USNC–URSI National Radio Science Meeting

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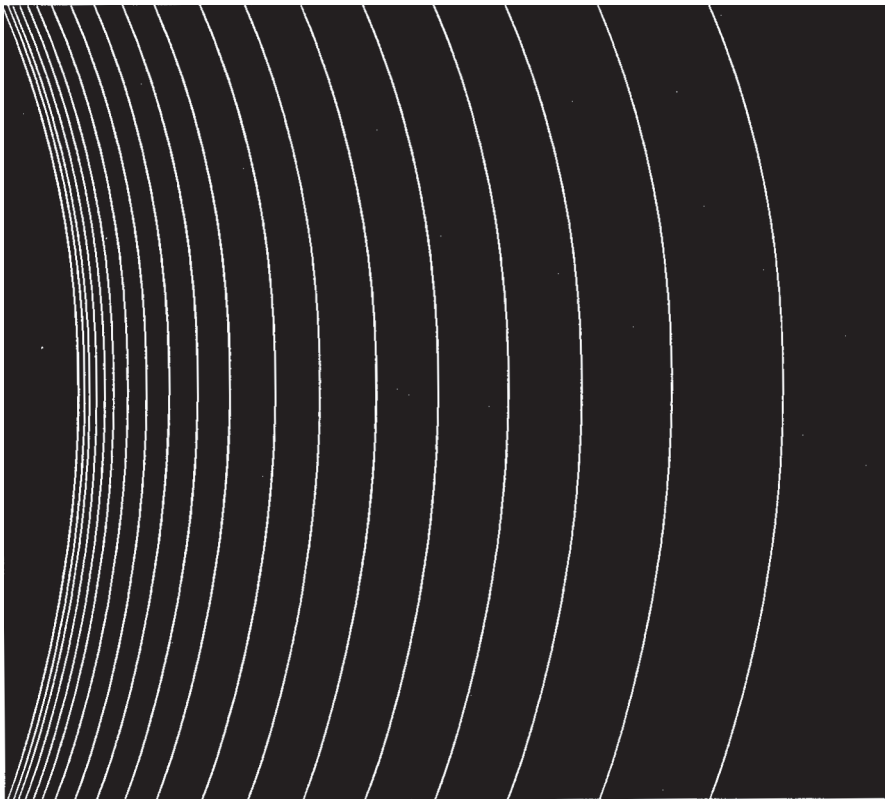
Board on International Scientific Organizations
U.S. National Committee for the
International Union of Radio Science
National Academy of Sciences



9–12 January 2019

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

2019 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
Wednesday 9 January 08:20-12:00	A1 - Channel Sounder Measurements and Verification	C1 - Imaging and Distributed Sensing C2 - Array Performance for Transmit and Receive Systems		G1 - Crowd Sourcing for Terrestrial and Planetary Applications G2 - New Application of SmallSat Sensors in Space	F1 - Random and Complex Media Models	B1 - Antenna Arrays	H1 - Physics of the Radiation Belts I	J1 - Next Generation Very Large Array Design and Development	B2 - Nano-electromagnetics and Waveguiding Structures B3 - Antennas for Specialized Platforms: SmallSats, UAVs, and UUVs	
Lunch	**Special Event: Historical Talk on Lise Meitner (Math 100)**									
Wednesday 9 January 13:20-17:00	AD - Passive and Active Device and System Measurements	C3 - Radar and Sensor Systems CDEJ - Spectrum Issues and Solutions for Next-Generation Wireless Systems	K1 - Biomedical Sensors and Devices	G3 - Space Plasma Measurement Techniques GH1 - Ionospheric Modification	F2 - Microwave Remote Sensing of the Earth	B5 - Antennas	H2 - Physics of the Radiation Belts II	J2 - New Telescopes, Techniques and Technology	B4 - Metamaterials and Metasurfaces: Theory & Applications	D1 - Submillimeter-Wave/ Terahertz Circuits and Applications
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**									
Thursday 10 January 08:20-12:00	**Plenary Session (Math 100):** **Ernest K. Smith USNC-URSI Student Paper Competition** ***Meeting Highlight Plenary Talks: (1) IEEE SmartAg Initiative: Technology Applied to the Food Supply Chain;*** ***(2) Atacama Large Millimeter Array (ALMA) in 2030***									
Lunch	**Lunch is Provided for all Students (Atrium at Koelbel - Business School)**									
Thursday 10 January 13:20-17:00			K2 - RF, Microwave and THz Diagnostics / Therapeutics	G4 - Radar and Radio Techniques for Ionospheric Diagnostics	F3 - RF Propagation Utilizing Numerical Weather Prediction	B6 - Numerical Methods	H3 - Waves and Turbulence in Laboratory and Space Plasmas	J3 - Radio Emission from Extrasolar Planets	BK - Wearable, Implants, and Body-Area Networks	D2 - Components and Circuits for Wireless Applications
17:00				Commission G 17:00					Commission B 17:00	
18:00			Commission K 18:00				Commission H 18:00			Commission D 18:00
Friday 11 January 08:20-12:00				G5 - New Horizons in Active and Passive Radio Techniques for Geospace Remote Sensing	F4 - Remote Sensing: Small Satellites and RFI Mitigation	B7 - Microstrip and Printed Devices and Antennas B9 -Wireless Communications and Periodic Structures	HEG - Lightning and the Ionosphere	J4 - Cosmology and Astrophysics at Low Frequencies I	B8 - Analytical and Theoretical Electromagnetics	
Lunch	**Special Event: Sixth Hans Liebe Lecture (Math 100)**									
Friday 11 January 13:20-17:00	FGH - GNSS and Radio Beacon Remote Sensing				F5 - Point-to-Point Propagation Effects: Measurements and Models		GH2- Meteors, Orbital Debris, and Dusty Plasmas	J5 - Cosmology and Astrophysics at Low Frequencies II	B10 - Low-Profile Antennas from Gigahertz to Terahertz	

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. For further information on URSI, please visit www.ursi.org.

Both URSI and the U.S. National Committee (USNC) for 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 next NARSM will be held in Montreal, Quebec, Canada on July 4–11, 2020.

The international URSI General Assembly and Scientific Symposium (GASS) is held every three years in locations around the world. The 32nd URSI GASS 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 GASS will be held in Rome, Italy, on August 29 – Sept. 5, 2020.

In addition to the GASS, URSI holds two other flagship meetings every three years, the Atlantic Radio Science Conference (AT–RASC) and the Asia–Pacific Radio Science Conference (AP–RASC). The last AT–RASC meeting was held on 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 on 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.

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New in 2019: Look for Color–Coded Name Badges

The colored ribbons attached to certain individuals' name tags will help you identify the Officers, Commission Chairs and Committee Members of the USNC–URSI, as well as recognize those who have volunteered to serve as session chairs. If you have any questions about USNC–URSI, please ask one of these leaders.

Blue: USNC–URSI Officer
Green: USNC–URSI Committee Member
Orange: USNC–URSI Commission Chair
Red: Session Chair

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UNITED STATES NATIONAL COMMITTEE
INTERNATIONAL UNION OF RADIO SCIENCE
TECHNICAL PROGRAM
National Radio Science Meeting
9–12 January 2019
University of Colorado Boulder
Sponsored by USNC–URSI

ROOM AND TIME SCHEDULE FOR SESSIONS

National Radio Science Meeting
9–12 January 2019
University of Colorado Boulder
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TUESDAY EVENING, 8 January 2019

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

WEDNESDAY MORNING, 9 January 2019

Session A1: Channel Sounder Measurements and Verification
Room 105
Co–Chairs: Jeanne Quimby, *NIST Boulder*;
Christopher Anderson, *US Naval Academy*

08:20 A1–1
AN NTIA/ITS HIGH–PERFORMANCE CW CHANNEL SOUNDER
Robert T. Johnk*, Chris A. Hammerschmidt
Institute for Telecommunication Sciences, Boulder, CO

08:40 A1–2
A SOFTWARE DEFINED RADIO PN CHANNEL SOUNDER FOR UNMANNED AERIAL VEHICLES
Kenneth R. Baker*[1], Christopher R. Anderson[2]
[1]Theory Division, Institute for Telecommunication Sciences, Boulder, CO
[2]Wireless Measurement Group, US Naval Academy, Annapolis, MD

09:00 A1–3
PRECISION GEOLOCATION FOR PROPAGATION MEASUREMENTS IN THE FIELD: CONSIDERATIONS AND BEST PRACTICES
Anna Paulson*
Institute for Telecommunication Sciences/Spectrum and Propagation Measurements Division, National Telecommunications and Information Administration, Boulder, CO

09:20 A1–4
MODELING THE SPATIO–TEMPORAL RESOLUTION OF DIRECTIONAL CHANNEL SOUNDERS
David G. Michelson*, Anmol Bhardwaj
Electrical and Computer Engineering, University of British Columbia, Vancouver, BC, CANADA

09:40 A1–5
CHANNEL SOUNDER MEASUREMENT VERIFICATION: CONDUCTED MEASUREMENT CAMPAIGN
Jeanne Quimby*[1], Chris Hammerschmidt[2], Amanda Koepke[1], Robert Johnk[2], Jacob Rezac[1], Jeffrey Jargon[1], Rod Leonhardt[1], Kate A. Remley[1], Paul Mckenna[2], Irena Stange[2], Mike Chang[2], Paul Hale[1], Nicholas DeMinco[2], Savio Tran[2]
[1]NIST Boulder, Boulder, CO
[2]ITS Boulder, Boulder, CO

10:00 Break

10:20 A1–6
CHANNEL SOUNDER MEASUREMENT VERIFICATION: OPEN AREA TEST SITE MEASUREMENT CAMPAIGNS
Robert Johnk*[1], Jeanne Quimby[2], Chris Hammerschmidt[1], Amanda Koepke[2], Irena Strang[1], Mike Chang[1], Savio Tran[1], Jacob Rezac[2], Jeffrey Jargon[2], Rod Leonhardt[2], Paul Mckenna[1], Nicholas DeMinco[1], Paul Hale[2], Kate A. Remley[2]
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10:40 A1–7
CHANNEL SOUNDER MEASUREMENT VERIFICATION: RANDOM MEASUREMENT ERROR
Amanda Koepke*[1], Jeanne Quimby[1], Chris Hammerschmidt[2], Jacob Rezac[1], Rod Leonhardt[1], Paul Hale[1], Robert Johnk[2], Paul Mckenna[2], Jeffrey Jargon[1], Irena Stange[2], Mike Chang[2], Kate A. Remley[1], Savio Tran[2], Nicholas DeMinco[2]
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11:00 A1–8
CHANNEL SOUNDER MEASUREMENT VERIFICATION: BEST PRACTICES
Chris Hammerschmidt*[1], Jeanne Quimby[2], Amanda Koepke[2], Jacob Rezac[2], Robert Johnk[1], Jeffrey Jargon[2], Rod Leonhardt[2], Paul Hale[2], Kate A. Remley[2], Paul Mckenna[1], Irena Stange[1], Mike Chang[1], Savio Tran[1], Nicholas DeMinco[1]
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11:20 A1–9
CHANNEL MODEL COMPARISON FOR 28 GHZ MILLIMETER WAVE IN SUBURBAN AND RURAL ENVIRONMENTS
Yaguang Zhang[1], Christopher R. Anderson*[2], James V. Krogmeier[1]
[1]School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN
[2]Electrical and Computer Engineering, United States Naval Academy, Annapolis, MD

11:40 A1–10
SPATIAL VARIABILITY OF RADIO–FREQUENCY NOISE IN URBAN ENVIRONMENTS IN THE VHF AND UHF BANDS
Caitlin E. Haedrich*, Daniel J. Breton, Keith D. Wilson
Signature Physics, Cold Regions Research and Engineering Laboratory, Hanover, NH

Session B1: Antenna Arrays
Room 200
Co–Chairs: Filippo Capolino, *University of California, Irvine*;
Nader Behdad, *University of Wisconsin–Madison*

08:20 B1–1
SIMPLIFYING AND GENERALIZING ANTENNA ARRAY EXPRESSIONS WITH THE ANTENNA EQUATION
Everett G. Farr*
Farr Fields, LC, Albuquerque, NM

08:40 B1–2
EXPERIMENTAL COMPARISON OF DIGITAL BEAMFORMING INTERFERENCE CANCELLATION ALGORITHMS USING A SOFTWARE DEFINED RADIO ARRAY
Daniel C. Gaydos*, Payam Nayeri, Randy Haupt
Electrical Engineering, Colorado School of Mines, Golden, CO

09:00 B1–3
A COMPACT BEAM STEERING DRA ANTENNA FOR WIRELESS POWER TRANSFER
Reza Karimian Bahnemiri, Behzad Koosha*, Shahrokh Ahmadi, Mona Zaghloul
Electrical and Computer Engineering, The George Washington University, Washington, DC

09:20 B1–4
DESIGN OF WIDEBAND ELLIPTIC MONOPOLE ANTENNA ARRAYS WITH CONSTANT HALF–POWER BEAMWIDTH
Dakotah J. Simpson*, Christopher G. Gay, Dimitra Psychogiou
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

09:40 B1–5
A WIDEBAND DIFFERENTIALLY FED TIGHTLY COUPLED DIPOLE ARRAY
Alexander D. Johnson*, Elias A. Alwan, John L. Volakis
Florida International University, Miami, FL

10:00 Break

10:20 B1–6
5G MASSIVE MIMO BASE STATION PANELS WITH DUAL LINEAR POLARIZED VIVALDI ARRAY ANTENNA APERTURE
Hao–Lung Chu, Ghanshyam Mishra*, Satish Kumar Sharma
Electrical and Computer Engineering, San Diego State University, San Diego, CA

10:40 B1–7
DEPLOYABLE ULTRA–WIDEBAND TIGHTLY COUPLED DIPOLE TEXTILE ARRAY
Matthew W. Nichols*, Alexander D. Johnson, Elias A. Alwan, John L. Volakis
Florida International University, Miami, FL

11:00 B1–8
EXTENDED BUTLER MATRIX DESIGN BY USING PHASE RECONFIGURABLE CRLH TRANSMISSION LINE
Reza Karimian Bahnemiri, Behzad Koosha*, Shahrokh Ahmadi, Mona Zaghloul
Electrical and Computer Engineering, The George Washington University, Washington, DC

11:20 B1–9
WIDEBAND DUAL–POLARIZED CAVITY–BACKED VIVALDI ARRAY ANTENNAS FOR BI–STATIC SIMULTANEOUS TRANSMIT RECEIVE
Elie G. Tianang*, Mohamed A. Elmansouri, Dejan S. Filipovic
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

11:40 B1–10
BROADBAND SMALL–APERTURE DIRECTION FINDING ARRAY WITH AZIMUTH AND ELEVATION ESTIMATION CAPABILITY
Ruyu Ma*, Nader Behdad
Electrical and Computer Engineering, University of Wisconsin–Madison, Madison, WI

Session B2: Nano–electromagnetics and Waveguiding Structures
Room 1B40
Co–Chairs: Zoya Popovic, *University of Colorado Boulder*; Dimitrios Peroulis, *Purdue University*

08:20 B2–1
H–PLANE CAVITY FILTERS AND DIPLEXERS FOR MICROWAVE RADIOMETERS
Zheng Wang*
Boulder Environmental Sciences and Technology, Boulder, CO

08:40 B2–2
CAD OF SELF–BIASED FERRITE CIRCULATORS
Laila F. Marzall*, Mauricio Pinto, Andrea Ashley, Dimitra Psychogiou, Zoya Popovic
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

09:00 B2–3
GAAS MMIC ACTIVE CIRCULATOR
Laila Marzall*, Zoya Popovic
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

09:20 B2–4
HYBRID WEDGE–INTEGRATED PLASMONIC–PHOTONIC WAVEGUIDE
Zahra Manzoor*
Missouri University of Science and Technology, Rolla, MO

09:40 B2–5
EMBEDDED MTM–EBGS FOR ANTENNA APPLICATIONS
Stuart Barth, Braden P. Smyth, Jacob A. Brown, Ashwin K. Iyer*
Electrical and Computer Engineering, University of Alberta, Edmonton, Alberta, CANADA

Session B3: Antennas for Specialized Platforms: SmallSats, UAVs, and UUVs
Room 1B40
Co–Chairs: Reyhan Baktur, *Utah State University*; David Jackson, *University of Houston*

10:20 B3–1
REPRESENTATIVE LOW–PROFILE GREGORIAN REFLECTOR ANTENNA DESIGN WITH A COMPACT DEPLOYMENT STRATEGY FOR EMERGING CUBESATS
Vignesh Manohar*, Jordan Budhu, Yahya Rahmat–Samii
Electrical and Computer Engineering, University of California, Los Angeles, Los Angeles, CA

10:40 B3–2
COMPACT HIGH ISOLATION PLANAR RX–TX KU BAND PHASED ARRAYS FOR UNMANNED AERIAL SYSTEMS (UAS)
Jakob W. Kunzler*, Jacob M. Bartschi, Karl F. Warnick
Electrical and Computer Engineering, Brigham Young University, Provo, UT

11:00 B3–3 (Invited)
DESIGN OF A RECONFIGURABLE, PLATFORM–BASED HF DIRECTION FINDING SYSTEM USING THE CHARACTERISTIC MODE THEORY
Kai Ren*, Ruyu Ma, Nader Behdad
Electrical and Computer Engineering, University of Wisconsin–Madison, Madison, WI

11:20 B3–4
INFLATABLE ANTENNAS AND ANTENNAS PRINTED ON WEATHER BALLOONS
Robert M. McKay*, Reyhan Baktur
Electrical and Computer Engineering, Utah State University, Logan, UT

11:40 B3–5
A STUDY ON EFFECTS OF SMALL BREAKAGES ON AN ANTENNA
Dave W. Barker*, Reyhan Baktur
Electrical Engineering, Utah State University, Logan, UT

Session C1: Imaging and Distributed Sensing
Room 135
Co–Chairs: Jean–Francois Chamberland, *Texas A&M University*; Gregory Huff, *The Pennsylvania State University*; Eric Mokole, *The MITRE Corporation*

08:20 C1–1
AUTOMATIC SENSOR RECONFIGURATION BASED ON ADAPTIVE RELEVANCE VECTOR MACHINE FOR UNCERTAINTY REDUCTION IN TOMOGRAPHY IMAGING
Daniel Ospina Acero*[1], Shah M. Chowdhury[1], Fernando L. Teixeira[1], Qussai M. Marashdeh[2]
[1]*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Tech4Imaging, Columbus, OH*

08:40 C1–2
EVALUATING CROSS–PLANE ACQUISITIONS FOR VOLUME PROCESS TOMOGRAPHY IN THE LAPLACIAN REGIME
Rafiul K. Rasel*[1], Daniel Ospina Acero[1], Fernando L. Teixeira[1], Qussai M. Marashdeh[2]
[1]*Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Tech4Imaging LLC, Columbus, OH*

09:00 C1–3
VELOCITY PROFILING OF TWO–PHASE FLOWS BASED ON SOFT–FIELD VOLUME TOMOGRAPHY
Shah M. Chowdhury*[1], Rafiul K. Rasel[1], Fernando L. Teixeira[1], Qussai M. Marashdeh[2]
[1]*Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*Tech4Imaging LLC, Columbus, OH*

09:20 C1–4
A SELF–SUSTAINING MARITIME MESH NETWORK
Ali Hosseini–Fahraji*, Kexiong Zeng, Yaling Yang, Majid Manteghi
Electrical and Computer Engineering, Virginia Polytechnic Institute & State University, Blacksburg, VA

09:40 C1–5
AN ANTENNA SYSTEM FOR AUTONOMOUS UNDERWATER VEHICLE
Pedram Loghmannia*, Majid Manteghi
Electrical and Computer Engineering, Virginia Polytechnic Institute & State University, Blacksburg, VA

Session C2: Array Performance for Transmit and Receive Systems
Room 135
Co–Chairs: Lawrence Cohen, *Naval Research Laboratory*; Eric Mokole, *The MITRE Corporation*

10:20 C2–1
USING THE ANTENNA EQUATION TO DESCRIBE COUPLING INTO AND LEAKAGE FROM IMPERFECTLY SHIELDED ENCLOSURES
Everett G. Farr*
Farr Fields, LC, Albuquerque, NM

10:40 C2–2
WIDEBAND TRANSMIT NOISE SUPPRESSION IN STAR SYSTEM WITH UWB ARRAYS
Satheesh Bojja Venkatakrishnan*, Alexander Hovsepian, Elias Alwan, John Volakis
Electrical and Computer Engineering, Florida International University, Miami, FL

11:00 C2–3
IMPROVING THE PERFORMANCE OF ARRAY RECEIVERS BY EXPLOITING THE BASIC PHYSICS OF SPACETIME
Arjuna Madanayake*[1], Soumyajit Mandal[2], Yingying Wang[2], Jifu Liang[2], Leonid Belostotski[3]
[1]*Florida International University (FIU), Miami, FL*
[2]*Case Western Reserve University (CWRU), Cleveland, OH*
[3]*University of Calgary, Calgary, AB, CANADA*

11:20 C2–4
MECHANICAL ROTATING ARRAYS FOR SIDELOBE SUPPRESSION
Junming Diao*, Maziar Hedayati, Rustu U. Tok, Yuanxun E. Wang
University of California, Los Angeles, Los Angeles, CA

11:40 C2–5
EXPERIMENTAL DEMONSTRATION OF DISTRIBUTED BEAMFORMING ON TWO FLYING MINI–DRONES
Junming Diao*, Maziar Hedayati, Yunxuan E. Wang
University of California, Los Angeles, Los Angeles, CA

Session F1: Random and Complex Media Models
Room 155
Co–Chairs: Saba Mudaliar, *Air Force Research Laboratory*; Gary Brown, *Virginia Polytechnic Institute & State University*

08:20 F1–1
ANALYTIC APPROACHES TO MULTIPLE SCATTERING ON ROUGH SURFACES
Gary S. Brown*, Kevin Diomedi
EMIL, Electrical and Computer Engineering, Virginia Polytechnic Institute & State University, Blacksburg, VA

08:40 F1–2 (Invited)
A METHOD OF A TANGENT CYLINDER IN THE THEORY OF WAVE SCATTERING BY CONVEX SURFACES
Alexander G. Voronovich*
Physical Sciences Division, NOAA/ESRL, Boulder, CO

09:00 F1–3 (Invited)
BISTATIC RADAR SCATTERING FROM THE OCEAN SURFACE: ASSESSMENT OF VALIDITY OF THE KIRCHHOFF–GEOMETRIC OPTICS APPROACH USING THE SMALL SLOPE APPROXIMATION
Valery U. Zavorotny*[1,2], Alexander G. Voronovich[1]
[1]*NOAA/Earth System Research Laboratory, Boulder, CO*
[2]*CIRES, University of Colorado Boulder, Boulder, CO*

09:20 F1–4 (Invited)
A STUDY OF FORWARD MODELS FOR PREDICTING CROSS–POLARIZED BACKSCATTER FROM SOIL SURFACES
Shanka N. Wijesundara*, Joel T. Johnson
ElectroScience Laboratory, The Ohio State University, Columbus, Ohio

09:40 F1–5 (Invited)
TIME–DOMAIN ANALYSIS OF MULTIPLE SCATTERING EFFECTS ON THE RADAR CROSS SECTION (RCS) OF OBJECTS IN A RANDOM MEDIUM
Chenxin Su*[1], Akira Ishimaru[1], Yasuo Kuga[1], Sermsak Jaruwatanadilok[2]
[1]*Electrical Engineering, University of Washington, Seattle, WA*
[2]*Jet Propulsion Laboratory, Pasadena, CA*

10:00 Break

10:20 F1–6
A MODAL ANALYSIS OF SCATTERING OF OBJECTS IN AN INHOMOGENEOUS WAVEGUIDE
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*

10:40 F1–7 (Invited)
PROPAGATION IN HIGHLY ANISOTROPIC RANDOM MEDIA
Charles L. Rino*, Charles S. Corrano
Institute for Scientific Research, Boston College, Chestnut Hill, MA

11:00 F1–8 (Invited)
DECONVOLUTION–IMPROVED ANGULAR RESOLUTION IN THE EARLY–TIME DIFFUSION IMAGING THROUGH RANDOM MEDIA
Elizabeth Bleszynski*, Marek Bleszynski, Thomas Jaroszewicz
Monopole Research, Thousand Oaks, CA

11:20 F1–9 (Invited)
NUMERICAL COMPUTATION OF SIGNAL LOG–AMPLITUDE VARIANCE IN TROPOSPHERIC TURBULENCE
Swagato Mukherjee*, Caglar Yardim
The Ohio State University, Columbus, OH

11:40 F1–10 (Invited)
BISTATIC SCATTERING FROM FORESTS WITH UNDERLYING ROUGH SURFACES
Can Suer*, Roger Lang
Electrical and Computer Engineering, George Washington University, Washington, DC

Session G1: Crowd Sourcing for Terrestrial and Planetary Applications
Room 151
Co–Chairs: Fabiano Rodrigues, *The University of Texas at Dallas*; Roy Calfas, *The University of Texas at Austin*

08:20 G1–1
INVESTIGATING CELL PHONE GNSS FOR IONOSPHERE REMOTE SENSING
Susan Skone*, Sajan Mushini
University of Calgary, Calgary, Alberta, CANADA

08:40 G1–2
FLEXIBLE, DEPLOYABLE RADIO INSTRUMENTS USING RAPID HARDWARE AND DIGITAL RF SOFTWARE
Ryan Volz*, Frank D. Lind, John Swoboda, Philip J. Erickson
MIT Haystack Observatory, Westford, MA

09:00 G1–3
THE IARPA PASSIVE IONOSPHERIC NON–CHARACTERIZED SOUNDING (PINS) CHALLENGE
Torreon Creekmore*[1], Eugene V. Dao[2], Patrick B. Dandenault[3], Ethan S. Miller[3], Charles Gill[1]
[1]*IARPA, Riverdale Park, MD*
[2]*Space Vehicles Directorate, Air Force Research Laboratory, Albuquerque, NM*
[3] *Johns Hopkins University Applied Physics Laboratory, Laurel, MD*

09:20 G1–4
DISTRIBUTED SENSOR NETWORKS IN COLLABORATION WITH CITIZEN SCIENTISTS
Asti Bhatt*
SRI International, Menlo Park, CA

09:40 G1–5
PLANS FOR ECLIPSEMOB 2024
Kiersten C. Kerby–Patel*[1], William Liles[2], Jill Nelson[3], Laura Lukes[3]
[1]*University of Massachusetts Boston, Boston, MA*
[2]*Independent Consultant, Reston, VA*
[3]*George Mason University, Fairfax, VA*

Session G2: New Application of SmallSat Sensors in Space
Room 151
Co–Chairs: Paul Bernhardt, *Naval Research Laboratory*; Rebecca Bishop, *The Aerospace Corporation*

10:20 G2–1
THE LOW–LATITUDE IONOSPHERE/THERMOSPHERE ENHANCEMENTS IN DENSITY (LLITED) MISSION
Rebecca L. Bishop*[1], James H. Clemmons[2], Aroh Barjatya[3], Richard L. Walterscheid[1]
[1]*The Aerospace Corporation, El Segundo, CA*
[2]*University of New Hampshire, Durham, NH*
[3]*Embry–Riddle Aeronautical University, Daytona Beach, FL*

10:40 G2–2
UTILIZING GNSS RADIO OCCULTATION SENSORS ON SPACE WEATHER CUBESAT MISSIONS
Rebecca L. Bishop*
The Aerospace Corporation, El Segundo, CA

11:00 G2–3
COMPOSITION OF THE TOPSIDE IONOSPHERE DETERMINED FROM PLASMA WAVE MEASUREMENTS USING THE RADIO RECEIVER INSTRUMENT ON E–POP
Paul A. Bernhardt*[1], Michael K. Griffin[2], William C. Bougas[2], A D. Howarth[3], Gordon James[3]
[1]*Plasma Physics, Naval Research Laboratory, Washington, DC*
[2]*Space Systems and Technology, MIT/Lincoln Laboratory, Lexington, MA*
[3]*Physics and Astronomy, University of Calgary, Calgary, Alberta, CANADA*

11:20 G2–4
SPACE– AND GROUND–BASED MEASUREMENTS OF RADIATION BELT PRECIPITATION: EXTENDING THE CAPABILITIES OF CUBESATS AND RADARS
Diana Juarez Madera*[1], Sigrid Close[1], Alexander Crew[2], Robert Marshall[3]
[1]*Aeronautics and Astronautics, Stanford University, Stanford, CA*
[2]*Applied Physics Laboratory, Johns Hopkins University, Laurel, MD*
[3]*Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO*

11:40 G2–5
CYGNSS: GLOBAL REMOTE SENSING WITH A CONSTELLATION OF SMALL SATELLITES
Scott Gleason*[1], Chris Ruf[2], Dorina Twigg[2], Charles Bussy–Virat[2], Aaron Ridley[2], Kyle Nave[3]
[1]*UCAR, Boulder*
[2]*University of Michigan, Ann Arbor, MI*
[3]*Applied Defense Solutions, Denver, CO*

Session H1: Physics of the Radiation Belts I
Room 245
Co–Chairs: Poorya Hosseini, *University of Colorado Denver*; Christopher Crabtree, *Naval Research Laboratory*

08:20 H1–1
RECENT PROGRESS TOWARDS A RADIATION BELT REMEDIATION STRATEGY BASED ON ARTIFICIAL INJECTION OF PLASMA WAVES
Gian Luca Delzanno*[1], Quinn Marksteiner[1], Geoffrey Reeves[1], Bruce Carlsten[1], Patrick Colestock[2], Misa Cowee[1], Gregory Cunningham[1], Seth Dorfman[3], Leanne Duffy[1], Christopher Jeffery[1], Oleksandr Koshkarov[1], Vadim Roytershteyn[4], Kateryna Yakymenko[1], Nikolai Yampolsky[1]
[1]*Los Alamos National Laboratory, Los Alamos, NM*
[2]*Retired, Pojoaque, NM*
[3]*University of California, Los Angeles, Los Angeles, CA*
[4]*Space Science Institute, Boulder, CO*

08:40 H1–2
STATISTICAL OCCURRENCE AND DISTRIBUTION OF THE ELECTRIC AND MAGNETIC FIELD PEAKS OF HIGH AMPLITUDE WHISTLER–MODE WAVES IN THE OUTER RADIATION BELT
Evan A. Tyler*[1], Aaron Breneman[1], Cynthia Cattell[1], John Wygant[1], Scott Thaller[2], David Malaspina[2]
[1]*University of Minnesota, Minneapolis, MN*
[2]*Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO*

09:00 H1–3
OBSERVED PROPAGATION ROUTE OF VLF TRANSMITTER SIGNALS IN THE MAGNETOSPHERE
Lunjin Chen*, Zhenxia Zhang, Zhiyang Xia
The Center for Space Sciences, The University of Texas at Dallas, Richardson, TX

09:20 H1–4
OBSERVATIONS OF INTERACTIONS BETWEEN EMIC AND MAGNETOSONIC WAVE MODES AT HEAVY ION BOUNDARIES
Kristoff Paulson*[1], Charles Smith[1], Roy Torbert[2], Scott Boardsen[3]
[1]*University of New Hampshire, Durham, NH*
[2]*Southwest Research Institute, Durham, NH*
[3]*University of Maryland Baltimore, Baltimore, MD*

09:40 H1–5
PARAMETRIC INTERACTION OF VLF AND ELF WAVES AND IMPACT ON ENERGETIC ELECTRONS IN A RADIATION BELT
Vladimir Sotnikov*
Air Force Research Laboratory, Wright Patterson AFB, OH

10:00 Break

10:20 H1–6
SPATIAL SCALES AND PROPERTIES OF EMIC WAVES USING SIMULTANEOUS MULTI–SATELLITE OBSERVATIONS
Xiaochen Shen*[1], Wen Li[1], Qianli Ma[2,1], Run Shi[3], Murong Qin[4]
[1]*Center for Space Physics, Boston University, Boston, MA*
[2]*Atmospheric and Oceanic Sciences, University of California, Los Angeles, Los Angeles, CA*
[3]*Space Physics, Wuhan University, Wuhan, Hebei, CHINA*
[4]*Physics and Astronomy, Dartmouth College, Hanover, NH*

10:40 H1–7
THEORETICAL PLASMA PHYSICS TO BE TESTED IN THE SMART EXPERIMENT
Christopher Crabtree*, Guru Ganguli, Alex Fletcher, Carl Siefring, Bill Amatucci, Erik Tejero
Naval Research Laboratory, Washington, DC

11:00 H1–8
NONLINEAR INTERACTIONS BETWEEN CHORUS WAVES AND RADIATION BELT ELECTRONS
Wen Li*[1], Longzhi Gan[1], Qianli Ma[2,1], Jay M. Albert[3]
[1]*Boston University, Boston, MA*
[2]*University of California, Los Angeles, Los Angeles, CA*
[3]*Air Force Research Laboratory, Kirtland AFB, NM*

11:20 H1–9
ORIENTATION OF WHISTLER–MODE CHORUS WAVE VECTORS AND THE IMPLICATIONS FOR THE CHORUS–TO–HISS MECHANISM
David P. Hartley*[1], Craig A. Kletzing[1], Lunjin Chen[2], Richard B. Horne[3], Ondrej Santolik[4,5]
[1]*University of Iowa, Iowa City, Iowa*
[2]*University of Texas at Dallas, Richardson, Texas*
[3]*British Antarctic Survey, Cambridge, UNITED KINGDOM*
[4]*Institute of Atmospheric Physics, Prague, CZECH REPUBLIC*
[5]*Charles University, Prague, CZECH REPUBLIC*

11:40 H1–10
MMS OBSERVATIONS OF HARMONIC ELECTROMAGNETIC ION CYCLOTRON WAVES
Maria E. Usanova*[1], Narges Ahmadi[1], David Malaspina[1], Robert Ergun[1], Karlheinz Trattner[1], Quinton Reece[1,2], Trevor Leonard[1], Stephen Fuselier[3,4], Roy Torbert[5], Christopher Russell[6], Jim Burch[3]
[1]*Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO*
[2]*Boulder High School, Boulder, CO*
[3]*Southwest Research Institute, San Antonio, TX*
[4]*Physics and Astronomy, University of Texas at San Antonio, San Antonio, TX*
[5]*Space Science Center, University of New Hampshire, Durham, NH*
[6]*University of California, Los Angeles, Los Angeles, CA*

Session J1: Next Generation Very Large Array Design and Development
Room 265
Co–Chairs: Steve Durand, *National Radio Astronomy Observatory*; Robert Selina, *National Radio Astronomy Observatory*

08:20 J1–1 (Invited)
NGVLA: REFERENCE DESIGN OVERVIEW
Robert J. Selina*
ngVLA, National Radio Astronomy Observatory, Socorro, NM

08:40 J1–2 (Invited)
ANTENNA ELECTRONICS REFERENCE DESIGN FOR THE NEXT–GENERATION VERY LARGE ARRAY
James M. Jackson*, Robert Selina, Steven Durand
National Radio Astronomy Observatory, Socorro, NM

09:00 J1–3 (Invited)
TRIDENT FREQUENCY SLICE ARCHITECTURE CORRELATOR/BEAMFORMER REFERENCE DESIGN FOR NGVLA
Mike Pleasance*, Brent Carlson, Michael Rupen
Herzberg Astronomy and Astrophysics, National Research Council Canada, Penticton, BC, CANADA

09:20 J1–4 (Invited)
WIDEBAND RECEIVER PROTOTYPE FOR NGVLA: DEVELOPMENT REPORT
Hamdi Mani*[1], Sander Weinreb[2], Jun Shi[2], Ahmed Akgiray[3]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Electrical Engineering, California Institute of Technology, Pasadena, CA*
[3]*Electrical Engineering, Ozyegin University, Turkey, TURKEY*

09:40 J1–5 (Invited)
REFERENCE FRONT END DESIGN FOR A NEXT GENERATION VERY LARGE ARRAY
Wes Grammer, Denis Urbain*, Silver Sturgis
National Radio Astronomy Observatory, Socorro NM

10:00 Break

10:20 J1–6 (Invited)
EXPERIMENTAL EVALUATION USING VLA DATASETS OF RFI MITIGATION PERFORMANCE OVER LONG NGVLA BASELINES
Michael Lambert[1], Urvashi Rao Venkata[2], Mitchell C. Burnett[1], Brian D. Jeffs*[1]
[1]*Electrical and Computer Engineering, Brigham Young University, Provo, UT*
[2]*National Radio Astronomy Observatory VLA Operations Center, Socorro, NM*

10:40 J1–7 (Invited)
INCOHERENT CLOCKING AND APPLICATION TO THE NGVLA
Brent R. Carlson*, Thushara G. Gunaratne
National Research Council Canada, Penticton, BC, CANADA

11:00 J1–8 (Invited)
A HIGH PERFORMANCE, OFFSET, SHAPED ANTENNA DESIGN FOR THE NEW GENERATION VLA PROJECT
Lynn Baker*
Consultant, Issaquah, WA

11:20 J1–9 (Invited)
COMPOSITE 18M ANTENNA REFLECTOR FOR THE NGVLA
Dean R. Chalmers*[1], Gordon E. Lacy[1], Mohammad Islam[1], Richard Hellyer[1], Joeleff Fitzsimmons[1], Lynn Baker[2], Matt C. Fleming[3], Matt Wessel[4]
[1]*National Research Council of Canada – Herzberg Astronomy and Astrophysics, Penticton, BC, CANADA*
[2]*Private Consultant, Issaquah, WA*
[3]*Minex Engineering, Antioch, CA*
[4]*SED Systems, Saskatoon, SK, CANADA*

11:40 J1–10 (Invited)
THE LONG BASELINE MAJOR OPTION FOR THE NEXT GENERATION VERY LARGE ARRAY
Thomas J. Maccarone*
Physics and Astronomy, Texas Tech University, Lubbock, TX

WEDNESDAY NOON, 9 January 2019
Special Historical Lecture
Math 100

12:15 LM –1
LISE MEITNER: HER ESCAPE FROM GERMANY AND THE DISCOVERY OF FISSION
Anthea J. Coster*
MIT Haystack Observatory, Westford, MA

WEDNESDAY AFTERNOON, 9 January 2019

Session AD: Passive and Active Device and System Measurements
Room 105
Session Co–Chairs: Jeanne Quimby, *NIST*;
Matt Simons, *NIST*

13:20 AD–1
TRANSIENT ANTENNA PATTERNS BASED ON THE ANTENNA EQUATION
Everett G. Farr*
Farr Fields, LC, Albuquerque, NM

13:40 AD–2
RADIO FREQUENCY POWER MEASUREMENTS BASED ON RYDBERG ATOM SPECTROSCOPY
Matt T. Simons*[1], Abdulaziz H. Haddab[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, LLC, Ann Arbor, MI*
[3]*Physics, University of Michigan, Ann Arbor, MI*

14:00 AD–3
DEVELOPMENT AND MEASUREMENT OF ULTRA–THIN ANTENNAS FOR MUOS
Steven Weiss*
US Army Research Laboratory, Adelphi, MD

14:20 AD–4
USING RADIATION PRESSURE TO DEVELOP A NEW SI TRACEABLE POWER MEASUREMENT
Christopher L. Holloway*, Matthew Simons, Alexandra Artusio–Glimpse, Ivan Ryger, Abdulaziz Haddab, David Novotny, Kyle Rogers, John Lehman, Paul Williams, Gordon Shaw
NIST, Boulder, CO

14:40 AD–5
ULTRA–WIDEBAND, COMPACT, AND HIGH–GAIN SLOT ANTENNA SYSTEM FOR FULL–DUPLEX APPLICATIONS
Seyed Mohammad Amjadi*, Kamal Sarabandi
The University of Michigan, Ann Arbor, MI

15:00 Break

15:20 AD–6
A SINGLE LAYER PLANAR K–BAND MONOPULSE RADAR RECEIVER
Michael C. Brown*, Changzhi Li
Electrical and Computer Engineering, Texas Tech University, Lubbock, TX

15:40 AD–7
MILLIMETER WAVE INTEGRATED ANTENNA ARRAY ON LTCC
Maxence Carvalho*, Abe Akhiyat, John Volakis
Electrical and Computer Engineering, Florida International University, Miami, FL

16:00 AD–8
DIELECTRIC METAMATERIAL FOR ANTENNA SUBSTRATES
Quang Nguyen, Max Burnett*, Amir Zaghloul
U.S. Army Research Laboratory, Adelphi, MD

16:20 AD–9
MEASUREMENT OF A FOUR CHANNEL ANALOG BEAMFORMER FOR ANTI–JAM GPS APPLICATIONS
Jeffrey A. Maloney*[1], Steven D. Keller[2], Theodore K. Anhony[2], Steven J. Weiss[2], Do–Hoon Kwon[1], Ramakrishna Janaswamy[1]
[1]*Electrical and Computer Engineering, University of Massachusetts Amherst, Amherst, MA*
[2]*Sensors and Electronic Devices Directorate, The US Army Research Laboratory, Adelphi, MD*

16:40 AD–10
DIELECTRIC MEASUREMENTS OF HIGH PERMITTIVITY 3D PRINTED SUBSTRATES
Gregory Mitchell*, Thedore Anthony, Quang Nguyen
U.S. Army Research Laboratory, Adelphi, MD

Session B4: Metamaterials and Metasurfaces: Theory & Applications
Room 1B40
Session Co–Chairs: Ashwin Iyer, *University of Alberta*;
Filippo Capolino, *University of California, Irvine*

13:20 B4–1 (Invited)
MAGNET–FREE CIRCULATORS BASED ON LINEAR TIME–VARYING CIRCUITS
Ahmed Kord*[1], Andrea Alu[2]
[1]*Electrical and Computer Engineering, University of Texas at Austin, Austin, TX*
[2]*Advanced Science Research Center, City University of New York, New York, NY*

13:40 B4–2 (Invited)
EXCEPTIONAL POINTS OF DEGENERACY INDUCED IN LINEAR TIME–PERIODIC SYSTEMS
Hamidreza Kazemi*, Mohamad Y. Nada, Tarek Mealy, Ahmed F. Abdelshafy, Filippo Capolino
University of California, Irvine, Irvine, CA

14:00 B4–3 (Invited)
N–PATH NETWORK ANALYSIS USING THE FLOQUET SCATTERING MATRIX METHOD
Cody R. Scarborough*, Anthony Grbic
Electrical Engineering and Computer Science, The University of Michigan, Ann Arbor, MI

14:20 B4–4 (Invited)
RECTANGULAR WAVEGUIDE LOADED WITH A DIELECTRIC SLOT IN A THICK METALLIC SHIELD
Abdulaziz H. Haddab*[1], Edward F. Kuester[1], Christopher L. Holloway[2]
[1]*University of Colorado Boulder, Boulder, Colorado*
[2]*National Institute of Standards and Technology (NIST), Boulder, CO*

14:40 B4–5 (Invited)
DISPERSION AND FIELD CONTROL IN A METASURFACE–IMPLANTED WAVEGUIDE
Pai–yen Chen*[1], Danilo Erricolo[1], Yue Li[2], Atif Shamim[3], Hakan Bagci[3]
[1]*Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL*
[2]*Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, PA*
[3]*Division of Computer, Electrical, and Mathematical Science and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, SAUDI ARABIA*

15:00 Break

15:20 B4–6
SHAPE–INDEPENDENT ULTRA–SUBWAVELENGTH TOPOLOGICAL SUPERSCATTERERS
S. Ali Hassani Gangaraj*[1], Constantinos Valagiannopoulos[2], Francesco Monticone[1]
[1]*School of Electrical and Computer Engineering, Cornell University, Ithaca, NY*
[2]*Physics, Nazarbayev University, Astana, KAZAKSTAN*

15:40 B4–7 (Invited)
ADVANCES IN METASURFACES BASED ON METAMATERIAL–LINED APERTURES AND DISCS
Mitchell Semple, Elham Baladi, Ashwin K. Iyer*
Electrical and Computer Engineering, University of Alberta, Edmonton, Alberta, CANADA

16:00 B4–8 (Invited)
MANIPULATION OF FRESNEL COEFFICIENTS USING CROSS–ANISOTROPIC METASURFACE COATING
Guillaume Lavigne*, Christophe Caloz
Polytechnique Montreal, Montreal, Quebec, CANADA

16:20 B4–9 (Invited)
DESIGN OF COMPACT BEAM–STEERING ACTIVE SLOT ANTENNAS WITH A METASURFACE REFLECTOR
Omid Manoochehri[1], Danilo Erricolo*[1], Amin Darvazehban[2], Francesco Monticone[3]
[1]*Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL*
[2]*Electrical Engineering, University of Queensland, Queensland, AUSTRALIA*
[3]*School of Electrical and Computer Engineering, Cornell University, Ithaca, NY, SAUDI ARABIA*

16:40 B4–10
A NOVEL X–BAND OPTICALLY TUNABLE TRANSMISSION SURFACE BASED ON LUMPED ELEMENT OPTOELECTRONIC COMPONENTS
Marco D. Poort*, Piergiorgio L. Uslenghi
University of Illinois at Chicago, Chicago, IL

Session B5: Antennas
Room 200

Session Co–Chairs: Yahya Rahmat–Samii, *University of California, Los Angeles*;
John Volakis, *Florida International University*

13:20 B5–1
EVANESCENT–MODE CAVITY–BACKED TUNABLE SLOT ANTENNA
Abbas Semnani*, Michael D. Sinanis, Dimitrios Peroulis
School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN

13:40 B5–2
A PLANAR POSITIONING SYSTEM FOR ANTENNAS
Damien M. Gilbert*, Yangqinq Liu, Danilo Erricolo
University of Illinois at Chicago, Chicago, IL

14:00 B5–3
SMALL ANTENNA REMOTE IMPEDANCE MEASUREMENT
Ali Hosseini–Fahraji*, Majid Manteghi
Electrical and Computer Engineering, Virginia Polytechnic Institute & State University, Blacksburg, VA

14:20 B5–4
PORT TO PORT ISOLATION OF AN OMNIDIRECTIONAL ANTENNA THROUGH PERFECT SYMMETRY FOR SIMULTANEOUS TRANSMIT AND RECEIVE (STAR)
Alexander Hovsepian*, Satheesh Bojja Venkatakrishnan, Elias A. Alwan, John L. Volakis
Florida International University, Miami, FL

14:40 B5–5
HIGH DIRECTIVITY PARABOLIC REFLECTOR ANTENNA FOR SIMULTANEOUS TRANSMIT AND RECEIVE (STAR)
Merarys A. Caquias Olivera*, Prathap Valale Prasannakumar, Mohamed Elmansouri, Dejan S. Filipovic
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

15:00 Break

15:20 B5–6
A NEW 3D–PRINTED ELECTRONICALLY SCANNED SPINNING SPOT BEAM INHOMOGENEOUS DIELECTRIC LENS ANTENNA FOR SPACEBORNE WIND SCATTEROMETER WEATHER RADAR SATELLITES
Jordan F. Budhu*, Yahya Rahmat–Samii
Electrical and Computer Engineering, University of California Los Angeles, Los Angeles, CA

15:40 B5–7
DEPLOYABLE ULTRA WIDEBAND ANTENNA FOR CUBESATS
Alexander D. Johnson*, Satheesh Bojja Venkatakrishnan, Maifuz Ali, John L. Volakis
Florida International University, Miami, FL

16:00 B5–8
A SYSTEMATIC APPROACH FOR THE DESIGN OF METALLIC DELAY LENSES
Anastasios Papathanasopoulos*, Yahya Rahmat–Samii
Electrical and Computer Engineering, University of California, Los Angeles, Los Angeles, CA

16:20 B5–9
DESIGN OF UWB SMALL LOOP ANTENNA WITH CONTINUOUS TUNING FREQUENCY 1–10 MHZ
Yubin Cai*, Daisong Zhang, Yahya Rahmat–Samii
Electrical and Computer Engineering, University of California, Los Angeles, Los Angeles, CA

16:40 B5–10
EXPERIMENTAL RESULTS FROM A HIGHLY DIRECTIONAL AIR–TO–GROUND COMMUNICATIONS LINK
Sunil Ramlall*[1], Sally McGehee[1], Jorge Romero[1], Terrence Gibbons[2], Nick Marcoux[3], Adam Jones[1], Kevin Quinn[1]
[1]*SPAWAR Systems Center Pacific, San Diego, CA*
[2]*MIT Lincoln Laboratory, Lexington, MA*
[3]*Naval Undersea Warfare Center, Newport, RI*

Session C3: Radar and Sensor Systems
Room 135
Session Co–Chairs: Gregory Huff, *The Pennsylvania State University*;
Jean–Francois Chamberland, *Texas A&M University*;
Eric Mokole, *The MITRE Corporation*

13:20 C3–1
INVESTIGATING 77 GHZ AUTOMOTIVE RADAR CORNER CASES USING HIGH FIDELITY FULL–PHYSICS SIMULATIONS
Ushemadzoro Chipengo*
ANSYS Inc., Ann Arbor, MI

13:40 C3–2
EFFECTS OF TIME–VARYING TRANSMIT AMPLIFIER MATCHING NETWORKS IN COGNITIVE RADAR APPLICATIONS
Austin S. Egbert*[1], Kyle Gallagher[2], Charles Baylis[1], Anthony Martone[2], Ed Viveiros[2], Robert Marks[1]
[1]*Baylor University, Waco, TX*
[2]*Army Research Laboratory, Adelphi, MD*

14:00 C3–3
VIRTUAL ANTENNA ARRAYS IN MIMO FMCW RADAR
Eloi Guerrero–Menéndez[1], Jordi Verdú[1], Pedro de Paco Sánchez*[1,2]
[1]*Telecommunication and Systems Engineering, Universitat Autònoma de Barcelona, Bellaterra, SPAIN*
[2]*University of Colorado Boulder, Boulder, CO*

14:20 C3–4
TOWARDS MULTIPLIERLESS DIGITAL ARCHITECTURES FOR APERTURE ARRAYS WITH 1024 RF BEAMS: A 32–BEAM BUILDING BLOCK AT 5.8 GHZ
Arjuna Madanayake[1], Renato Cintra[2], Soumyajit Mandal[3], Viduneth Ariyarathna*[1], Sravan Pulipati[1], Suresh Madishetty[4], Diego Coelho[5], Ted Rappaport[6], Leonid Belostotski[7]
[1]*Electrical and Computer Engineering, Florida International University (FIU), Miami, FL*
[2]*Universidade Federal de Pernambuco, Recife, Pernambuco, BRAZIL*
[3]*Electrical and Computer Engineering, Case Western Reserve University, Cleveland, OH*
[4]*Electrical and Computer Engineering, University of Akron, Akron, OH*
[5]*Independent Researcher, Calgary, AB, CANADA*
[6]*Tandon School of Engineering, New York University, Brooklyn, NY*
[7]*Electrical and Computer Engineering, University of Calgary, Calgary, AB, CANADA*

14:40 C3–5
WIDEBAND LEAKAGE CANCELLATION NETWORK FOR MONOSTATIC CONTINUOUS–WAVE RADARS
Farnaz Foroughian*, Aly E. Fathy
The University of Tennessee, Knoxville, TN

Session CDEJ: Spectrum Issues and Solutions for Next–Generation Wireless Systems
Room 135
Session Co–Chairs: Lawrence Cohen, *Naval Research Laboratory*;
Eric Mokole, *The MITRE Corporation*;
Zoya Popovic, *University of Colorado Boulder*

15:20 CDEJ–1
APPROACH FOR REAL–TIME SYNTHESIS OF SIMULTANEOUS RADAR AND SPATIALLY SECURE COMMUNICATIONS FROM A COMMON PHASED ARRAY
Gordon L. Ledford*, Pedro Rodriguez–Garcia, Charles Baylis,

Robert J. Marks
Electrical and Computer Engineering, Baylor University, Waco, TX

15:40 CDEJ–2
REAL–TIME SYNTHESIS APPROACH FOR COEXISTENCE OF RADAR AND COMMUNICATIONS IN THE SPATIAL–SPECTRAL DOMAIN
Pedro A. Rodriguez–Garcia*[1], Austin Egbert[1], Gordon Ledford[1], Charles Baylis[1], Robert J. Marks II[1], Lawrence Cohen[2]

[1]*Baylor University, Waco, TX*
[2]*Naval Research Laboratory, Washington, DC*

16:00 CDEJ–3
A SAMPLE UNCERTAINTY BUDGET FOR A CONDUCTED COEXISTENCE TEST
Noel C. Hess*[1], Jason B. Coder[2]

[1]*University of Colorado Denver, Denver, CO*
[2]*National Institute of Standards and Technology, Boulder, CO*

16:20 CDEJ–4 (Invited)
SOFTWARE DEFINED, SPECTRALLY SENSITIVE RADAR TRANSMISSION
Charles Baylis*[1], Anthony Martone[2], Kyle Gallagher[2], Ed Viveiros[2], Abbas Semnani[3], Dimitrios Peroulis[3], Robert J. Marks II[1]

[1]*Baylor University, Waco, TX*
[2]*Army Research Laboratory, Adelphi, MD*
[3]*Purdue University, West Lafayette, IN*

16:40 CDEJ–5 (Invited)
FAST RECONFIGURATION OF SECOND–GENERATION TUNABLE EVANESCENT–MODE CAVITY MATCHING NETWORK FOR FREQUENCY AGILITY IN S–BAND COGNITIVE RADAR APPLICATIONS
Jose A. Alcala–Medel*[1], Caleb Calabrese[1], Charles Baylis[1], Anthony Martone[2], Kyle Gallagher[2], Ed Viveiros[2], Abbas Semnani[3], Dimitrios Peroulis[3]

[1]*Electrical and Computer Engineering, Baylor University, Waco Texas*
[2]*Army Research Laboratory, Adelphi, MD*
[3]*Purdue University, West Lafayette, IN*

Session D1: Submillimeter–Wave/ Terahertz Circuits and Applications
Room 1B51

Session Co–Chairs: Negar Ehsan, *NASA Goddard Space Flight Center*;
Berhanu Bulcha, *NASA Goddard Space Flight Center*;
Jonathan Chisum, *University of Notre Dame*

13:20 D1–1 (Invited)
SWIRP: COMPACT SUBMM–WAVE AND LWIR POLARIMETERS FOR CIRRUS ICE PROPERTIES
Dong L. Wu*[1], Manuel Vega[1], William R. Deal[2], William Gaines[2], Caitlyn M. Cooke[2], Russell Chipman[3], Kira Hart[3], Ping Yang[4]

[1]*NASA Goddard Space Flight Center, Greenbelt, Maryland*
[2]*Aerospace Systems, Northrop Grumman Corp, Redondo Beach, CA*
[3]*College of Optical Sciences, University of Arizona, Tucson, AZ*
[4]*Atmospheric Sciences, Texas A&M University, College Station, TX*

13:40 D1–2 (Invited)
220 GHZ AND 680 GHZ DIRECT DETECTION POLARIMETRIC RECEIVERS FOR CLOUD ICE MEASUREMENTS
Caitlyn M. Cooke*[1], Kevin M. K. H. Leong[1], Xiao Bing Mei[1], Jennifer Arroyo[2], Manuel A. Vega[3], Dong L. Wu[3], William R. Deal[1]

[1]*Northrop Grumman Corporation, Redondo Beach, CA*
[2]*Nuvotronics Inc., Durham, NC*
[3]*NASA Goddard Space Flight Center, Greenbelt, MD*

14:00 D1–3 (Invited)
A COMPACT 670–GHZ POLARIMETRIC RADIOMETER FOR CUBESAT CLOUD ICE OBSERVATIONS
Eric Bryerton*, Theodore Reck, Daniel Koller, Yiwei Duan, Jeffrey Hesler
Virginia Diodes, Inc., Charlottesville, VA

14:20 D1–4 (Invited)
SUBMILLIMETER–WAVE SCHOTTKY DIODES BASED ON HETEROGENEOUS INTEGRATION OF GAAS ONTO SILICON
Robert M. Weikle*, Linli Xie, Souheil Nadri, Masoud Jafari, Christopher M. Moore, Naser Alijabbari, Michael E. Cyberey, N S. Barker, Arthur W. Lichtenberger
Electrical and Computer Engineering, University of Virginia, Charlottesville, VA

14:40 D1–5 (Invited)
BROADBAND ULTRA–COMPACT HIGH–POWER ARRAY LOCAL OSCILLATOR SOURCES FOR HIGH–SPECTRAL RESOLUTION SUBMILLIMETER–WAVE RECEIVERS
Jose V. Siles*, Jonathan H. Kawamura, Imran Mehdi
NASA Jet Propulsion Laboratory, Pasadena, CA

15:00 Break

15:20 D1–6 (Invited)
PICTURE THIS SELFI: A TECHNOLOGY MATURATION PROJECT FOR A SUBMILLIMETER ENCELADUS LIFE FUNDAMENTALS INSTRUMENT (SELFI)
Paul Racette*[1], Carrie Anderson[1], Damon Bradley[1], Gordon Chin[1], Negar Ehsan[1], Terry Hurford[1], Tilak Hewagamal[2], Tracee Jamison[1], Tim Livengood[2]

[1]*NASA Goddard Space Flight Center, Greenbelt, MD*
[2]*University of Maryland, College Park, MD*

15:40 D1–7 (Invited)
μ–SPEC: AN INTEGRATED SPECTROMETER FOR THZ SPECTROSCOPY
Emily M. Barrentine*[1], Ari D. Brown[1], Berhanu T. Bulcha[1], Giuseppe Cataldo[1], Negar Ehsan[1], Larry Hess[1], Omid Noroozian[1,2], Thomas R. Stevenson[1], Eric R. Switzer[1], Kongpop U–Yen[1], Edward J. Wollack[1], S. H. Moseley[1]

[1]*NASA–Goddard Space Flight Center, Greenbelt, MD*

[2]*National Radio Astronomy Observatory, Charlottesville, VA*

Session F2: Microwave Remote Sensing of the Earth
Room 155
Session Co-Chairs: Thomas Hanley, *Johns Hopkins University Applied Physics Laboratory*;
David Kunkee, *The Aerospace Corporation*

13:20 F2-1
RELATING CYGNSS OBSERVATIONS TO SOIL MOISTURE VARIATIONS DURING THE 2018 HURRICANE SEASON
Orhan Eroglu*, Dylan R. Boyd, Ali C. Gurbuz, Mehmet Kurum
Electrical and Computer Engineering, Mississippi State University, Starkville, MS

13:40 F2-2
L-BAND HIGH SPATIAL RESOLUTION SOIL MOISTURE MAPPING USING SMALL UNMANNED AERIAL SYSTEMS
Eryan Dai*[1], Aravind Venkitasubramony[1], Albin Gasiewski[1], Maciej Stachura[2], Jack Elston[2]
[1]*ECEE, University of Colorado Boulder, Boulder, CO*
[2]*Black Swift Technologies (BST) LLC, Boulder, CO*

14:00 F2-3
INVESTIGATION OF ROOT-ZONE SOIL MOISTURE PROFILE SENSITIVITY TO MULTIPLE SIGNAL OF OPPORTUNITY SOURCES
Dylan R. Boyd*[1], Mehmet Kurum[1], Orhan Eroglu[1], Ali Gurbuz[1], James Garrison[2], Benjamin Nold[2], Manuel Vega[3], Jeffrey Piepmeier[3], Rajat Bindlish[3]
[1]*Electrical and Computer Engineering, Mississippi State University, Starkville, MS*
[2]*Purdue University, West Lafayette, IN*
[3]*NASA Goddard Space Flight Center, Greenbelt, MD*

14:20 F2-4
NON-DESTRUCTIVE DIELECTRIC CONSTANT MEASUREMENT OF A LOSS-LESS DIELECTRIC SLAB USING COHERENT MULTIPATH INTERFERENCE OF A WIDEBAND RADIATION
Seyedmohammad Mousavi*[1], Roger De Roo[2], Kamal Sarabandi[1], Anthony England[3]
[1]*Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI*
[2]*Climate and Space Sciences and Engineering, University of Michigan, Ann Arbor, MI*
[3]*College of Engineering and Computer Science, University of Michigan, Dearborn, MI*

14:40 F2-5
USING 0.5-2 GHZ MICROWAVE RADIOMETRY FOR ARCTIC SEA-ICE THICKNESS AND SALINITY RETRIEVAL
Oguz Demir*[1], Mark Andrews[1], Joel T. Johnson[1], Kenneth Jezek[2]
[1]*ElectroScience Laboratory, The Ohio State University, Columbus, Ohio*
[2]*Byrd Polar and Climate Research Center, The Ohio State University, Columbus, OH*

15:00 Break

15:20 F2-6
EXPERIMENTAL VALIDATION OF AN ENDFIRE SAR AMBIGUITY FUNCTION
Omkar P. Pradhan*, Albin J. Gasiewski
University of Colorado Boulder, Boulder CO

15:40 F2-7
DETECTION, ANALYSIS AND MITIGATION OF SEA CLUTTER IN POLARIMETRIC WEATHER RADAR
Amit Dutta*, Chandrasekar Venkatachalam
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

16:00 F2-8
SIMULATIONS OF 3D CLOUD RADIATION FIELDS USING THE HORIZONTALLY INHOMOGENEOUS UNIFIED MICROWAVE RADIATIVE TRANSFER MODEL
Kun Zhang*, Albin J. Gasiewski
University of Colorado Boulder, Boulder, CO

16:20 F2-9
IDENTIFYING LIQUID CLOUD DROPLETS AND FROZEN HYDROMETEORS IN MIXED-PHASE CLOUDS USING 35-GHZ VERTICALLY POINTING RADAR VELOCITY SPECTRA
Christopher R. Williams*[1], Maximilian Maahn[2,3], Joseph C. Hardin[4], Gijs de Boer[2,3]
[1]*Smead Aerospace Engineering Science, University of Colorado Boulder, Boulder, CO*
[2]*Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder, Boulder, CO*
[3]*NOAA Earth System Research Laboratory, Boulder, CO*
[4]*Pacific Northwest National Laboratory, Richland, WA*

16:40 F2-10
UTILIZATION OF CONVOLUTIONAL NEURAL NETWORKS IN CLASSIFICATION OF SNOWFLAKES BASED ON IMAGES BY A MULTI-ANGLE SNOWFLAKE CAMERA
Adam C. Hicks*, V.N. Bringi, Branislav M. Notaros
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

Session G3: Space Plasma Measurement Techniques
Room 151
Session Co-Chairs: Thomas Gaussiran, *The University of Texas at Austin*;
Terry Bullett, *University of Colorado Boulder*

13:20 G3-1
JULIA STUDIES OF POST-MIDNIGHT EQUATORIAL SPREAD F EVENTS OBSERVED DURING THE 2008/2009 SOLAR MINIMUM
Fabiano S. Rodrigues*[1], Weijia Zhan[1], Marco A. Milla[2]
[1]*The University of Texas at Dallas, Richardson, TX*
[2]*Jicamarca Radio Observatory, Lima, PERU*

13:40 G3–2
HIGH–LATITUDE INTERMEDIATE–SCALE TEC STRUCTURE
Charles L. Rino*[1], Brian Breitsch[1], Yu Morton[1],
Charles S. Carrano[2]
[1]*Smead Aerospace Engineering Sciences, University of Colorado, Boulder, Colorado*
[2]*Institute for Scientific Research, Boston College, Boston, MA*

14:00 G3–3
ANALYSIS OF SEVERE PHASE SCINTILLATION EVENTS OBSERVED IN THE AURORAL OVAL
James P. Conroy*[1], Kshitija Deshpande[2], Wayne Scales[1],
Amir Zaghloul[1]
[1] *Virginia Polytechnic Institute & State University, Blacksburg, VA*
[2]*Embry–Riddle, Daytona Beach, FL*

14:20 G3–4
DETERMINATION AND ANALYSIS OF THE REFRACTIVE CONTRIBUTION TO GPS PHASE VARIATIONS
Anthony M. McCaffrey*, P. T. Jayachandran
Physics, University of New Brunswick, Fredericton, CANADA

Session GH1: Ionospheric Modification
Room 151
Session Co–Chairs: Eliana Nossa, *Arecibo Observatory*;
Robert McCoy, *Geophysical Institute University of Alaska Fairbanks*;
Stanley Briczinski, *Naval Research Laboratory*

15:20 GH1–1
EXCITATION AND MODELING OF ARTIFICIAL AURORA AT HAARP
Beket Tulegenov*[1], Anatoly V. Streltsov[1], Elizabeth Kendall[2],
Mike McCarrick[3], Ivan Galkin[4]
[1]*Physical Sciences, Embry-Riddle Aeronautical University, Daytona beach, FL*
[2]*SRI International, Menlo Park, CA*
[3]*Naval Research Laboratory, Washington, DC*
[4]*University of Massachusetts Lowell, Lowell, MA*

15:40 GH1–2
INVESTIGATION OF STIMULATED ELECTROMAGNETIC EMISSION SECOND HARMONIC GENERATION
Augustine D. Yellu*[1], Alireza Mahmoudian[2], Paul Bernhardt[3],
Carl Siefring[3]
[1]*Electrical and Computer Engineering, Virginia Polytechnic Institute & State University, Blacksburg, VA*
[2]*Electrical and Computer Engineering, InterAmerican University, PUERTO RICO*
[3]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*

16:00 GH1–3
HF TRANSMITTED POWER EXPERIMENT AND THE ISR DIAGNOSTICS AT ARECIBO
Eliana Nossa*, Michael Sulzer, Phil Perillat, Nestor Aponte
Arecibo Observatory, Arecibo, PUERTO RICO

16:20 GH1–4
POLARIZATION MEASUREMENTS OF AN UNEXPECTED EPOP–RRI OBSERVATION DURING AN ARECIBO HF HEATING CAMPAIGN
Ashanthi S. Maxworth*[1], Glenn C. Hussey[1], Paul Bernhardt[2],
Eliana Nossa[3], Fraser Hird[1]
[1]*University of Saskatchewan, Saskatoon, Saskatchewan, CANADA*
[2]*Naval Research Laboratory, Washington, DC*
[3]*Arecibo Observatory, Arecibo, PUERTO RICO*

Session H2: Physics of the Radiation Belts II
Room 245
Session Co–Chairs: Poorya Hosseini, *University of Colorado Denver*;
Christopher Crabtree, *Naval Research Laboratory*

13:20 H2–1
ACCELERATION OF RELATIVISTIC ELECTRONS IN EARTH'S OUTER RADIATION BELT BY WHISTLER MODE CHORUS: EVIDENCE AND THE IMPORTANCE OF ENERGETIC PARTICLE INJECTIONS
Drew L. Turner*
The Aerospace Corporation, El Segundo, CA

13:40 H2–2
THE DEVELOPMENT OF CHORUS, SOURCE AND SEED ELECTRONS, AND THE RADIATION BELT RESPONSE DURING ICME AND CIR STORMS
Samuel T. Bingham*, Christopher G. Mouikis, Lynn M. Kistler,
Kristoff W. Paulson, Charlie J. Farrugia, Chia–Lin Huang,
Harlan E. Spence, Craig A. Kletzing
Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, NH

14:00 H2–3
CONSEQUENCES OF OBLIQUE CHORUS WAVES ON THE LOSS AND ACCELERATION OF THE OUTER RADIATION BELT ELECTRONS
Oleksiy Agapitov*[1], Anton Artemyev[2], Didier Mourenas[3],
Forrest Mozer[1], Vladimir Krasnoselskikh[4]
[1]*Space Science Laboratory, University of California, Berkeley, Berkeley*
[2]*University of California, Los Angeles, Los Angeles, CA*
[3]*CEA, Arpajon, FRANCE*
[4]*LPC2E/CNRS–University of Orleans, Orleans, FRANCE*

14:20 H2–4
CHORUS AND MICROBURSTS: QUANTIFYING THE CONNECTION WITH A SUBSTANTIAL DATASET OF SIMULTANEOUS LOW– AND HIGH–ALTITUDE HIGH TIME RESOLUTION OBSERVATIONS
Aaron W. Breneman*[1], Chris Colpitts[1], John G. Sample[2],
Arlo Johnson[2], Mykhaylo Shumko[2], Alexander Crew[3],
David Klumpar[2], Harlan Spence[4], Bernard Blake[5], John Wygant[1],
Robyn Millan[6], Alexa Halford[5], Leslie Woodger[6]
[1]*School of Physics and Astronomy, University of Minnesota, Minneapolis, MN*
[2]*Physics, Montana State University, Bozeman, MT*
[3]*Applied Physics Laboratory, Johns Hopkins University, Laurel, MD*
[4]*Physics and Astronomy, University of New Hampshire, Durham, NH*
[5]*The Aerospace Corporation, El Segundo, CA*
[6]*Physics and Astronomy, Dartmouth College, Hanover, NH*

14:40 H2–5
REMOTE SENSING OF RADIATION BELT ENERGETIC ELECTRONS USING LIGHTNING TRIGGERED UPPER BAND CHORUS
Poorya Hosseini*, Mark Golkowski, Vijay Harid
University of Colorado Denver, Denver, CO

Session J2: New Telescopes, Techniques and Technology
Room 265
Session Co–Chairs: Jeffery Mangum, *National Radio Astronomy Observatory*;
Alyson Ford, *University of Arizona*

13:20 J2–1
FULL MUELLER AW PROJECTION
Preshanth Jagannathan*[1], Sanjay Bhatnagar[1], Urvashi Rau[1], Andrew R. Taylor[2,3]
[1]*National Radio Astronomy Observatory, Socorro, NM*
[2]*Astronomy, University of Cape Town, Cape Town, SOUTH AFRICA*
[3]*Physics, University of Western Cape, Western Cape, SOUTH AFRICA*

13:40 J2–2
NEW RADIO FREQUENCY INTERFERENCE MITIGATION TECHNIQUES IN THE CONTEXT OF 21–CM COSMOLOGY
Mike J. Wilensky*
University of Washington, Seattle, WA

14:00 J2–3
CAN WE CALIBRATE OUT THE WEDGE WITH HERA AND ITS SUCCESSORS?
Aaron Parsons*, Joshua Dillon
University of California, Berkeley, Berkeley, CA

14:20 J2–4
RFI MITIGATION FOR PULSAR TIMING USING SPECTRAL KURTOSIS
Anastasia Kuske*[1], Luke Hawkins[2]
[1]*Physics and Astronomy, Franklin & Marshall College, Lancaster, PA*
[2]*Green Bank Observatory, Green Bank, WV*

14:40 J2–5
DIGITAL BACK–END FOR THE NEW ULTRA–WIDEBAND FEED AND RECEIVER FOR THE PARKES RADIO TELESCOPE
Paul Roberts, Daniel Deorge, John Tuthill*, Mark Leach, Ron Beresford, Michael Brothers, Tasso Tzioumis
CSIRO Astronomy and Space Science, Sydney, NSW, AUSTRALIA

15:00 Break

15:20 J2–6
MODULAR DIGITAL INFRASTRUCTURE FOR RADIO TELESCOPE ARRAYS
Sylas Ashton*
National Radio Astronomy Observatory, Socorro, NM

15:40 J2–7
REAL–TIME, ALL–SKY, EXTREME TIME–RESOLUTION IMAGING FROM THE LWA–SEVILLETA TELESCOPE USING THE EPIC ARCHITECTURE
Nithyanandan Thyagarajan*[1], James Kent[2], Jayce Dowell[3], Adam P. Beardsley[4], Judd Bowman[4], Greg Taylor[3]
[1]*National Radio Astronomy Observatory, Socorro, NM*
[2]*Cavendish Laboratories, University of Cambridge, Cambridge, UNITED KINGDOM*
[3]*Physics and Astronomy, University of New Mexico, Albuquerque, NM*
[4]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*

16:00 J2–8
HIRAX INSTRUMENT CHARACTERIZATION
Emily R. Kuhn*, Benjamin R. Saliwanchik, Laura B. Newburgh
Physics, Yale University, New Haven, CT

16:20 J2–9
ASKAP: THE AUSTRALIAN SKA PATHFINDER
Douglas C. –J. Bock*
CSIRO Astronomy and Space Science, Marsfield, NSW, AUSTRALIA

16:40 J2–10
COMMISSIONING RESULTS AND FUTURE WORK WITH THE FOCAL–PLANE L–BAND ARRAY FEED FOR THE GREEN BANK TELESCOPE (FLAG)
Mark W. Ruzindana*[1], Karl F. Warnick[1], Brian D. Jeffs[1], Richard A. Black[1], Mitchell C. 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], Devansh Agarwal[2]
[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*

Session K1: Biomedical Sensors and Devices
Room 150
Session Co–Chairs: Majid Manteghi, *Virginia Polytechnic Institute & State University*;
Asimina Kiourti, *The Ohio State University*

13:20 K1–1 (Invited)
A PORTABLE DOPPLER/FSK/FMCW MULTI–MODE RADAR WITH ANALOG DC OFFSET CANCELLATION FOR BIOMEDICAL APPLICATIONS
Jing Wang*, Changzhi Li
Electrical Engineering, Texas Tech University, Lubbock, TX

13:40 K1–2 (Invited)
GLUCOSE–DEPENDENT DIELECTRIC PROPERTIES OF BLOOD PLASMA FOR 500 MHZ TO 50 GHZ
Sydney Wojcieszak*[1], Nikhat Nusrat[2,3], Madeline Hayes[3], Lynn Secondo[1], Erdem Topsakal[2]
[1]*Chemical and Life Sciences Engineering, Virginia Commonwealth University College of Engineering, Richmond, VA*
[2]*Electrical and Computer Engineering, Virginia Commonwealth University College of Engineering, Richmond, VA*
[3]*Biomedical Engineering, Virginia Commonwealth University College of Engineering, Richmond, VA*

14:00 K1–3 (Invited)
BREAKING THE BOUNDARIES: MONITORING JOINT FLEXION USING RADIO–FREQUENCY COILS
Vigyanshu Mishra*, Asimina Kiourti
Electrical and Computer Engineering, The Ohio State University, Columbus, OH

14:20 K1–4 (Invited)
IMPROVING ACCURACY OF INKJET PRINTED CORE BODY WRAP TEMPERATURE SENSOR USING RANDOM FOREST REGRESSION IMPLEMENTED WITH AN ANDROID APP
Md Juber Rahman, Bashir I. Morshed*
The University of Memphis, Memphis, TN

14:40 K1–5 (Invited)
SUBCUTANEOUS BIOCOMPATIBLE CONTINUOUS GLUCOSE MONITORING SENSOR
Shanze I. Eshai*, Lynn E. Secondo, Sydney Wojcieszak, Madeline Hays, Nastassja Lewinski, Vitaliy Avrutin, Erdem Topsakal
Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA

15:00 Break

15:20 K1–6
ULTRA LOW–POWER OTA FOR BIOMEDICAL APPLICATIONS
Shahram Hatefi Hesari*[1], Ava Hedayatipour[1], Shaghayegh Aslanzadeh[1], Syed K. Islam[2]
[1]*The University of Tennessee, EECS Dept., Knoxville, TN*
[2]*University of Missouri, Columbia, MO*

15:40 K1–7
IN VIVO RECORDING OF EPILEPTIFORM NEURAL ACTIVATION USING A NOVEL FULLY–PASSIVE IMPLANTABLE SYSTEM
Carolina Moncion*[1], Lakshmini Balachandar[1], Satheesh Bojja–Venkatakrishnan[2], Jorge Riera Diaz[1], John L. Volakis[2]
[1]*Biomedical Engineering, Florida International University, Miami, FL*
[2]*Electrical Engineering, Florida International University, Miami, FL*

16:00 K1–8
LOW–POWER HIGHLY EFFICIENT VOLTAGE–BOOSTING RECTIFIER FOR WIDE–BAND INDUCTIVELY–COUPLED POWER TELEMETRY
Ramaa Saket Suri*, Nishat Tarannum Tasneem, Ifana Mahbub
Electrical Engineering, University of North Texas, Denton, TX

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 135
18:00	Commission J	Room 265

WEDNESDAY EVENING, 9 January 2019
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.

THURSDAY MORNING, 10 January 2019

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) IEEE SmartAg Initiative: Technology Applied to the Food Supply Chain
(2) Atacama Large Millimeter Array (ALMA) in 2030

Co–Chairs: Eric Mokole, The Mitre Corporation;
Jeff Mangum, National Radio Astronomy Observatory

10:00 P1–1
IEEE SMART AG INITIATIVE: TECHNOLOGY APPLIED TO THE FOOD SUPPLY CHAIN
John P. Verboncoeur *
Michigan State University, East Lansing, MI

10:50 P1–2
ATACAMA LARGE MILLIMETER ARRAY (ALMA) IN 2030
Sean Dougherty*
ALMA Observatory, Santiago, CHILE

11:40 Awards Ceremony for Student Paper Competition

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

THURSDAY AFTERNOON, 10 January 2019

Session B6: Numerical Methods
Room 200
Session Co–Chairs: Fernando Teixeira, *The Ohio State University*;
Branislav Notaros, *Colorado State University*

13:20 B6–1
ANALYSIS OF MULTIPACTOR EFFECTS BY A PARTICLE–IN–CELL ALGORITHM COUPLED WITH THE FURMAN–PIVI SECONDARY ELECTRON EMISSION MODEL
Dong–Yeop Na*, Julio L. Nicolini, Fernando L. Teixeira
ElectroScience Laboratory, The Ohio State University, Columbus, OH

13:40 B6–2
PROPER ORTHOGONAL DECOMPOSITION FOR PARTICLE–IN–CELL SIMULATIONS
Julio de Lima Nicolini*, Dong–Yeop Na, Fernando L. Teixeira
The Ohio State University, Columbus, OH

14:00 B6–3
FAR–FIELD EXTRAPOLATION OF THE BODY–OF–REVOLUTION PARABOLIC WAVE EQUATION
Reid K. McCargar*[1,2], Mark C. Strother[1]
[1]*Applied Physics Laboratory, The Johns Hopkins University, Laurel, MD*
[2]*Electrical and Computer Engineering, The George Washington University, Washington, DC*

14:20 B6–4
A STUDY OF FIREFLY ALGORITHM, ANT COLONY OPTIMIZATION, AND ARTIFICIAL BEE COLONY ALGORITHM
Utsav Poudel*, Sembiam R. Rengarajan
Electrical and Computer Engineering, California State University, Northridge, CA

14:40 B6–5
PREDICTING PML PERFORMANCE AT NORMAL INCIDENCE IN CYLINDRICAL FDTD
Mohammed F. Hadi*, Atef Z. Elsherbeni
Electrical Engineering, Colorado School of Mines, Golden, CO

15:00 Break

15:20 B6–6
COMPARISON OF TLBO, DE, AND BBO ALGORITHMS FOR APPLICATIONS IN ELECTROMAGNETICS
Edwin E. Rebollo*, Sembiam R. Rengarajan
Electrical and Computer Engineering, California State University, Northridge, CA

15:40 B6–7
NATURE INSPIRED METAHEURISTIC OPTIMIZATION ALGORITHMS AND APPLICATIONS
Samuel Gaxiola*, Sembiam R. Rengarajan
Electrical and Computer Engineering, California State University, Northridge, CA

16:00 B6–8
ANALOG COPROCESSORS FOR SOLVING LINEAR– AND NON–LINEAR PARTIAL DIFFERENTIAL EQUATIONS
Arjuna Madanayake[1], Soumyajit Mandal[2], Nilan Udayanga*[1], Jifu Liang[2], Subramaniya I. Hariharan[3], Leonid Belostotski[4]
[1]*Florida International University (FIU), Miami, FL*
[2]*Case Western Reserve University (CWRU), Cleveland, OH*
[3]*University of Akron, Akron, OH*
[4]*University of Calgary, Calgary, AB, CANADA*

16:20 B6–9
ADJOINT–BASED A POSTERIORI ERROR ESTIMATION AND ITS APPLICATIONS IN CEM: DHO FEM TECHNIQUES AND 3D SCATTERING PROBLEMS
Jake J. Harmon*[1], Cam L. Key[1], Blake A. Troksa[1], Troy D. Butler[2],

Donald Estep[3], Branislav M. Notaros[1]
[1]*Electrical and Computer Engineering, Colorado State University, Fort Collins, CO*
[2]*Mathematical and Statistical Sciences, University of Colorado Denver, Denver, CO*
[3]*Statistics, Colorado State University, Fort Collins, CO*

16:40 B6–10
SCHOTTKY DIODE FULL–WAVE SIMULATION FOR ZERO–BIASED DETECTOR DESIGN
Colton R. Dunlap*
Boulder Environmental Sciences and Technology, Boulder, CO

Session BK: Wearable, Implants, and Body–Area Networks
Room 1B40
Session Co–Chairs: Ryan Green, *Virginia Commonwealth University*;
Bashir Morshed, *The University of Memphis*

13:20 BK–1 (Invited)
ULTRA LOW–POWER INDUCTIVELY COUPLED WEARABLE ECG SENSOR DESIGN WITH INKJET PRINTED DRY ELECTRODES
Bashir I. Morshed*
Electrical and Computer Engineering, The University of Memphis, Memphis, TN

13:40 BK–2 (Invited)
BIO–MAGNETIC DETECTION OF CARDIAC ACTIVITY USING WEARABLES
Keren Zhu, Vigyanshu Mishra*, Asimina Kiourti
Electrical and Computer Engineering / ElectroScience Laboratory, The Ohio State University, Columbus, OH

14:00 BK–3 (Invited)
ANALYSIS AND MULTI–CLASS CLASSIFICATION OF PATHOLOGICAL HEART MURMURS BASED ON SEGMENTED PHONOCARDIOGRAM RECORDINGS
Ali Elhouderi*, Kimberly Newman, Frank Barnes
Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, CO

14:20 BK–4 (Invited)
MULTI–MODE SMART WEARABLE FABRIC ANTENNAS FOR AUGMENTED TOUCH TRACKING AND MOTION DETECTION ON HUMAN SKIN
Umar Hasni*, Erdem Topsakal
Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA

14:40 BK–5 (Invited)
TOWARDS EMBROIDERED TEXTILE ANTENNA SYSTEMATIC DESIGN AND ACCURATE MODELING: INVESTIGATION OF STITCH DENSITY
Lingnan Song*, Daisong Zhang, Yahya Rahmat–Samii
Electrical and Computer Engineering, University of California, Los Angeles, Los Angeles, CA

15:00 Break

15:20 BK–6 (Invited)
SHORT RANGE TITANIUM NITRITE ANTENNA FOR SUBCUTANEOUS IMPLANT
Ryan B. Green*, Jessica R. Shaffer, Madeline R. Hays, Erdem Topsakal
Virginia Commonwealth University, Richmond, VA

15:40 BK–7 (Invited)
DESIGN OF A FLEXIBLE RECEIVER MODULE FOR IMPLANTABLE WIRELESS POWER TRANSFER (WPT) APPLICATIONS
Melissa A. Sinclair*[1], Dipon K. Biswas[1], Tien Le[1], Joshua Hyde[1], Ifana Mahbub[1], Lingqian Chang[2], Yongcun Hao[3]
[1]*Electrical Engineering, University of North Texas, Denton, TX*
[2]*Biomedical Engineering, University of North Texas, Denton, TX*
[3]*Northwestern Polytechnical University, Mechanical Engineering, Xi'an, Shaanxi, CHINA*

16:00 BK–8 (Invited)
LOW–POWER RF ENERGY HARVESTER CIRCUIT DESIGN FOR WEARABLE MEDICAL APPLICATIONS
Taeho Oh[1], Omiya Hassan[2], Samira Shamsir*[2], Syed K. Islam[2]
[1]*EECS, The University of Tennessee, Knoxville, TN*
[2]*EECS, University of Missouri, Columbia, MO*

16:20 BK–9 (Invited)
MICS BAND DIGITAL VOLTAGE–CONTROLLED OSCILLATOR (DVCO) FOR LOW–POWER BIOMEDICAL DATA TRANSMISSION
Hanfeng Wang[1], Samira Shamsir*[2], Shahram H. Hesari[1], Syed K. Islam[2]
[1]*Electrical Engineering and Computer Science, University of Tennessee, Knoxville, TN*
[2]*Electrical Engineering and Computer Science, University of Missouri–Columbia, Columbia, MO*

16:40 BK–10 (Invited)
INVESTIGATION OF ELECTROMAGNETIC WAVE PROPAGATION FOR IN–BODY TO ON–BODY WIRELESS COMMUNICATIONS
Mary E. Leece*, Yang Li
Baylor University, Waco, TX

Session D2: Components and Circuits for Wireless Applications
Room 1B51
Session Co–Chairs: Jonathan Chisum, *University of Notre Dame*;
Negar Ehsan, *NASA Goddard Space Flight Center*

13:20 D2–1
FREQUENCY–SELECTIVE FERRITE–BASED CIRCULATORS
Andrea Ashley*, Laila Marzall, Zoya Popovic, Dimitra Psychogiou
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

13:40 D2–2
RF CHARACTERIZATION OF 3D–PRINTED COAXIAL CAVITY RESONATORS
Kshitij Sadasivan*, Dimitra Psychogiou
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

14:00 D2–3
FREQUENCY–AGILE RECONFIGURATION FOR A HIGH–POWER RESONANT CAVITY TUNER USING PREVIOUS SEARCH RESULTS
Angelique Dockendorf*[1], Ellie Langley[1], Austin Egbert[1], Charles Baylis[1], Abbas Semnani[2], Dimitrios Peroulis[2], Anthony Martone[3], Ed Viveiros[3], Robert Marks II[1]
[1]*Baylor University, Waco, TX*
[2]*Purdue University, West Lafayette, IN*
[3]*Army Research Laboratory, Adelphi, MD*

14:20 D2–4
COUPLED–RESONATOR–BASED DESIGN OF THIN–FILM BULK ACOUSTIC RESONATOR (FBAR)–BASED BANDPASS FILTERS
Nikolaus Luhrs S. Luhrs*, Dimitra Psychogiou
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

14:40 D2–5
THE ROLE OF THE REFLECTION COEFFICIENT PHASE IN THE DESIGN OF ACOUSTIC WAVE FILTERS
Patricia M. Silveira*, Jordi Verdú, Pedro de Paco
Telecommunications and Systems Engineering, Autonomous University of Barcelona, Barcelona, SPAIN

15:00 Break

15:20 D2–6
LOW COST POWER EFFICIENT BEAMFORMER WITH ELEMENT–TO–ELEMENT MIXING (BEEM)
Rimon J. Hokayem*, John L. Volakis, Elias A. Alwan
Electrical and Computer Engineering, Florida International University, Miami, FL

15:40 D2–7
SUPPLY MODULATION OF LOAD–MODULATED POWER AMPLIFIERS
Dan Fishler*, Tommaso Cappello, Zoya Popovic, Taylor Barton
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

16:00 D2–8
A 2.45 GHZ TEXTILE–BASED RF RECTENNA ARRAY FOR SENSOR APPLICATIONS
Dieff Vital*, Shubhendu Bhardwaj, John L. Volakis
Electrical and Computer Engineering, Florida International University, Miami, FL

16:20 D2–9
ON–TEXTILE COUPLED MAGNETIC RESONATORS FOR WIRELESS POWER HARVESTING APPLICATIONS
Dieff Vital*, John L. Volakis, Shubhendu Bhardwaj
Electrical and Computer Engineering, Florida International University, Miami, FL

Session F3: RF Propagation Utilizing Numerical Weather Prediction
Room 155
Session Co–Chairs: Tracy Haack, *Naval Research Laboratory – Marine Meteorology Division*
Thomas Hanley, *Johns Hopkins University/Applied Physics Laboratory*

13:20 F3–1
PERFORMANCE OF FORECAST MODELS DURING CASPER WEST CAMPAIGN
Tracy Haack*[1], Thomas Hanley[2], Qing Wang[3]
[1]*Marine Meteorology Division, Naval Research Laboratory, Monterey, CA*
[2]*Johns Hopkins University/Applied Physics Laboratory, Laurel, MD*
[3]*Meteorology, Naval Postgraduate School, Monterey, CA*

13:40 F3–2
FIXED–LINK AND RANGE–DEPENDENT X–BAND EM PROPAGATION MEASUREMENTS IN THE MARINE ATMOSPHERIC BOUNDARY LAYER FOR TESTING NUMERICAL WEATHER PREDICTION OF REFRACTIVITY
Qi Wang*[1], Robert Burkholder[1], Caglar Yardim[1], Tracy Haack[2], Qing Wang[3], Denny Alappattu[3], Ryan Yamaguchi[3], Joseph Fernando[4], Adam Christman[4], Djamal Khelif[5]
[1]*The Ohio State University, Columbus, OH*
[2]*Office of Naval Research, Arlington, VA*
[3]*Naval Postgraduate School, Monterey, CA*
[4]*University of Notre Dame, Notre Dame, IN*
[5]*The University of California, Irvine, Irvine, CA*

14:00 F3–3
LOW ATMOSPHERIC PROPAGATION SYSTEM (LATPROP) MEASUREMENT RESULTS ON CASPER–WEST
Luyao Xu*[1], Caglar Yardim[1], Robert Burkholder[1], Qing Wang[2], Ryan T. Yamaguchi[2], David G. Ortiz–Suslow[2], Harindra Joseph S. Fernando[3], Raghu Krishnamurthy[3], Kyle B. Franklin[2], Denny P. Alappattu[2], Benjamin Wauer[2]
[1]*The Ohio State University, Columbus, OHIO*
[2]*Naval Postgraduate School, Monterey CA*
[3]*University of Notre Dame, Notre Dame, IN*

14:20 F3–4
LOWER ATMOSPHERIC PROPAGATION MEASUREMENT SYSTEM (LATPROP) RADAR CASPER WEST RESEARCH CAMPAIGN POST PROCESSING UPDATE
ToJoshua D. Compaleo*[1], Caglar Yardim[1], Luyao Xu[1], Shanka Wijesundara[1], Joel Johnson[1], Bob Burkholder[1], Qing Wang[2]
[1]*ElectroScience Laboratory, The Ohio State University, Columbus, OH*
[2]*Meteorology, Naval Post Graduate School, Monterey CA*

14:40 F3–5
ANALYSIS OF EVAPORATIVE DUCT VARIABILITY FROM LARGE EDDY SIMULATIONS
Kyle B. Franklin*[1], Qing Wang[1], Tao Cao[2], Lian Shen[2]
[1]*Meteorology, Naval Postgraduate School, Monterey, CA*
[2]*University of Minnesota, Minneapolis, MN*

15:00 Break

15:20 F3–6
MESOSCALE NUMERICAL WEATHER PREDICTIONS USED FOR RADIO FREQUENCY PROPAGATION ALONG A LOW ELEVATION OVER WATER PATH
Abby Anderson*, Katherine L. Mulreany, Zachary B. Ratliff, Matthew I. Jackson, Victor R. Wiss
NSWC Dahlgren, Dahlgren, VA

15:40 F3–7
BLENDING SURFACE LAYER, NWP MODEL AND CLIMATOLOGICAL REFRACTIVITY PROFILES: METHODS AND ISSUES
Paul A. Frederickson*
Meteorology, Naval Postgraduate School, Monterey, CA

16:00 F3–8
INVESTIGATING CORRELATION DROPOUTS OF NWP FORECAST EM PROPAGATION FOR TAPS FIELD CAMPAIGN
Andrew J. Kammerer*[1], Tracy Haack[1], Hedley Hansen[2]
[1]*Marine Meteorology Division, Naval Research Laboratory, Monterey, CA*
[2]*Cyber and Electronic Warfare Division, Defense Science and Technology Organization, Adelaide, AUSTRALIA*

Session G4: Radar and Radio Techniques for Ionospheric Diagnostics
Room 151
Session Co–Chairs: Thomas Gaussiran, *The University of Texas at Austin*;
Y. Jade Morton, *University of Colorado Boulder*

13:20 G4–1
THE DISCOVERY OF NOVEL IONOSPHERIC PHENOMENA USING IONOSPHERIC HIGH FREQUENCY SOFTWARE–DEFINED RADAR
Salih M. Bostan, Julio V. Urbina*, John D. Mathews
Electrical Engineering, The Pennsylvania State University, University Park, PA

13:40 G4–2
HAMSCI PERSONAL SPACE WEATHER STATION: A NEW TOOL FOR CITIZEN SCIENCE GEOSPACE RESEARCH
Joshua S. Vega*[1], Nathaniel A. Frissell[1], Philip J. Erickson[2], Andrew J. Gerrard[1]
[1]*New Jersey Institute of Technology, Newark, NJ*
[2]*MIT Haystack Observatory, Westford, MA*

14:00 G4–3
HIGH ALTITUDE ISR EXPERIMENTS AT JICAMARCA
Sevag Derghazarian*
Earth and Atmospheric Sciences, Cornell University, Ithaca, NY

14:20 G4–4
IRREGULARITY PARAMETER ESTIMATION FOR INTERPRETATION OF SCINTILLATION DOPPLER AND INTENSITY SPECTRA
Charles S. Carrano*, Charles L. Rino
Institute for Scientific Research, Boston College, Chestnut Hill, MA

14:40 G4–5
ELECTRON–ELECTRON COLLISION EFFECTS ON ISR TEMPERATURE MEASUREMENTS
William J. Longley*, Meers M. Oppenheim, Yakov S. Dimant
Center for Space Physics, Boston University, Boston, MA

15:00 Break

15:20 G4–6
RADIO PROPAGATION EFFECTS FROM INFRASONIC WAVES IN THE IONOSPHERE
Justin J. Mabie*, Terrence Bullett
CIRES, University of Colorado Boulder, Boulder, CO

15:40 G4–7
IONTV: USING TIMING REFERENCE SIGNALS TO OBSERVE IONOSPHERIC VARIATION
Joseph Dusenbury*[1], William Liles[2], Philip Erickson[3], Kiersten C. Kerby–Patel[1]
[1]*University of Massachusetts Boston, Boston, MA*
[2]*Independent Consultant, Reston, VA*
[3]*MIT Haystack Observatory, Westford, MA*

16:00 G4–8
SOUNDING THE IONOSPHERE WITH SIGNALS OF OPPORTUNITY IN THE HIGH–FREQUENCY (HF) BAND
Ethan S. Miller*[1], Gary S. Bust[1], Gareth W. Perry[2], Stephen R. Kaeppler[3], Juha Vierinen[4], Nathaniel A. Frissell[5], Andrew A. Knuth[1], Phil J. Erickson[6], Romina Nikoukar[1], Alex T. Chartier[1], Pedrina Santos[7], Christiano Brum[7], Jonathan T. Fentzke[7,8], Thomas R. Hanley[1], Andrew J. Gerrard[5]
[1] *Johns Hopkins University Applied Physics Laboratory, Laurel, MD*
[2]*University of Calgary, Calgary, AB, CANADA*
[3]*Clemson University, Clemson, SC*
[4]*University of Tromsø, Tromsø, NORWAY*
[5]*New Jersey Institute of Technology, Newark, NJ*
[6]*Haystack Observatory, MIT, Westford, MA*
[7]*Arecibo Observatory, Arecibo, PUERTO RICO*
[8]*Scientific Solutions, Inc, Computational Physics, Inc, North Chelmsford, MA*

Session H3: Waves and Turbulence in Laboratory and Space Plasmas
Room 245
Session Co–Chairs: Carl Siefring, *Naval Research Laboratory*;
Jim Schroeder, *University of Iowa*;
Vijay Harid, *University of Colorado Denver*

13:20 H3–1
FARLEY–BUNEMAN INSTABILITIES IN THE AURORAL E–REGION: HYBRID SIMULATIONS AND CONVECTION ESTIMATES
Enrique L. Rojas Villalba*, David L. Hysell
Earth and Atmospheric Sciences, Cornell University, Ithaca, NY

13:40 H3–2
GLOBAL SIMULATION OF ELECTRON CYCLOTRON HARMONIC WAVE INSTABILITY IN A STORM–TIME MAGNETOSPHERE
Xu Liu*[1], Lunjin Chen[1], Miles A. Engel[2], Vania K. Jordanova[2]
[1]*Physics, University of Texas at Dallas, Richardson,TX*
[2]*Los Alamos National Laboratory, Los Alamos, NM*

14:00 H3–3
RESONANT HEATING OF THERMAL IONS BY ELECTROMAGNETIC ION CYCLOTRON WAVES IN THE MAGNETOSPHERE
Qianli Ma*[1], Chao Yue[1], Wen Li[2], Jacob Bortnik[1], Richard M. Thorne[1]
[1]*Atmospheric and Oceanic Sciences, University of California, Los Angeles, Los Angeles, CA*
[2]*Center for Space Physics, Boston University, Boston, MA*

14:20 H3–4
INVESTIGATION OF RESONANT ULTRA–LOW FREQUENCY WAVES IN FIELD LINE RESONATOR AND IONOSPHERIC ALFVÉN RESONATOR AT LOW AND MIDDLE LATITUDES
Mergen Alimaganbetov*, Anatoly V. Streltsov
Physical Sciences, Embry–Riddle Aeronautical University, Daytona Beach, FL

14:40 H3–5
PROPAGATION CHARACTERISTICS OF IONOSPHERIC HISS WAVES
Zhiyang Xia*, Lunjin Chen
Physics, University of Texas at Dallas, Richardson, TX

15:00 Break

15:20 H3–6
TWO DIMENSIONAL FULL–WAVE MODELING OF PROPAGATION OF LOW–ALTITUDE HISS IN THE IONOSPHERE
Xiang Xu*, Lunjin Chen
William B. Hanson Center for Space Sciences, University of Texas at Dallas, Richardson, TX

15:40 H3–7
ELECTRON–ION HYBRID INSTABILITY IN A QUASI–STATIC NEAR–EARTH DIPOLARIZATION FRONT
Dong Lin*[1], Wayne A. Scales[1], Gurudas Ganguli[2], Xiangrong Fu[3], Erik Tejero[2], Chris Crabtree[2], Yuxi Chen[4], Alex Fletcher[2]
[1]*Electrical and Computer Engineering, Virginia Polytechnic Institute & State University, Blacksburg, VA*
[2]*Naval Research Laboratory, Washington, DC*
[3]*New Mexico Consortium, Los Alamos, NM*
[4]*Center for Space Environment Modeling, University of Michigan, Ann Arbor, MI*

16:00 H3–8
POLARIZATION MEASUREMENTS OF NATURAL LOW–FREQUENCY RADIO EMISSIONS OBSERVED BY EPOP– RRI
Ashanthi S. Maxworth*[1], Glenn C. Hussey[1], Fraser Hird[1], George Sofko[1], Gordon James[2], Andrew W. Yau[2]
[1]*Physics and Engineering Physics, University of Saskatchewan, Saskatoon, Saskatchewan, CANADA*
[2]*Physics, University of Calgary, Calgary, Alberta, CANADA*

16:20 H3–9
POLARIZATION MEASUREMENTS OF H+ ION CYCLOTRON WHISTLERS OBSERVED BY EPOP– RRI
Ashanthi S. Maxworth*[1], Glenn C. Hussey[1], George Sofko[1], Fraser Hird[1], Gordon James[2], Andrew W. Yau[2]
[1]*Physics and Engineering Physics, University of Saskatchewan, Saskatoon, CANADA*
[2]*Physics, University of Calgary, Calgary, Alberta, CANADA*

16:40 H3–10
SPACE MEASUREMENTS OF A ROCKET–RELEASED TURBULENCE (SMART) IS A FUTURE EXPERIMENT TO STUDY TURBULENCE EFFECTS ON THE RADIATION BELTS
Carl L. Siefring*, Gurudas Ganguli, Chris E. Crabtree, Alex Fletcher
Plasma Physics Division, Naval Research Laboratory, Washington, DC

17:00 H3–11
A FRAMEWORK FOR MICROSCOPIC/MACROSCOPIC SIMULATIONS OF MAGNETIZED PLASMAS
Gian Luca Delzanno*[1], Vadim Roytershteyn[2], Oleksandr Koshkarov[1], Cecilia Pagliantini[3], Gianmarco Manzini[1]
[1]*Los Alamos National Laboratory, Los Alamos, NM*
[2]*Space Science Institute, Boulder, CO*
[3]*École Polytechnique Fédérale de Lausanne, Lausanne, SWITZERLAND*

17:20 H3–12
PHASE–SPACE DYNAMIC OF COHERENT WAVE–PARTICLE INTERACTION IN THE RADIATION BELT
Poorya Hosseini*, Vijay Harid, Mark Golkowski
University of Colorado Denver, Denver, CO

17:40 H3–13
HYBRID–PIC SIMULATION OF WHISTLER MODE WAVE–PARTICLE INTERACTIONS IN THE EARTH'S RADIATION BELTS
Hoyoung Kim*, Vijay Harid
Electrical Engineering, University of Colorado Denver, Denver, CO

Session J3: Radio Emission from Extrasolar Planets
Room 265
Session Co–Chairs: Joseph Lazio, *Jet Propulsion Laboratory, California Institute of Technology*;
Alex Wolszczan, *The Pennsylvania State University*

13:20 J3–1 (Invited)
OBSERVING JUPITER'S AURORAL RADIO SOURCES AND EMISSIONS WITH JUNO
Masafumi Imai*[1], William S. Kurth[1], George B. Hospodarsky[1], Yasmina M. Martos[2], Philippe Louarn[3], Scott J. Bolton[4], John E. P. Connerney[2], Corentin K. Louis[3], Laurent Lamy[5], Philippe Zarka[5], Tracy E. Clarke[6], Charles A. Higgins[7], Baptiste Cecconi[5]
[1]*University of Iowa, Iowa City, IA*
[2]*NASA Goddard Space Flight Center, Greenbelt, MD*
[3]*IRAP, Toulouse, FRANCE*
[4]*Southwest Research Institute, San Antonio, TX*
[5]*LESIA, CNRS, Observatoire de Paris, Meudon, FRANCE*
[6]*Naval Research Laboratory, Washington, DC*
[7]*Middle Tennessee State University, Murfreesboro, TN*

14:00 J3–2
USING RADIO EMISSION FROM PLANETARY–MASS BROWN DWARFS TO UNDERSTAND PLANETARY MAGNETISM
Melodie M. Kao*[1], Evgenya Shkolnik[1], Gregg Hallinan[2], J. S. Pineda[3], Adam Burgasser[4], David Stevenson[5]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Astronomy, California Institute of Technology, Pasadena, CA*
[3]*School of Earth and Space Exploration, University of Colorado Boulder, Boulder, CO*
[4]*Center for Astrophysics and Space Science, University of California, San Diego, San Diego, CA*
[5]*Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA*

14:20 J3–3
THE SEARCH FOR RADIO EMISSION FROM EXOPLANETS USING LOFAR BEAM–FORMED OBSERVATIONS
Jake D. Turner*[1], Jean–Mathias Griessmeier[2,3], Philippe Zarka[4,3], Iaroslavna Vasylieva[5]
[1]*Astronomy, Cornell University, Ithaca, NY*
[2]*Laboratoire de Physique et Chimie de l'Environnement et de l'Espace (LPC2E), Université d'Orléans/CNRS, Orleans, FRANCE*
[3]*Station de Radioastronomie de Nancay, Observatoire de Paris, CNRS, PSL, Nancay, FRANCE*
[4]*LESIA, Observatoire de Paris, CNRS, PSL, Meudon, FRANCE*
[5]*Institute of Radio Astronomy, National Academy of Sciences of Ukraine, Kharkov, UKRAINE*

14:40 J3–4
MONITORING NEARLY 4000 NEARBY STELLAR SYSTEMS FOR RADIO EXOPLANETS WITH THE OVRO–LWA
Marin M. Anderson*, Gregg Hallinan
Astronomy, California Institute of Technology, Pasadena, CA

15:00 Break

15:20 J3–5
SEARCHING FOR LOW–FREQUENCY RADIO EMISSIONS FROM NEARBY STARS AND EXOPLANETS
Jason Ling*[1], Andrea Isella[1], Christopher M. Johns–Krull[1], Joseph T. Lazio[2]
[1]*Physics and Astronomy, Rice University, Houston, TX*
[2]*Interplanetary Network Directorate, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*

15:40 J3–6
USING SUNRISE AS A PATHFINDER FOR DETECTING LOW FREQUENCY RADIO EMISSION FROM EXTRASOLAR PLANETS WITH SPACE BASED RADIO ARRAYS
Alexander M. Hegedus*[1], Justin C. Kasper[1], Joseph Lazio[2], Andrew Romero–Wolf[2], Timothy S. Bastian[3]
[1]*Climate and Space Sciences and Engineering, University of Michigan, Ann Arbor, MI*
[2]*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA*
[3]*National Radio Astronomy Observatory, Charlottesville, VA*

16:00 J3–7
RADIO EMISSION FROM EXTRASOLAR PLANETS AND THE ASTRONOMY & ASTROPHYSICS 2020 DECADAL SURVEY
Joseph Lazio*
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

Session K2: RF, Microwave and THz Diagnostics/ Therapeutics
Room 150
Session Co–Chairs: John Stang, *University of Southern California*; Erdem Topsakal, *Virginia Commonwealth University*

13:20 K2–1
NEURAL NETWORK ASSISTED MULTI–MODALITY MICROWAVE INVERSE SCATTERING FOR BRAIN DIELECTRIC IMAGING
Guanbo Chen, Pratik Shah, John Stang*, Mahta Moghaddam
EE – Electrophysics, University of Southern California, Los Angeles, CA

13:40 K2–2
EFFECT OF WEAK STATIC MAGNETIC FIELDS ON CELL PROLIFERATION AND REACTIVE OXYGEN SPECIES OF HT–1080 HUMAN FIBROSARCOMA CELLS
Hakki Gurhan*, Sahithi Kandala, Frank Barnes
Electrical Engineering, University of Colorado Boulder, Boulder, CO

14:00 K2–3
IN VITRO BIOCOMPATIBILITY OF DUAL–BAND TIN ANTENNA IN EXCITED AND NON–EXCITED ENVIRONMENTS IN REAL TIME
Madeline Hays*[1,2], Lynn E. Secondo[3], Ryan Green[2], Nastassja Lewinski[3], Erdem Topsakal[2]
[1]*Biomedical Engineering, Virginia Commonwealth University, Richmond, VA*
[2]*Electrical and Computer Engineering, Virginia Commonwealth University, Richmond, VA*
[3]*Chemical and Life Science Engineering, Virginia Commonwealth University, Richmond, VA*

14:20 K2–4
DIELECTRIC PROPERTIES OF BROWN AND WHITE ADIPOSE TISSUE IN RODENT MODEL FROM 0.5 GHZ TO 50 GHZ
Nikhat Nusrat*, Sydney Wojcieszak, Madeline Hays, Erdem Topsakal
Virginia Commonwealth University, Richmond, VA

14:40 K2–5
AIRBORNE INSECTS RADAR SCATTERING CHARACTERISTICS UTILIZING ELECTROMAGNETIC MODELING
Omar Alzaabi*[1], Diego Peñaloza–Aponte[1], Julio Urbina[1], James Breakall[1], Michael Lanagan[2]
[1]*Electrical Engineering, The Pennsylvania State University, University Park Pennsylvania*
[2]*Engineering Science and Mechanics, The Pennsylvania State University, University Park, PA*

15:00 Break

15:20 K2–6
VALIDATION OF AN ARM–SWINGING HUMAN PHANTOM MODEL FOR THE STUDY OF WIRELESS BODY AREA NETWORKS
George Lee*, Brian Garner, Yang Li
School of Engineering and Computer Science, Baylor University, Waco, TX

15:40 K2–7
TITANIUM NITRIDE ANTENNAS FOR MEDICAL WIRELESS DATA TELEMETRY
Ryan Assi*, Ryan Green, Vitaliy Avrutin, Erdem Topsakal
Electrical and Computer Engineering, Virginia Commonwealth University, 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 150

THURSDAY EVENING, 10 January 2019
Women's Reception (TBD)

Session B7: Microstrip and Printed Devices and Antennas
Room 200
Session Co–Chairs: Payam Nayeri, *Colorado School of Mines*;
Dimitra Psychogiou, *University of Colorado Boulder*

08:20 B7–1
SIW MICROSTRIP CAVITY RESONATORS WITH A SENSING APERTURE
Chaoxian Qi*, David R. Jackson, Yan Yao, Jiefu Chen
Electrical and Computer Engineering, University of Houston, Houston, TX

08:40 B7–2
A BROADBAND PRINTED CONICAL BOWTIE DIPOLE ANTENNA WITH AN INTEGRATED BALUN
Ami Desai*, Payam Nayeri
Electrical Engineering, Colorado School of Mines, Golden, CO

09:00 B7–3
A WIDEBAND DUAL–POLARIZED STACKED MICROSTRIP PATCH ANTENNA WITH A DUMBBELL SHAPED APERTURE
Ami Desai*, Payam Nayeri
Colorado School of Mines, Golden, CO

09:20 B7–4
QUASI–ELLIPTIC BANDPASS FILTERS AND RF–DUPLEXERS WITH TUNABLE CENTER FREQUENCY, BANDWIDTH AND INTRINSIC RF SWITCHING–OFF CAPABILITIES
Dakotah J. Simpson*[1], Roberto Gómez–García[2], Dimitra Psychogiou[1]
[1]*Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO*
[2]*Signal Theory and Communications, University of Alcalá, Spain, Alcalá de Henares, SPAIN*

09:40 B7–5
A COMPACT HARMONIC SENSOR BASED ON A DUAL–RESONANT MICROSTRIP ANTENNA LOADED WITH A MICROFLUIDIC CHANNEL
Liang Zhu*[1], Nasser Alkhaldi[2], Pai–yen Chen[1]
[1]*Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL*
[2]*Electrical and Computer Engineering, Wayne State University, Detroit, MI*

Session B8: Analytical and Theoretical Electromagnetics
Room 1B40
Session Co–Chairs: Piergiorgio Uslenghi, *University of Illinois at Chicago*;
Branislav Notaros, *Colorado State University*

08:20 B8–1
THE ANTENNA EQUATION: A DESCRIPTION OF ANTENNAS INSPIRED BY SCATTERING PARAMETERS
Everett G. Farr*
Farr Fields, LC, Albuquerque, NM

08:40 B8–2
ANALOGY BETWEEN ELASTODYNAMIC DISPLACEMENT AND ELECTROMAGNETIC VECTOR POTENTIALS
John W. Neese*[1], David R. Jackson[2], Leon A. Thomsen[1]
[1]*Earth and Atmospheric Sciences, University of Houston, Houston, TX*
[2]*Electrical and Computer Engineering, University of Houston, Houston, TX*

09:00 B8–3
EXCEPTIONAL POINTS OF DEGENERACIES IN GAIN AND LOSS BALANCED DEVICES
Ahmed Abdelshafy*, Tarek Mealy, Filippo Capolino
Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA

09:20 B8–4
THE DEGENERACY OF THE DOMINANT–MODE IN RECTANGULAR WAVEGUIDES
Tarek Mealy*, Ahmed F. Abdelshafy, Filippo Capolino
University of California, Irvine, Irvine, CA

09:40 B8–5
EXACT GEOMETRICAL OPTICS SCATTERING BY A RIGHT–ANGLE METALLIC WEDGE ILLUMINATED BY THREE PLANE WAVES
Piergiorgio L. E. Uslenghi*
Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL

10:00 Break

10:20 B8–6
APPLICATIONS OF SHOOTING–BOUNCING RAY TRACING TO MODELING PROPAGATION IN UNDERGROUND MINES
Blake A. Troksa*, Cam L. Key, Jake J. Harmon, Sanja B. Manic, Branislav M. Notaros
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

10:40 B8–7
FAST SPHERE INTERSECTION TESTS FOR SHOOTING–BOUNCING RAY TRACING: SPACE PARTITIONING AND RAY PATH VOXELIZATION
Cam Key*, Jake Harmon, Blake Troksa, Branislav M. Notaros
Electrical and Computer Engineering, Colorado State University, Fort Collins, CO

11:00 B8–8
WIDEBAND IN–BAND FULL–DUPLEX DUAL REFLECTOR ANTENNA SYSTEM
Prathap Valale Prasannakumar*, Mohamed A. Elmansouri, Dejan S. Filipovic
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

11:20 B8–9
WIRELESS MICROWAVE POWERING OF AGRICULTURAL SENSORS
Abbas Semnani*, Badri Baskaran, Dimitrios Peroulis
School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN

Session B9: Wireless Communications and Periodic Structures
Room 200
Session Co–Chairs: Satish Sharma, *San Diego State University*; Nader Behdad, *University of Wisconsin–Madison*

10:20 B9–1
A RECIPROCAL TERRESTRIAL BACKHAUL ARCHITECTURE FOR THE INTEGRATION OF 5G IN HTS NETWORKS
Behzad Koosha*, Hermann Helgert, Reza Karimian
The George Washington University, Washington, DC

10:40 B9–2
INTERFERENCE MITIGATION FOR 5G MILLIMETER WAVE COMMUNICATION LINKS
Dimitrios Siafarikas*, Elias A. Alwan, John L. Volakis
Florida International University, Miami, FL

11:00 B9–3
A HYBRID BEAM HOPPING DESIGN FOR NON–UNIFORM TRAFFIC IN HTS NETWORKS
Behzad Koosha*, Hermann Helgert, Reza Karimian
The George Washington University, Washington, DC

11:20 B9–4
LOW–PROFILE POLARIZATION ROTATING SURFACES WITH SECOND–ORDER BAND PASS RESPONSES
Konstantinos Mavrakakis*, Hung Luyen, John H. Booske, Nader Behdad
Electrical Engineering, University of Wisconsin–Madison, Madison, WI

11:40 B9–5
FROZEN–LIGHT MODES IN 3–WAY COUPLED SILICON RIDGE WAVEGUIDES
Raed Almhmadi*, Kubilay Sertel
Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

Session F4: Remote Sensing: Small Satellites and RFI Mitigation
Room 155
Session Co–Chairs: Steven Reising, *Colorado State University*; Albin Gasiewski, *University of Colorado Boulder*

08:20 F4–1
RAINCUBE, A KA–BAND PRECIPITATION RADAR MISSION IN A CUBESAT
Eva Peral[1], Shannon Statham[1], Simone Tanelli[1], Shivani Joshi*[1], Travis Imken[1], Douglas Price[1], Jonathan Sauder[1], Nacer Chahat[1], Austin Williams[2]
[1]*Jet Propulsion Laboratory, Pasadena, CA*
[2]*Tyvak Nano–Satellite Systems, Inc., Irvine, CA*

08:40 F4–2
ICECUBE'S 15–MONTH EXPERIMENT WITH A COMMERCIAL 883–GHZ CLOUD RADIOMETER
Dong L. Wu*[1], Jeffrey R. Piepmeier[1], Jaime Esper[1], Negar Ehsan[1], Paul E. Racette[1], Thomas E. Johnson[1], Brian S. Abresh[1], Eric Bryerton[2]
[1]*NASA Goddard Space Flight Center, Greenbelt, MD*
[2]*Virginia Diodes, Inc., Charlottesville, VA*

09:00 F4–3
STATUS OF THE MICROMAS–2 AND TROPICS CUBESAT MISSIONS
William Blackwell*
MIT Lincoln Laboratory, Lexington, MA

09:20 F4–4
THE CUBESAT RADIOMETER RADIO FREQUENCY INTERFERENCE TECHNOLOGY VALIDATION (CUBERRT) MISSION
Joel T. Johnson*[1], Christa McKelvey[1], Chris Ball[1], Chi–Chih Chen[1], Graeme Smith[1], Mark Andrews[1], Sidharth Misra[2], Shannon Brown[2], Robert Jarnot[2], Rudi Bendig[2], Carl Felten[2], Kevin Horgan[3], Jared Lucey[3], Jinzheng Peng[3], Jeffrey Piepmeier[3], Michael Solly[3], Joseph Knuble[3], Jonathon Kocz[4], Doug Laczkowski[5], Matt Pallas[5]
[1]*The Ohio State University, Columbus, OH*
[2]*NASA Jet Propulsion Laboratory, Pasadena, CA*
[3]*NASA Goddard Space Flight Center, Greenbelt, MD*
[4]*California Institute of Technology, Pasadena, CA*
[5]*Blue Canyon Technologies, Inc., Boulder, CO*

09:40 F4–5
EARLY RESULTS OF HURRICANE AND SEVERE STORM OBSERVATIONS FROM TEMPORAL EXPERIMENT FOR STORMS AND TROPICAL SYSTEMS – DEMONSTRATION (TEMPEST–D) MISSION
Steven C. Reising*[1], Todd C. Gaier[2], Sharmila Padmanabhan[2], Boon H. Lim[2], Shannon T. Brown[2], Cate Heneghan[2], Wesley Berg[1], Christian D. Kummerow[1], V. Chandrasekar[1], Matthew Pallas[3], Doug Laczkowski[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*

10:00 Break

10:20 F4–6
INITIAL RADIANCE VALIDATION OF ON–ORBIT MICROMAS–2A DATA
Angela Crews*[1], William Blackwell[2], R. Vincent Leslie[2], Michael Grant[3], Idahosa Osaretin[2], Michael DiLiberto[2], Adam Milstein[2], Kerri Cahoy[1]
[1]*MIT, Cambridge, MA*
[2]*MIT Lincoln Laboratory, Lexington, MA*
[3]*NASA Langley, Hampton, VA*

10:40 F4–7
RADIO FREQUENCY INTERFERENCE PROCESSING FOR THE CUBESAT RADIOMETER RADIO FREQUENCY INTERFERENCE TECHNOLOGY VALIDATION (CUBERRT) MISSION
Joel T. Johnson*[1], Christa McKelvey[1], Chris Ball[1], Graeme Smith[1], Mark Andrews[1], Sidharth Misra[2], Shannon Brown[2], Robert Jarnot[2], Rudi Bendig[2], Carl Felten[2], Kevin Horgan[3], Jinzheng Peng[3], Jeffrey Piepmeier[3], Jonathon Kocz[4]
[1]*The Ohio State University, Columbus, OH*
[2]*NASA Jet Propulsion Laboratory, Pasadena, CA*
[3]*NASA Goddard Space Flight Center, Greenbelt, MD*
[4]*California Institute of Technology, Pasadena, CA*

11:00 F4–8
ATMOSPHERIC AND IONOSPHERIC RADIO OCCULTATION MEASUREMENTS OBTAINED FROM SPIRE'S NANOSATELLITE CONSTELLATION
Vu Nguyen*[1], Vladimir Irisov[1], Tim Duly[1], Oleguer Nogues–Correig[2], Linus Tan[3], Takayuki Yuasa[3], Dallas Masters[1]
[1]*Spire Global, Inc., Boulder, CO*
[2]*Spire Global, Inc., Glasgow, UNITED KINGDOM*
[3]*Spire Global, Inc., Singapore, SINGAPORE*

11:20 F4–9
SIGNALS OF OPPORTUNITY P–BAND INVESTIGATION (SNOOPI)
James L. Garrison*[1], Jeffrey R. Piepmeier[2], Rashmi Shah[3], David Spencer[1], Manuel A. Vega[2]
[1]*School of Aeronautics and Astronautics, Purdue University, West Lafayette, IN*
[2]*555, NASA Goddard Spaceflight Center, Greenbelt, MD*
[3]*NASA Jet Propulsion Laboratory, Pasadena, CA*

11:40 F4-10
DIGITAL BACK END FOR PERFORMING HIGH RESOLUTION SPECTROMETRY IN CORRELATION RADIOMETERS
Aravind Venkitasubramony*[1], Eryan Dai[1], Albin J. Gasiewski[1], Maciej Stachura[2], Jack Elston[2]
[1]*University of Colorado Boulder, Boulder, CO*
[2]*Blackswift Technologies LLC, Boulder, CO*

Session G5: New Horizons in Active and Passive Radio Techniques for Geospace Remote Sensing
Room 151
Session Co–Chairs: Philip Erickson, *MIT Haystack Observatory*; Julio Urbina, *The Pennsylvania State* University

08:20 G5–1
COMPARISON OF METER–SCALE PLASMA IRREGULARITIES PROBED BY TWO EQUATORIAL RADARS LOCATED IN PERU: JICAMARCA AND HUANCAYO
Adriyel Nieves, Julio Urbina*
Electrical Engineering, The Pennsylvania State University, University Park, PA

08:40 G5–2
NEW OBSERVATIONS OF THE HF PLASMA LINE OVERSHOOT AT THE ARECIBO OBSERVATORY
Anthea Coster*[1], Eliana Nossa[2], Phil Perrilat[3], Elizabeth Kendall[4], Asti Bhatt[4]
[1]*MIT Haystack Observatory, Westford, MA*
[2]*Johns Hopkins Applied Physics Laboratory, Laurel, MD*
[3]*Arecibo Observatory, Arecibo, PR*
[4]*SRI International, Palo Alto, CA*

09:00 G5–3
USING THE LWA RADIO TELESCOPE TO OBSERVE THE IONOSPHERE
Kenneth S. Obenberger*
Space Vehicles Directorate, Air Force Research Laboratory, NM

09:20 G5–4
AN INVESTIGATION OF IONOSPHERIC FORECASTING USING TIE–GCM AND ENKF
Scott M. Rabidoux*, Roy S. Calfas, Thomas L. Gaussiran
Applied Research Laboratories, The University of Texas at Austin, Austin, TX

09:40 G5–5
COMPARING MSTIDS GENERATED FROM TROPOSPHERIC WEATHER TO THE HOOKE MODEL
Katherine A. Zawdie*, Sarah E. McDonald, Stephen Eckermann, Fabrizio Sassi
Space Science Division, Naval Research Laboratory, Washington, DC

10:00 Break

10:20 G5–6
EXAMINING THE USE OF THE EMPIRICAL CANADIAN HIGH ARCTIC IONOSPHERIC MODEL (E–CHAIM) USING IN SITU MEASUREMENTS
David R. Themens*, P. T. Jayachandran, Anthony M. McCaffrey
Physics, University of New Brunswick, Fredericton, CANADA

10:40 G5–7
EXPLORING THE FORMATION OF POLAR CAP PATCHES VIA MODEL–BASED LAGRANGIAN COHERENT STRUCTURES IN THE IONOSPHERE
Ningchao Wang*[1], Seebany Datta–Barua[1], Uriel Ramirez[1], Alex Chartier[2]
[1]*Illinois Institute of Technology, Chicago, IL*
[2]*Johns Hopkins University, Laurel, MD*

Session HEG: Lightning and the Ionosphere
Room 245
Session Co–Chairs: Robert Marshall, *University of Colorado Boulder*;
Victor Pasko, *The Pennsylvania State University*

08:20 HEG–1 (Invited)
HIGH–ENERGY ATMOSPHERIC PHYSICS THEORY AND MODELING
Joseph R. Dwyer*, Ningyu Liu, Kevin M. A. Ihaddadene
Physics, University of New Hampshire, Durham NH

08:40 HEG–2 (Invited)
STUDYING TERRESTRIAL GAMMA–RAY FLASHES WITH FERMI GAMMA–RAY BURST MONITOR AND LIGHTNING LOCATING SYSTEMS
Bagrat G. Mailyan*[1], Amitabh Nag[2], Michael S. Briggs[1]
[1]*The University of Alabama in Huntsville, Huntsville, AL*
[2]*Florida Institute of Technology, Melbourne, FL*

09:00 HEG–3
SPRITE STREAMER INITIATION DUE TO IONIZATION OF METALLIC SPECIES AT SPRITE ALTITUDES
Reza Janalizadeh Choobbasti*, Victor P. Pasko
Communications and Space Sciences Laboratory, Electrical Engineering, The Pennsylvania State University, University Park, PA

09:20 HEG–4
PHOTOIONIZATION OF METALLIC SPECIES AT SPRITE ALTITUDES BY FAR–UV EMISSIONS OF LBH BAND SYSTEM OF MOLECULAR NITROGEN
Victor P. Pasko*
The Pennsylvania State University, University Park, PA

09:40 HEG–5 (Invited)
EXPLAINING THE SPECTRUM OF NARROW BIPOLAR EVENTS WITH A SYSTEM OF STREAMERS
Ningyu Liu*[1], Joseph Dwyer[1], Julia Tilles[1], Mark Stanley[2], Paul Krehbiel[2], William Rison[2], Robert Brown[3], Jennifer Wilson[3]
[1]*Physics and Space Science Center (EOS), University of New Hampshire, Durham, NH*
[2]*Physics, New Mexico Institute of Mining and Technology, Socorro, NM*
[3]*NASA, Kennedy Space Center, FL*

10:00 Break

10:20 HEG–6
THE RADIO FREQUENCY EMISSION SPECTRUM OF COLLIDING STREAMERS
Jacob H. Koile*[1], Ningyu Liu[1], Feng Shi[2], Joseph R. Dwyer[1]
[1]*Physics, University of New Hampshire, Durham, NH*
[2]*Physics, Auburn University, Auburn, AL*

10:40 HEG–7
INVESTIGATING IONOSPHERIC LIGHTNING RETURNS USING THE LONG WAVELENGTH ARRAY
Joseph B. Malins*[1], Kenneth Obenberger[2], Gregory Taylor[1]
[1]*Phyics and Astronomy, University of New Mexico, Albuquerque, NM*
[2]*Kirtland AFB, Air Force Research Laboratory, Albuquerque, NM*

Session J4: Cosmology and Astrophysics at Low Frequencies I
Room 265
Session Co–Chairs: Greg Taylor, *University of New Mexico*;
Nithyanandan Thyagarajan, *National Radio Astronomy Observatory*;
Judd Bowman, *Arizona State University*

08:20 J4–1 (Invited)
THE LOW FREQUENCY TRANSIENT SKY
Gregg Hallinan*
California Institute of Technology, Pasadena, CA

08:35 J4–2 (Invited)
STRENGTHENING THE COSMOLOGICAL INTERPRETATION OF THE EDGES SIGNAL THROUGH INSTRUMENTAL VERIFICATION
Raul A. Monsalve*[1], Judd D. Bowman[2], Alan E. Rogers[3], Thomas J. Mozdzen[2], Nivedita Mahesh[2]
[1]*Physics, McGill University, Montreal, Quebec, CANADA*
[2]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[3]*Haystack Observatory, Massachusetts Institute of Technology, Westford, MA*

08:50 J4–3 (Invited)
PULSARS AT LOW RADIO FREQUENCIES, CYCLIC SPECTROSCOPY, AND PULSAR TIMING ARRAYS
Timothy Dolch*
Physics, Hillsdale College, Hillsdale, MI

09:05 J4–4 (Invited)
STATUS OF THE HYDROGEN EPOCH OF REIONIZATION ARRAY
David R. DeBoer*
University of California, Berkeley, CA

09:20 J4–5
DARK COSMOLOGY: INVESTIGATIONS OF DARK MATTER IN THE DARK AGES WITH THE SPACE–BASED DARK AGES POLARIMETER PATHFINDER (DAPPER)
Jack O. Burns*[1], Stuart Bale[2], Richard Bradley[3], Keith Tauscher[1], David Rapetti[1]
[1]CASA, *University of Colorado Boulder, Boulder, CO*
[2]*Space Sciences Laboratory, University of California, Berkeley, Berkeley, CA*
[3]*Central Development Laboratory, National Radio Astronomy Observatory, Charlottesville, VA*

09:30 J4–6
FUNDAMENTAL LIMITATIONS ON THE CALIBRATION OF REDUNDANT 21–CM COSMOLOGY INSTRUMENTS AND IMPLICATIONS FOR HERA AND THE SKA
Ruby L. Byrne*[1], Miguel F. Morales[1], Bryna Hazelton[1], Wenyang Li[2], Nichole Barry[3]
[1]*Physics, University of Washington, Seattle, WA*
[2]*Physics, Brown University, Providence, RI*
[3]*Physics, University of Melbourne, Melbourne, Victoria, AUSTRALIA*

09:40 J4–7
A RADIO SCREAM AT COSMIC DAWN: MODELING THE IMPACT OF RADIO–LOUD BLACK HOLES IN THE 21 CM SIGNAL
Aaron Ewall–Wice*, Tzu–Ching Chang, Joseph Lazio
Jet Propulsion Laboratory, Pasadena, CA

09:50 J4–8
THE HIGH–Z 21–CM GLOBAL SPECTRUM EXPERIMENT
Jeffrey B. Peterson*
Carnegie Mellon University, Pittsburgh PA

10:00 Break

10:20 J4–9
SPECTRAL INDEX OF THE DIFFUSE RADIO BACKGROUND BETWEEN 50 AND 100 MHZ
Thomas J. Mozdzen[1], Nivedita Mahesh*[1], Raul A. Monsalve[2], Alan E. E. Rogers[3], Judd D. Bowman[1]
[1]*Astrophysics, Arizona State University, Tempe, AZ*
[2]*University of Colorado Boulder, Boulder, CO*
[3]*MIT Haystack observatory, Westford, MA*

10:30 J4–10 (Invited)
FRB DETECTION & CHARACTERIZATION AT THE DAWN OF THE CHIME ERA
Emmanuel Fonseca*
McGill University, Montreal, CANADA

10:45 J4–11 (Invited)
THE CANADIAN HYDROGEN INTENSITY MAPPING EXPERIMENT (CHIME): UPDATE AND STATUS
Laura Newburgh*
Physics, Yale University, New Haven, CT

11:00 J4–12 (Invited)
AN ANTI–COINCIDENCE SEARCH FOR COSMIC TRANSIENTS WITH THE LWA RADIO TELESCOPES
Kenneth S. Obenberger*[1], Savin S. Varghese[2], Gregory B. Taylor[2]
[1]*Space Vehicles Directorate, Air Force Research Laboratory, KAFB, NM*
[2]*Physics and Astronomy, University of New Mexico, Albuquerque, NM*

11:15 J4–13 (Invited)
PREDICTIONS AND DETECTIONS OF HIGH MASS GALAXIES IN CHILES
Monica C. Sanchez*[1,2], Patricia A. Henning[2], Emmanuel Momjian[1], Jacqueline van Gorkom[3]
[1]*National Radio Observatory, Socorro, NM*
[2]*Physics and Astronomy, University of New Mexico, Albuquerque, NM*
[3]*Astronomy, Columbia University, New York, NY*

11:30 J4–14
A RE–ANALYSIS OF PAPER–64 WITH THE SIMPLEDS PIPELINE
Matthew Kolopanis*[1], Daniel C. Jacobs[1], Carina Cheng[2]
[1]*School of Earth and Space Exploration, Arizona State University, Tempe, AZ*
[2]*Astronomy, University of California, Berkeley, Berkeley, CA*

11:40 J4–15
FULL DATA ANALYSIS PIPELINE FOR LOW RADIO FREQUENCY MEASUREMENTS OF THE DARK AGES AND COSMIC DAWN
David Rapetti*[1,2], Keith Tauscher[1], Jack O. Burns[1], Jordan Mirocha[3]
[1]*Center for Astrophysics and Space Astronomy, Astrophysical and Planetary Science, University of Colorado Boulder, Boulder, CO*
[2]*NASA Ames Research Center, Moffett Field, CA*
[3]*Physics, McGill University, Montreal, Quebec, CANADA*

11:50 J4–16
RECENT RESULTS FROM THE MWA AND LESSONS LEARNED AT THE FOREFRONT OF EOR PS ANALYSIS EFFORTS
Miguel F. Morales*
University of Washington, Seattle, WA

FRIDAY NOON, 11 January 2019
Sixth Hans Liebe Lecture Event
Math 100

12:15 HL –1
FOSTERING GROUND–BASED MICROWAVE RADIOMETRY: FROM UNCERTAINTY TO NETWORKING
Domenico Cimini *
Institute of Methodologies for Environmental Analysis (CNR–IMAA) C.da S.Loja, Tito Scalo (Potenza), ITALY

FRIDAY AFTERNOON, 11 January 2019

Session B10: Low–Profile Antennas from Gigahertz to Terahertz
Room 1B40
Session Co–Chairs: Goutam Chattopadhyyay, *Jet Propulsion Laboratory, California Institute of Technology*; Satish Sharma, *San Diego State University*

13:20 B10–1 (Invited)
A MECHANICALLY CONFIGURABLE MICROSTRIP PATCH ANTENNA FOR IEEE 802.11 WLAN BAND
Payam Nayeri*, Randy Haupt
Electrical Engineering, Colorado School of Mines, Golden, CO

13:40 B10–2
DESIGN OF STRONGLY MINIATURIZED, INHERENTLY MATCHED, AND SCALABLE FOLDED DIPOLE ANTENNAS
Sanghamitro Das[1], David J. Sawyer[1], Nectaria Diamanti[2,3], A. P. Annan[3], Ashwin K. Iyer*[1]
[1]*Electrical and Computer Engineering, University of Alberta, Edmonton, Alberta, CANADA*
[2]*Aristotle University of Thessaloniki, Thessaloniki, GREECE*
[3]*Sensors & Software Inc., Mississauga, Ontario, CANADA*

14:00 B10–3
A 2D PERIODIC CROSS–SHAPED LEAKY–WAVE ANTENNA
Sohini Sengupta*[1], David R. Jackson[2], Ahmed T. Almutawa[3], Hamidreza Kazemi[3], Filippo Capolino[3]
[1]*Energous Corporation, San Jose, California*
[2]*Electrical and Computer Engineering, University of Houston, Houston, TX*
[3]*Electrical Engineering and Computer Science, University of California, Irvine, Irvine, CA*

14:20 B10–4 (Invited)
3D–PRINTED FREQUENCY SCANNING SLOTTED WAVEGUIDE ARRAY WITH WIDE BAND POWER DIVIDER
Kunchen Zhao*, Grant Senger, Nima Ghalichechian
Electrical and Computer Engineering, ElectroScience Laboratory, The Ohio State University, Columbus, OH

14:40 B10–5 (Invited)
ANTI–REFLECTIVE SUEX COATINGS OF SILICON OPTICS FOR MMW AND THZ APPLICATIONS
Seckin Sahin*, Niru K. Nahar, Kubilay Sertel
Electrical and Computer Engineering, The Ohio State University, Columbus, OH

15:00 Break

15:20 B10–6
3D PRINTED LINEAR AND CIRCULAR POLARIZED MAGNETO–ELECTRIC ANTENNA COVERING L1–L5 GPS BANDS
Ghanshyam Mishra*, Satish Kumar Sharma
Electrical and Computer Engineering, San Diego State University, San Diego, CA

15:40 B10–7 (Invited)
CAPACITY RECONFIGURABLE ORIGAMI ENABLED MIMO ANTENNA
Nicholas E. Russo*, Constantinos L. Zekios, Stavros V. Georgakopoulos
Electrical and Computer Engineering, Florida International University, Miami, FL

16:00 B10–8 (Invited)
DESIGN OF A CORRUGATED ANTIPODAL VIVALDI ANTENNA WITH STABLE PATTERN
Omid Manoochehri[1], Farhad Farzami[1], Danilo Erricolo*[1], Pai–yen Chen[1], Amin Darvazehban[2], Atif Shamim[3], Hakan Bagci[3]
[1]*Electrical and Computer Engineering, University of Illinois at Chicago, Chicago, IL*
[2]*Electrical Engineering, University of Queensland, Queensland, AUSTRALIA*
[3]*Division of Computer, Electrical, and Mathematical Science and Engineering, King Abdullah University of Science and Technology, Thuwal, SAUDI ARABIA*

16:20 B10–9 (Invited)
SIMULTANEOUS TRANSMIT AND RECEIVE ARCHITECTURE FOR REFLECTARRAY ANTENNAS
Aman Samaiyar*, Dejan S. Filipovic
Electrical, Computer, and Energy Engineering, University of Colorado Boulder, Boulder, CO

16:40 B10–10 (Invited)
A DUAL–POLARIZED PATCH ANTENNA WITH IMPROVED BANDWIDTH FOR SIMULTANEOUS TRANSMIT AND RECEIVE (STAR)
KueiJih Lu*, Carlene Goodbody, Nicholas A. Trudeau, Tutku Karacolak
School of Engineering and Computer Science, Washington State University Vancouver, Vancouver, WA

Session F5: Point–to–Point Propagation Effects: Measurements and Models
Room 155
Session Co–Chairs: Michael Newkirk, *Johns Hopkins University Applied Physics Laboratory*;
David Michelson, *University of British Columbia*

13:20 F5–1
A PHYSICS–DRIVEN DEEP LEARNING NETWORK FOR SUBSURFACE INVERSION
Yuchen Jin*[1], Xuqing Wu[1], Yueqin Huang[2], Jiefu Chen[1]
[1]*University of Houston, Houston, TX*
[2]*Cyentech Consulting LLC, Cypress, TX*

13:40 F5–2
PARABOLIC WAVE EQUATION PROPAGATION IN A MARITIME DUCT WITH A ROUGH SEA SURFACE AND VOLUME TURBULENCE
Frank Ryan*
Applied Technology, Inc., San Diego, CA

14:00 F5–3
MEASURED CHARACTERISTICS OF URBAN DEPOLARIZATION IN GROUND–TO–GROUND UHF WIDEBAND CHANNELS
Daniel J. Breton*, Caitlin E. Haedrich, Garrett R. Hoch
Signature Physics Branch, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH

14:20 F5–4
HEIGHT GAIN FUNCTIONS FOR RADIO–WAVE PROPAGATION MODELS
Nicholas N. DeMinco*
Telecommunication Theory Division, Institute for Telecommunication Sciences, Boulder, CO

14:40 F5–5
RECOGNITION AND CLASSIFICATION OF BODY POSTURE AND GESTURES USING MULTIFREQUENCY SIGNALS
Muneeba Raja[1], Aidan Hughes[2], Xiyuan Xu[2], Parham Zarei[2], David Michelson*[2], Stephan Sigg[1]
[1]*Communication and Networking, Aalto University, Espoo, FINLAND*
[2]*Electrical and Computer Engineering, University of British Columbia, Vancouver, BC, CANADA*

Session FGH: GNSS and Radio Beacon Remote Sensing
Room 105
Session Co–Chairs: Clara Chew, *UCAR*;
Carl Siefring, *Naval Research Laboratory*

13:40 FGH–1
REMOTE SENSING OF IONOSPHERIC IRREGULARITIES OVER RESOLUTE BAY WITH GNSS AND BEACON SIGNAL PROPAGATION THROUGH GRADIENT–DRIFT INSTABILITY
Kshitija B. Deshpande*[1], Leslie Lamarche[2], Matt Zettergren[1], Roger Varney[2], Carl Siefring[3]
[1]*Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, FL*
[2]*SRI International, Menlo Park, CA*
[3]*Plasma Physics Division, Naval Research Laboratory, Washington, DC*

14:00 FGH–2
AN ANALYSIS OF MAXIMUM HURRICANE WIND RETRIEVALS USING SPACEBORNE GNSS–R SYSTEMS
Mohammad M. Al–Khaldi*[1], Alexandra Bringer[1], Joel T. Johnson[1], Stephen J. Katzberg[2,3], Ethan Kubatko[4]
[1]*ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, OH*
[2]*NASA Langley Research Center, Hampton, VA*
[3]*South Carolina State University, Orangeburg, SC*
[4]*Civil, Environmental and Geodetic Engineering, The Ohio State University, Columbus, OH*

14:20 FGH–3
CYGNSS CONSTELLATION OCEAN LEVEL 1 CALIBRATION AND WIND SPEED RETRIEVAL UPDATE
Tianlin Wang[1], Ruf, Chris Ruf[1], Scott Gleason*[2], Darren McKague[1], Andrew O'Brien[3]
[1]*University of Michigan, Ann Arbor, MI*
[2]*UCAR, Boulder, CO*
[3]*The Ohio State University, Columbus, OH*

14:40 FGH–4
TIME SERIES SOIL MOISTURE RETRIEVALS USING THE CYGNSS CONSTELLATION
Mohammad M. Al–Khaldi*, Joel T. Johnson
ElectroScience Laboratory, Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio

15:00 Break

15:20 FGH–5
SIMULATION STUDY OF CYGNSS RETRIEVAL ALGORITHMS FOR WETLAND EXTENT
Eric Loria*, Andrew O'Brien
The Ohio State University, Columbus, OH

15:40 FGH–6
A GNSS–REFLECTOMETRY INSTRUMENT FOR WETLAND EXTENT AND DYNAMICS
Stephen T. Lowe*, Jeff Dickson, Casey Handmer, David Robison, Larry Young
Jet Propulsion Laboratory, Pasadena, CA

Session GH2: Meteors, Orbital Debris, and Dusty Plasmas
Room 245
Session Co–Chairs: Julio Urbina, *The Pennsylvania State University*;
Sigrid Close, *Stanford University*;
Alex Fletcher, *Naval Research Laboratory*

13:20 GH2–1
MULTI–STATIC METEOR RADAR
John Marino*, Nicholas Rainville, Scott Palo
University of Colorado Boulder, Boulder, CO

13:40 GH2–2
TRANSMIT ARRAY MULTISTATIC METEOR RADAR
Nicholas Rainville*, Scott Palo, John Marino
Aerospace Engineering Sciences, University of Colorado Boulder, Boulder, CO

14:00 GH2–3
INVESTIGATION OF DUSTY PLASMA EFFECTS ON RADIO FREQUENCY EMISSIONS GENERATED BY HYPERVELOCITY IMPACTS ON SPACECRAFT
Gil Shohet*, Sigrid Close
Stanford University, Stanford, CA

14:20 GH2–4
STUDIES OF PLASMA INSTABILITIES ON SPECULAR METEOR TRAIL DECAY TIMES
Freddy R. Galindo*[1], Julio V. Urbina[1], Steven J. Franke[2], Lars P. Dyrud[3]
[1]*Electrical Engineering, The Pennsylvania State University, University Park, PA*
[2]*Electrical Engineering, University of Illinois at Urbana Champaign, Urbana, IL*
[3]*EagleView, Washington, DC*

14:40 GH2–5
ESTIMATING WIND FIELDS IN THE LOWER THERMOSPHERE WITH SIMONE, A SPREAD–SPECTRUM, INTERFEROMETRIC, MULTISTATIC METEOR OBSERVATION NETWORK
Ryan Volz*[1], Jorge L. Chau[2], Juha Vierinen[3], Juan M. Urco[2], Matthias Clahsen[2], Nico Pfeffer[2], Jörg Trautner[2], Philip J. Erickson[1]
[1]*MIT Haystack Observatory, Westford, MA*
[2]*Leibniz Institute of Atmospheric Physics at the University of Rostock, Kühlungsborn, GERMANY*
[3]*UiT Arctic University of Norway, Tromsø, NORWAY*

Session J5: Cosmology and Astrophysics at Low Frequencies II
Room 265
Session Co–Chairs: Greg Taylor, *University of New Mexico*; Nithyanandan Thyagarajan, *National Radio Astronomy Observatory*; Judd Bowman, *Arizona State University*

13:20 J5–1
COMMISSIONING OF THE HIRAX EIGHT–ELEMENT PATHFINDER
Austine A. Gumba*
University of Kwazulu Natal, Durban, SOUTH AFRICA

13:30 J5–2 (Invited)
A SIMULTANEOUS SEARCH FOR PROMPT RADIO EMISSION ASSOCIATED WITH GRBS USING THE OVRO–LWA
Marin M. Anderson*, Gregg Hallinan
Astronomy, California Institute of Technology, Pasadena, CA

13:45 J5–3 (Invited)
CONFRONTING THE CHALLENGES OF GLOBAL EOR DETECTION
Keith Tauscher*[1,2], David Rapetti[1,3], Jack O. Burns[1]
[1]*Center for Astrophysics and Space Astronomy, University of Colorado Boulder, Boulder, CO*
[2]*Physics, University of Colorado Boulder, Boulder, CO*
[3]*NASA Ames Research Center, Mountain View, CA*

14:00 J5–4 (Invited)
OBSERVING THE A–TEAM WITH THE ELWA
Frank K. Schinzel*[1], Paul Demorest[1], Kevin Stovall[1], Jayce Dowell[2], Gregory B. Taylor[2]
[1]*National Radio Astronomy Observatory, Socorro, NM*
[2]*Physics and Astronomy, University of New Mexico, Albuquerque, NM*

14:15 J5–5 (Invited)
COMMENSAL LOW FREQUENCIES ON THE NRAO VLA: THE VLA LOW–BAND IONOSPHERE AND TRANSIENT EXPERIMENT (VLITE) AND VLITE–FAST
Tracy Clarke*[1], Wendy Peters[1], Simona Giacintucci[1], Namir Kassim[1], Matthew Kerr[2], Paul S. Ray[2], Julia Deneva[3]
[1]*Code 7213, Naval Research Laboratory, Washington, DC*
[2]*Code 7655, Naval Research Laboratory, Washington, DC*
[3]*George Mason University, Washington, DC*

14:30 J5–6 (Invited)
TOWARD EXPERIMENTAL EVIDENCE OF COSMIC DAWN
Lincoln J. Greenhill*
Harvard University / Smithsonian Astrophysical Observatory, Cambridge, MA

14:45 J5–7 (Invited)
THE SWARM TELESCOPE CONCEPT
Jayce Dowell*, Greg B. Taylor
University of New Mexico, Albuquerque, NM

15:00 Break

15:20 J5–8
ALBATROS: A NEW ARRAY FOR LOW–FREQUENCY OBSERVATIONS
Nivek Ghazi*
School of Mathematics, Statistics and Computer Science, University of KwaZulu–Natal, Durban, SOUTH AFRICA

15:30 J5–9
THE COSMIC TWILIGHT POLARIMETER
David D. Bordenave*[1,2], Bang D. Nhan[1,2], Richard F. Bradley[1,2], Jack O. Burns[3]
[1]*Astronomy, University of Virginia, Charlottesville,VA*
[2]*Central Development Laboratory, National Radio Astronomy Observatory, Charlottesville, VA*
[3]*Center for Astrophysics and Space Astronomy, Astrophysical and Planetary Sciences, University of Colorado Boulder, Boulder, CO*

15:40 J5–10 (Invited)
A NOVEL APPROACH TO DETECTING 21CM EOR POWER SPECTRUM
Chris L. Carilli*[1,2], Nithyanandan Thyagarajan[1], Bojan Nikolic[2], James Kent[2], Kingsley Gale–Sides[2]
[1] National Radio Astronomy Observatory (for the HERA Team), Socorro, NM
[2]Cambridge University, Cavendish Astrophysics Group, Cambridge, UNITED KINGDOM

15:55 J5–11 (Invited)
SCATTERING STUDY OF PULSARS BELOW 100 MHZ
Karishma Bansal*[1], Greg Taylor[1], Kevin Stovall[2], Jayce Dowell[1]
[1]Physics and Astronomy, University of New Mexico, Albuquerque
[2] National Radio Astronomy Observatory, Socorro, NM

16:10 J5–12 (Invited)
MILLIARCSECOND IMAGING OF THE HIGHEST REDSHIFT RADIO–LOUD QUASARS
Emmanuel Momjian*
National Radio Astronomy Observatory, Socorro, NM

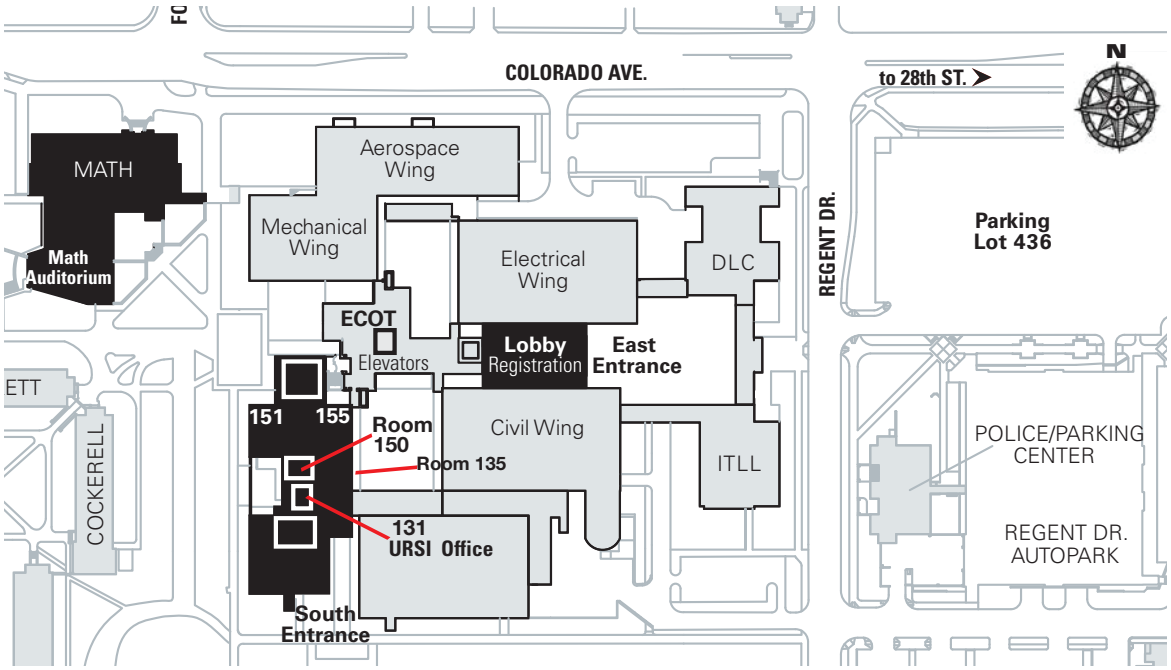
16:25 J5–13 (Invited)
MAPPING THE UNIVERSE'S ACCELERATED EXPANSION WITH HIRAX
Hsin C. Chiang*
McGill University, Montreal, Quebec, CANADA

16:40 J5–14 (Invited)
REALFAST: REAL–TIME, COMMENSAL FAST TRANSIENT SURVEYS WITH THE VERY LARGE ARRAY
Geoffrey C. Bower*
ASIAA, HI

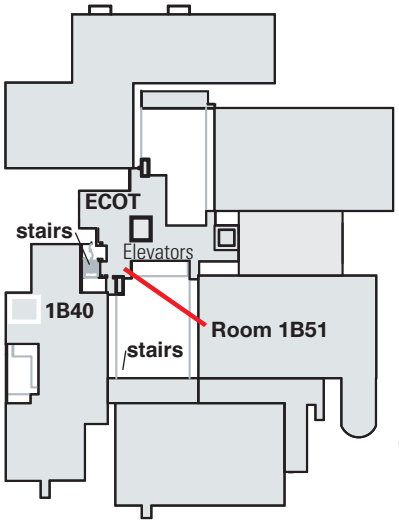
16:55 J5–15 (Invited)
PERSPECTIVES ON COSMOLOGY & ASTROPHYSICS AT LOW FREQUENCIES
Anthony J. Beasley*
National Radio Astronomy Observatory, Charlottesville, VA

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

CU–Boulder Engineering Center (EC)



Main / First Floor



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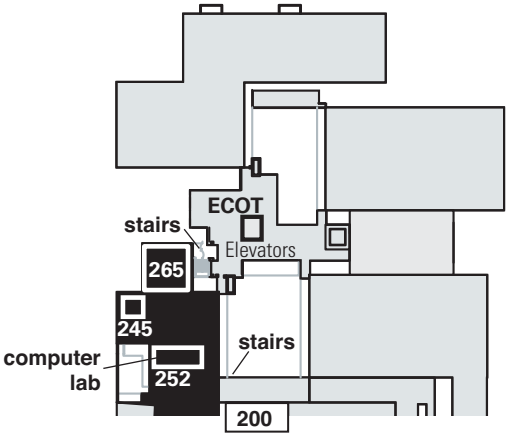

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