

Commission F

Session	Title	Convener names & e-mails	Number of slots
F01	Remote Sensing of Earth and Planetary Atmosphere	Animesh Maitra, Tomoo Ushio, animesh.maitra@gmail.com, ushio@comm.eng.osaka-u.ac.jp	10
<p>The active and passive remote sensing tools have been used to study the planetary atmosphere in recent years. A host of new remote sensing techniques have emerged to probe the earth's atmosphere that includes troposphere, stratosphere and mesosphere. This session will focus on new scientific results obtained by using VHF, microwave, and joint microwave/optical methods. Contributions are welcome on the topics that comprise physical models, retrieval algorithms, experiments, snow and ice products for climate change and regional comparative studies, and the use of data from advanced space-borne and airborne sensors.</p>			

Session	Title	Convener names & e-mails	Number of slots
F02	Microwave Remote Sensing of vegetation	Simonetta Paloscia s.paloscia@ifac.cnr.it	5
<p>This session will focus on the fundamental aspects of active and passive microwave remote sensing of surfaces covered by vegetation, considering both forests and agricultural areas and including the effects of vegetation on the measurements of soil parameters, and snow. Topics will comprise field and laboratory experiments, physical models, and retrieval algorithms. Special interests will be also on the use of data from the most advanced sensors and missions. The purpose will be to provide an updated state of the art of the discipline from theory to applications.</p>			

Session	Title	Convener names & e-mails	Number of slots
F03	Microwave Remote Sensing of Terrestrial Snow	Simonetta Paloscia s.paloscia@ifac.cnr.it	5
<p>This session will focus on the fundamental aspects of active and passive microwave remote sensing of surfaces covered by vegetation, considering both forests and agricultural areas and including the effects of vegetation on the measurements of soil parameters, and snow. Topics will comprise field and laboratory experiments, physical models, and retrieval algorithms. Special interests will be also on the use of data from the most advanced sensors and missions. The purpose will be to provide an updated state of the art of the discipline from theory to applications.</p>			

Session	Title	Convener names & e-mails	Number of slots
F04	Microwave Sensing of Soil Moisture	Simon Yueh, David M. Le Vine, simon.h.yueh@jpl.nasa.gov, david.m.levine@nasa.gov	10
<p>This session will focus on recent advances in microwave and low-frequency remote sensing of soil moisture, including passive microwave radiometry, synthetic aperture radar, and reflectometry. This session will focus on advances in measurement techniques, data products and applications of on-ground and space-borne soil moisture measurements. Contributions are also welcome on data assimilation from field campaigns and on modelling efforts.</p>			

Session	Title	Convener names & e-mails	Number of slots
F05	Millimeter-Wave Propagation and Remote Sensing	Albin Gasiewski, Animesh Maitra al.gasiewski@colorado.edu, animesh.maitra@gmail.com	10
<p>The propagation of millimeter (MM) and sub-millimeter (SMM) wavelength electromagnetic radiation in both natural and artificial media is a topic of key interest in planetary science, weather and climate observation and forecasting, telecommunications, remote sensing (including imaging), and environmental metrology. The basic mechanisms of absorption, propagation, and scattering at mm and sub-mm wavelengths (e.g., from ~30 GHz to ~3 THz) are understood, although algorithms for predicting propagation and emission behavior for randomly fluctuating media (including both discrete and continuous volume and surface scattering materials) are undergoing continual refinement. Algorithms for efficient and accurate prediction of the statistics of coherent and incoherent radiation in three-dimensionally fluctuating media remain of great interest for operational system implementation. Nonlinear propagation mechanisms for mm and sub-mm wavelength radiation present new opportunities for remote sensing but require coherency across multiple spectral bands. This session welcomes contributions on the above and closely related topic in mm and sub-mm wavelength propagation, including contributions that focus on propagation modelling, instrumentation, experiments, or a combination thereof.</p>			

Session	Title	Convener names & e-mails	Number of slots
F06	Radiowave Propagation and Channel Modelling for Wireless communication in Built-Up Areas	Robert J. C. Bultitude, Sen Wang, rbultitude@sce.carleton.ca, wangsen@mail.ntut.edu.tw	10
<p>The objective of the session is to provide a forum for the discussion and dissemination of results from the latest research on radiowave propagation and radio channel modelling for wireless applications in vegetated and build-up areas. A deeper understanding of these topics is considered a requirement, since present and future generation of wireless applications will depend heavily on the interaction of buildings/houses and vegetation. This session will present that opportunity to gather researchers in one session and exchange ideas on related current problems.</p>			

Session	Title	Convener names & e-mails	Number of slots
F07	Propagation Modelling for Aerospace Applications	Carlo Capasoni, Animesh Maitra, Franz Teschl carlo.capasoni@polimi.it, animesh.maitra@gmail.com, franz.teschl@tugraz.at	10
<p>Constantly increasing demand for higher data rates to support the numerous satellite and terrestrial services and for greater system capacity to accommodate larger number of users has led to a migration of wireless systems to higher frequencies in millimeter wave bands. The drawback of using very short wavelengths is the serious propagation impairments caused by various atmospheric constituents such as, gases, clouds, rain, and tropospheric turbulence that require to be mitigated using sophisticated Fade Mitigation Techniques. Mobile links operates in a propagation environment that requires specific consideration of the effects due to reflection, diffraction, wall penetration and multipath. This session welcomes contributions on the following and allied topics: (i) Propagation measurements along earth-space and fixed terrestrial links at microwave, millimeter wavelengths and THz frequencies, (ii) Fade mitigation techniques, (iii) Interactions of the atmosphere and earth's surface with the electromagnetic waves, (iii) Mobile signal propagation.</p>			

Session	Title	Convener names & e-mails	Number of slots
F08	Remote Sensing from Nanosatellites and small satellites	StevenReising, Jaan Praks Steven.Reising@colostate.edu, jaan.praks@aalto.fi	5
<p>Description: The use of nanosatellites and microsatellites to provide rapid, lower cost access to space has exponentially increased, especially over the past 6 years. In particular, hundreds of CubeSats are launched per year, greatly increasing access to space for science, Earth imaging, education and technology demonstration. From the development of the CubeSat standard in 1999 until the end of 2018, over 1000 CubeSats had been launched in less than 20 years. Now CubeSats have the ability to produce high-quality science, both for studying the Earth's atmosphere, oceans and land, as well as the science of other planets. These nanosatellites and microsatellites benefit from rapid development cycles as well as fly-learn-refly cycles when a single organization produces and launches many satellites. A particular benefit of constellations of nanosatellites or microsatellites is to provide rapid revisit times (minutes to hours) from low Earth orbit for sensing dynamic Earth processes, such as the development of clouds and storms.</p>			

Session	Title	Convener names & e-mails	Number of slots
F09	Remote sensing in Complex and Random Media	Saba Mudaliar, Giorgio Franceschetti, saba.mudaliar@us.af.mil, gfrance@unina.it	15
<p>The scope of this topic is very wide. The applications where one has to resort to stochastic models for scattering and propagation are several and important. Some of them are: Remote sensing: active and passive for oceans, forests, atmosphere, sea ice in polar region, Communications, Imaging applications in SAR and Medical diagnostic, Radar, Meteorology and Geophysical exploration.</p> <p>Deterministic models to these problems are overwhelmingly complicated. Statistical approaches are more appropriate and indeed desirable. With rapid progress in computational resources and with the availability of fast and efficient computational algorithms it is increasingly more feasible to simulate waves in complex and random media. In this special session we invite papers on all such topics and issues. This session will also be used to pay tribute to the contributions of Prof V.I. Tatarskii, a pioneer in the area of waves in random media.</p>			

Session	Title	Convener names & e-mails	Number of slots
F10	Remote Sensing of Precipitation	Luca Baldini, Roberto Cremonini, Renzo Bechini l.baldini@isac.cnr.it, roberto.cremonini@arpa.piemonte.it, renzo.bechini@arpa.piemonte.it	10
<p>Description: Information from Remote sensing of precipitation has been the cornerstone of the operations of national and international weather agencies, for the protection of lives and property. There has been extensive progress in this area in terms of all three domains namely science, technology and systems, going all the way from study of precipitation microphysics, dual-polarization and fast scan technologies to deployment of ground based and space borne systems. This session will cover cutting edge and review papers in the topic of remote sensing of precipitation in all three domains, namely, science, technology and systems.</p>			

Session	Title	Convener names & e-mails	Number of slots
F11	Remote Sensing of Sea Surface Salinity	Roger Lang, David M. Le Vine, lang@gwu.edu, David.M.LeVine@nasa.gov	10
<p>Salinity is important for understanding ocean circulation, climate and the global water cycle. Three recent L-band instruments, SMOS, Aquarius and SMAP, have demonstrated the potential for measuring surface salinity from space. But there is much to be learned such as how best to correct for surface roughness, radiation from the Sun and the effects of rain. This session will focus on issues of calibration and the retrieval algorithm including status of salinity retrievals from the three instruments.</p>			

Session	Title	Convener names & e-mails	Number of slots
F12	Deep Learning in Radar Image Understanding and Information Extraction	Feng Xu, V.Chandrasekar, fengxu@fudan.edu.cn, chandra@colostate.edu	10

Deep learning is promising in big data applications. Remote sensing with its huge volume data obtained daily by numerous in-orbit observation systems makes it a perfect area for such data-driven applications. Over the past years, there has been exponentially increasing interest and studies related to deep learning techniques applied to remote sensing including not only hyperspectral imagery but also synthetic aperture radar (SAR) imagery. The new challenges are raised by the continuously growing volume, but with a new very specific dimension for the Remote Sensing data: the intrinsic complexity of sensor data carrying high spatial information, and particularly complex physical meaningful parameters. Therefore, the emerging deep learning technology has to be coupled with the physics insights and models when dealing with remote sensing data. In this session, we will present selected talks in physics-inspired deep learning and case studies of applications in radar imagery understanding and information retrieval.

Session	Title	Convener names & e-mails	Number of slots
F13	Radio Frequency Interference (RFI) Issues in Microwave Remote Sensing	Paolo de Matthaeis, Thomas von Deak paolo.dematthaeis@nasa.gov thomas.vondeak@scienceservices-sme.com	5

With the ever growing demand of electromagnetic spectrum for commercial and scientific applications, Radio Frequency Interference (RFI) has been having an increasingly detrimental impact on microwave remote sensing. Interference can corrupt measurements made by microwave instruments and reduce the ability of retrieving relevant geophysical measurements over many regions of the globe.

This session will present interference detection and mitigation techniques as well as reports of observed RFI for microwave radiometer and report on the status of current and upcoming missions. It will also discuss spectrum management issues facing remote-sensing frequencies, with particular attention to topics of interest for the remote sensing community that will be examined at the World Radiocommunication Conference 2023 (WRC-13).

Session	Title	Convener names & e-mails	Number of slots
F14	AI for Weather Radars	Haonan Chen, V.Chandrasekar Haonan.chen@colostate.edu, chandra@colostate.edu	10

Weather radar observations are rich in information and the traditional ways of evaluating them have only been able to extract part of the information due to the nature of the analytical tools. Artificial Intelligence (AI) has been proven to be effective in extracting information from the large amount of multi-dimensional radar data in practical environments. This session is devoted to weather radar observations and applications through the lens of AI and machine (deep) learning. Topics include but are not limited to weather radar signal and data interpretation, precipitation identification, classification, estimation, and nowcasting. This session will also feature presentations that combine radar measurements in the context of numerical model assimilation and forecast, as well as multiscale hydrometeorological data fusion and regularization.

Session	Title	Convener names & e-mails	Number of slots
F15	Open session	V.Chandrasekar, T. Tanzi chandra@colostate.edu, tullio.tanzi@Telecom-Paris.fr	
The session will host papers that do not adequately fall in the other topics of commission F.			