9/19/17

# COSMIC/IROWG Agenda
# Main Meeting Room – Concert Hall Building

**Thursday, September 21:**

7:00-8:30 Working breakfast (MacGregor Room)

*Opening Session (Rick Anthes, Chair)* (Concert Hall)

This session is dedicated to the memory of Jay S. Fein, NSF program manager who played a key role in GPS/MET and COSMIC

8:45-8:50 Nick Pedatella (UCAR/COSMIC), *Welcome, logistics, etc.*

8:50-9:00 Guey-Shin Chang (National Applied Research Laboratories), *Opening remarks*

9:00-9:15 Rick Anthes (UCAR/COSMIC), *Jay Fein contributions to RO*

9:15-9:55 Keynote #1 Eric DeWeaver (National Science Foundation), *GNSSRO at NSF: A personal view from the NSF Climate and Large-Scale Dynamics Program*

9:55-10:35 Keynote #2 Karen St. Germain (Director, Systems Architecture and Advanced Planning, NOAA/NESDIS), *Radio Occultation in the NESDIS Enterprise*

**10:35-11:00 Break**

11:00-11:45 Keynote #3 Chung-Huei (Vicky) Chu (NSPO) and Bill Schreiner (UCAR/COSMIC), *From FORMOSAT-3/COSMIC to FORMOSAT-7/COSMIC-2 Mission*

11:45-12:00 Discussion and Group Photo

**12:00-1:00 Working Lunch** (MacGregor Room)

*Afternoon Session #1 – Current and Future Missions / GNSS Technology (Karen St. Germain, Chair)* (Concert Hall)

1:00-1:30 Dominique Raspaud (Météo-France/CNRS), *A future constellation of cubesats for radio occultation yielding 10,000 soundings per day* (Invited)

1:30-1:50 Karen St. Germain (NOAA/NESDIS), *NOAA Commercial Weather Data Pilot*

1:50-2:10 Vladimir Irisov (SPIRE), *Radio occultation profile results obtained from Spire's CubeSat GNSS-RO constellation*

2:10-2:30 Toshiuki Kurino (WMO), *WMO's status report on IROWG related issues update*

**2:30-3:00 Break**

3:00-3:30 Tom Meehan (NASA JPL), *Evolving the TriG RO Instrument to Life in a Cubesat Ecosystem* (Invited)

3:30-3:50 Michel Tossaint (ESA), *ESA activities for future GNSS Radio Occultation Receivers*

3:50-4:10 Anders Carlström (RUAG Space AB), *The RO instrument for MetOp-SG - first test results*

4:10-4:30 Weihua Bai (CAS), *Global Navigation Satellite System Occultation Sounder II (GNOS II)*

*Afternoon Session #2: Introduction to Posters (Ulrich Foelsche, Chair)*

4:35-5:35 Poster Introductions (1 minute oral introduction/summary per poster)

5:45-8:00 Welcome Reception and Poster Session (Pinon & Billard Rooms)
(posters will be available for viewing through Monday)

(Dinner on own)

**Friday, September 22:**

7:00-8:30 Working breakfast (MacGregor Room)

*Morning Session #1 – Ionosphere and Space Weather*
*(Tony Mannucci, Chair)* (Concert Hall)

9:00-9:20 J.Y. (Tiger) Liu (National Central University and National Space Organization), *Ionospheric Weather Monitored by GNSS Radio Occultation and Ground-based Observations*

9:20-9:40 Dominic Fuller-Rowell (NOAA SWPC), *Plans for Using COSMIC-II for Real-time Ionospheric Mapping at NOAA*

9:40-10:00 Nick Pedatella (UCAR/COSMIC, NCAR/HAO), *Coupled whole atmosphere-ionosphere data assimilation in WACCM-X*

10:00-10:20 Iurii Cherniak (UCAR/COSMIC) *Assessment of the NeQuick and IRI-Plas model performance on electron content representation using Spaceborne RO and topside TEC GPS measurements*

**10:20-10:40 Break**

*Morning Session #2 – GNSS Technology (Jan Weiss, Chair)* (Concert Hall)

10:40-11:10 Jyh-Ching Juang (National Cheng Kung University), *Recent development in GNSS-reflected signal processing and receiver research in Taiwan* (Invited)

11:10-11:30 Feiqin Xie (Texas A&M University - Corpus Christi), *Sensitivity of airborne radio occultation to tropospheric properties over ocean and land*

11:30-11:50 Yu Morton (University of Colorado), *Mountain-top radio occultation with multi-GNSS signals: experiment and receiver signal processing techniques.*

**11:50-12:50 Working lunch** (MacGregor Room)

*Afternoon Session #1 – Meteorology and NWP (Bill Kuo, Chair)* (Concert Hall)

12:50-1:20 Lidia Cucurull (NOAA), NOAA *Observing system simulation experiments with radio occultation observations* (Invited)

1:20-1:50 David Bromwich (The Ohio State University), *Impact of assimilation GPS-RO over Antarctica and the Southern Ocean*.

1:50-2:10 Shu-Ya Chen (National Central University), *The GPS RO data assimilation in the global MPAS-GSI model*

2:10-2:30 Eun-Hee Kim (/Korea Meteorological Administration), *Assimilation of GNSS data in KMA NWP models*

2:30-2:50 Ben Ruston (Naval Research Laboratory), *Impact of GNSS-RO bending angle assimilation at NRL*

**2:50-3:10 Break**

*Afternoon Session #2 – Meteorology and NWP*
*(Sean Healy, Chair)* (Concert Hall)

3:10-3:30 Michael Murphy (Scripts Institution of Oceanography), *The impact of Assimilating COSMIC Radio Occultation Observations on Forecasts of an Intense Atmospheric River during CALWATER2015*

3:30-3:50 Hiromi Owada (Japan Meteorological Agency), *Assimilation of GNSS radio occultation data at JMA*

3:50-4:10 Hui Liu (UCAR/COSMIC), *COSMIC RO impact on forecast of Typhoon Sinlaku (2008)*

4:10-4:30 Hailing Zhang (UCAR/COSMIC), *Demonstrating the impact of RO dynamic error estimate on NWP using GFS/GSI*

4:30-4:50 Fang-Ching Chien (National Taiwan Normal University), *Estimation of marine boundary layer heights over the western North Pacific using GPS radio occultation profiles*

*Afternoon Session #3 – IROWG (Axel von Engeln, Chair)* (Concert Hall)

4:50-5:30 Sean Healy and Ulrich Foelsche (IROWG Co-Chairs) and Tony Mannucci (NASA JPL), *Summary of IROWG activities* (Invited)

(Dinner on own)

**Saturday, September 23:**

7:00-8:30 Working breakfast (MacGregor Room)

9:00-12:00 IROWG Working Group Meetings (breakout rooms)
Note: the IROWG Space Weather Group will meet Monday morning, 9:00-10:30 in the Billiard Room

12:00-1:00 Working Lunch (Wonderview Patio)

1:00-6:00 Rocky Mountain National Park Excursion

(Dinner on own)

**Sunday, September 24:**

Free Day

**Monday, September 25:**

7:00-8:30 Working breakfast (MacGregor Room)
9:00-10:30 IROWG Space Weather Working Group (Billiard Room)

*Morning Session #1 – Meteorology and NWP*
*(Lidia Cucurull, Chair)* (Concert Hall)

9:00-9:30 Sean Healy (ECMWF), *ECMWF Impact of GPS-RO measurements in NWP and climate reanalyses* (Invited)

9:30-9:50 Riccardo Biondi (Istituto di Scienze dell'Atmosfera e del Clima), *How can the GNSS RO improve the volcanic cloud studies?*

9:50-10:10 D. Narayana Rao (SRM University), *Thermodynamic structure of marine atmospheric boundary layer over Indian Ocean using GPS radio occultation*

10:10-10:30 Ulrich Foelsche (University of Graz), *Observing atmospheric rivers with GNSS radio occultation*

**10:30-10:50 Break**

*Morning Session #2 – COSMIC-2 Updates*
*(Estel Cardellach, Chair)* (Concert Hall)

10:50-11:20 Jens Wickert (GFZ Potsdam/Technische Universität Berlin), *GNSS reflectometry from space for Earth observation: GEROS-ISS and GTERN* (Invited)

11:20-11:50 Jan Weiss (UCAR/COSMIC), *COSMIC Data Analysis and Archive Center (CDAAC): Processing Status, Science Highlights, and Plans*

11:50-12:10 Joe Hackel (NOAA), *Joint Program Verification and Validation Plan on FORMOSAT-7/COSMIC-2*

12:10-12:30 Lynette Gelinas (The Aerospace Corp.), *COSMIC-2 Space Weather Cal/Val Plans*

**12:30-1:20 Working lunch** (MacGregor Room)

*Afternoon Session #1 – Ionosphere and Space Weather*
*(Nick Pedatella, Chair)* (Concert Hall)

1:20-1:50 Keith Groves (Boston College), *Characterizing Irregularities and Scintillation with GNSS Radio Occultations* (invited)

1:50-2:10 Chris Watson (UCAR/COSMIC) *Climatology and Characteristics F-region Ionospheric Plasma Irregularities Observed by COSMIC Radio Occultation Receivers*

2:10-2:30 Julie Currie (RMIT University), *On Unseasonal Equatorial Plasma Bubbles above South-East Asia Using Ground- and Space-based Observations*

2:30-2:50 Ron Caton (AFRL), *COSMIC-2 for Specification of the Global Scintillation Environment*

2:50-3:10 Dong Wu (NASA GSFC) *New Global Electron Density Observations from GPS-RO in the D- and E-Region Ionosphere*

**3:10-3:30 Break**

*Afternoon Session #2 – Climate (Ben Ho, Chair)* (Concert Hall)

3:30-4:00 Anthony Mannucci (NASA JPL), *Advancing Earth Science With Global Navigation Satellite Signals (GNSS): The Benefits of a Community Approach* (Invited)

4:00-4:20 Axel von Engeln (EUMETSAT), *Latest new EUMETSAT Products: A 15 year Reprocessed RO Data Set / GRAS Occultation Prediction*

4:20-4:40 Kent Lauritsen (Danish Meteorological Institute), *Overview of ROM SAF activities and the generation of climate data records*

4:40-5:00 Stig Syndergaard (Danish Meteorological Institute), *The ROM SAF multi-mission reprocessing: Bending angle, refractivity, and dry temperature*

5:00-5:20 Andrea K. Steiner (University of Graz), *Structural uncertainty of multi-satellite RO records from different data centers: latest results*

(Dinner on own)

**Tuesday, September 26:**

7:00-8:30 Working breakfast (MacGregor Room)

*Morning Session – Climate (Andrea Steiner, Chair)* (Concert Hall)

9:00-9:30 Joan M. Alexander (NorthWest Research Associates), *Tropical Wave Studies with COSMIC Temperature Profiles (invited)*

9:30-9:50 William Randel (National Center for Atmospheric Research), *Tropical temperature variances and wave-mean flow interactions derived from GPS radio occultation measurements*

9:45-10:10 Shu-Peng Ho (UCAR/COSMIC), *Characterization of radiosonde temperature biases in the upper troposphere and lower stratosphere using RO data: Assessment of Vaisala RS92, GRUAN RS92, and RS41*

10:10-10:30 Jordis Tradowsky (Bodeker Scientific, National Institute of Water and Atmospheric Research, Freie Universitaet Berlin), *Comparison of temperature profiles from the GCOS (Global Climate Observing System) Reference Upper-Air Network with dry temperatures derived from radio occultation bending angles*

**10:30-10:50 Break**

10:50-11:20 Gottfried Kirchengast (University of Graz), *GNSS radio occultation is the most accurate thermometer from space: Where do we stand in realizing this claim?* (Invited)

11:20-11:40 Florian Ladstädter (University of Graz), *Differences in trends and anomalies of upper-air observations from GPS RO, AMSU, and radiosondes*

11:40-12:00 Panagiotis Vergados (NASA JPL), *Evaluation of tropospheric specific humidity from GPS radio occultations using ERA–Interim, NASA/MERRA, and AURA/AIRS satellite observations*

12:00-12:20 Therese Rieckh (UCAR/COSMIC, University of Graz), *Error characteristics of RO, radiosonde, and AIRS tropospheric humidity in the tropics and subtropics from high-resolution time series*

**12:20-1:20 Working Lunch** (MacGregor Room)

*Afternoon Session #1 – Climate (Gottfried Kirchengast, Chair)* (Concert Hall)

1:20-1:40 Hallgeir Wilhelmsen (University of Graz), *Atmospheric QBO and ENSO indices with high vertical resolution from GNSS RO*

1:40-2:00 Hans Gleisner (Danish Meteorological Institute), *Comparison of stratospheric temperature trends derived from GPS-RO and Aqua AMSU data*

2:00-2:20 Michelle Feltz (University of Wisconsin-Madison), *Working Together on the Stratosphere: Comparisons of RO and Hyperspectral IR Data in Temperature and Radiance Space*

2:20-2:40 Cheng-Yung Huang (NSPO), *Detection of Atmospheric Boundary Layer Height with FORMOSAT-3/COSMIC profiles for Plum Rain Fall*

2:40-3:00 Jeremiah Sjoberg (UCAR/COSMIC), *A multi-method comparison of estimating Kelvin wave amplitudes and forcing from radio occultation data*

**3:00-3:20 Break**

*Afternoon Session #2 – Data Processing and Algorithms (Bill Schreiner, Chair)*

3:20-3:40 Christian Marquardt (EUMETSAT), *Lower tropospheric rising vs. setting biases in GRAS bending angle retrievals.*

3:40-4:00 Thomas Sievert (Blekinge Institute of Technology), *Investigating the use of the Phase Matching amplitude: surface reflections and other structures.*

4:00-4:20 Kuo-Nung Wang (NASA JPL), *Correcting negatively-biased radio occultation refractivity below ducts using an optimal estimation approach.*

4:20-4:40 Chi Ao (NASA JPL), *Towards per datum error characterization for radio occultation retrieval products.*

4:40-5:00 Tae-Kwon Wee (UCAR COSMIC) *A variational regularization of Abel transform*.

5:00-5:20 Michael Gorbunov (Russian Academy of Sciences), *Fluctuations of radio occultation signals in sounding the Earth's atmosphere.*

5:20-5:40 Estel Cardellach (Institute of Space Studies, ICE-CSIC/IEEC) *Polarimetric GNSS RO: status of the PAZ mission and polarimetric retrieval algorithms.*

(Dinner on own)

**Wednesday, September 27:**

7:00-8:30 Working breakfast (MacGregor Room)

*Morning Session #1 – Data Processing and Algorithms*
*(Vicky Chu, Chair)* (Concert Hall)

9:10-9:30 Zhen Zeng (UCAR/COSMIC), *Representation of vertical atmospheric structures by radio occultation (RO) observations – Comparison of high resolution RO and radiosonde profiles*

9:30-9:50 Xiaolei Zou (University of Maryland) *GPS RO retrieval improvements in ice clouds*

9:50-10:10 Ramon Padulles (Institut de Ciències de l'Espai, IEEC-CSIC) *Assessment of radio occultation refractivity under heavy precipitation.*

**10:10-10:30 Break**

*Morning Session #2 – Wrap-Up Discussions*
*(Bill Schreiner and Tiger Liu, Chair)* (Concert Hall)

10:30-11:15 Sean Healy/Ulrich Foelsche (IROWG Co-Chairs), *IROWG Subgroups & Recommendations*

11:15-12:00 Discussion

12:00-12:20 Closing Remarks

12:20 – 1:30 Working lunch (Box lunch) (MacGregor Room)

Workshop Ends