[6], Charles A. Higgins[7]
[1]*University of Iowa, Iowa City, IA*
[2]*Southwest Research Institute, San Antonio, TX*
[3]*NASA Goddard Space Flight Center, Greenbelt, MD*
[4]*Jet Propulsion Laboratory, Pasadena, CA*
[5]*Observatoire de Paris, Meudon, FRANCE*
[6]*Naval Research Laboratory, Washington, DC*
[7]*Middle Tennessee State University, Murfreesboro, TN*

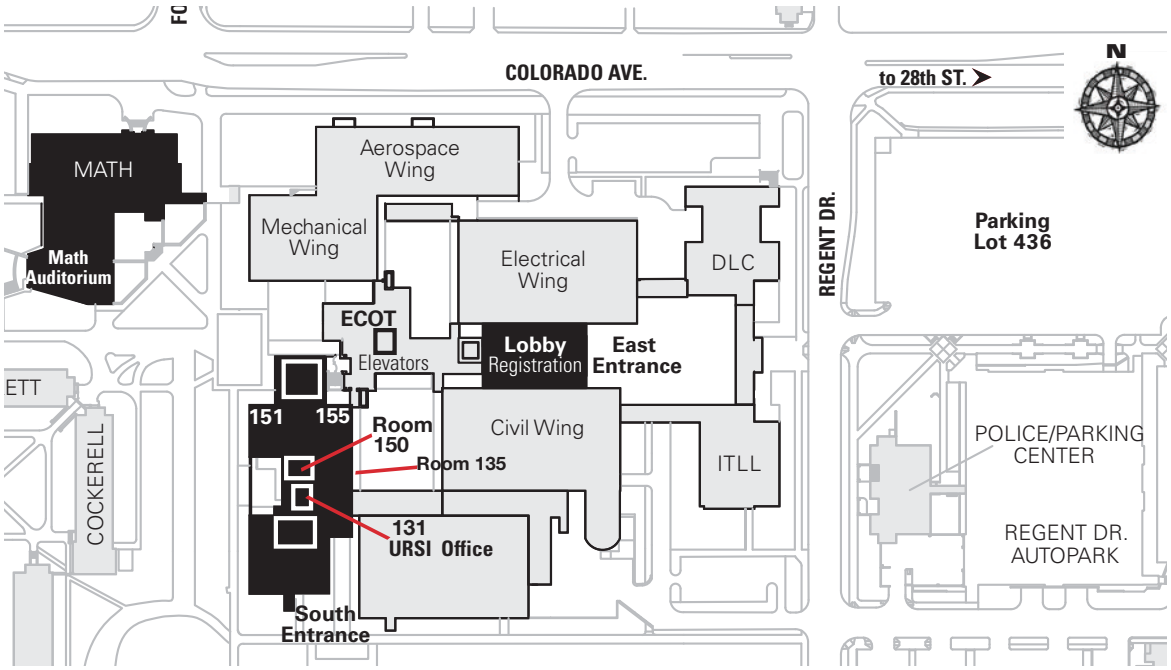
16:20 J6-9
ADDRESSING FOREGROUNDS AND SYSTEMATICS FOR IMAGING THE 21CM REIONIZATION SIGNAL
Aaron Parsons*
Astronomy, University of California, Berkeley, Berkeley, CA

16:40 J6-10
NGLOBO HIGH RESOLUTION, LOW-FREQUENCY IMAGING AND HIGH-Z HI COSMOLOGY: THE LONG VIEW TOWARDS INSTRUMENTAL CONVERGENCE
Namir E. Kassim*
Remote Sensing Division, Naval Research Laboratory, Washington, DC

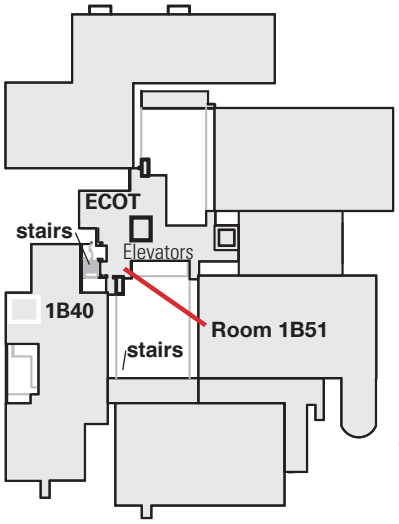
SUNDAY MORNING, 7 January 2018

08:00 – 11:00 USNC-URSI Executive Council Breakfast Meeting, Marriott Hotel

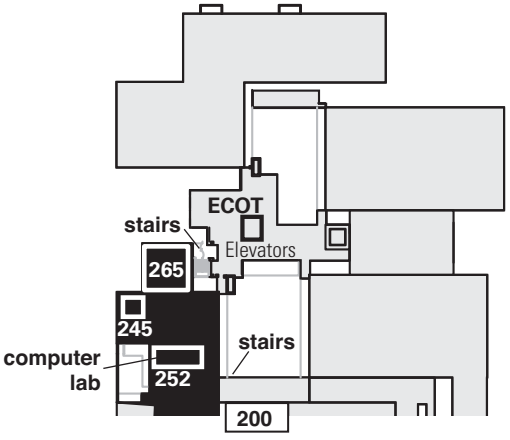
CU-Boulder Engineering Center (EC)



Main / First Floor



Ground / B Level



Second Floor

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