

Gi4DM Radar Training Tutorial:

An Inter-Union URSI-ISPRS Cooperation

Under the aegis of the Gi4DM-2019 conference, the Inter Union WG of ISPRS and URSI CWG III/IV - Disaster Assessment, Monitoring and Management, and the URSI Working Group F.1 on Education and Training in Remote Sensing and Wave Propagation, a **one-day** radar-training tutorial of title:

'Advanced Radar Methods and their Application in Disaster Management'

will be held on Tuesday, 3rd of September, 2019, at the conference venue of Gi4DM-2019 in Prague. The training programme is specially tailored to address the knowledge requirements of both early stage researchers and the remote-sensing-scientist engaged in the interdisciplinary areas of Earth Observation, GIS-Systems, and Disaster Management. The designers and presenters of the course are: Prof. Orhan Altan (Technical University of Istanbul, Turkey), Prof. Tullio Tanzi (Institut Mines-Telecom, ParisTech, Campus SophiaTech Les Templiers, France), and Prof. Madhu Chandra (Technical University of Chemnitz, Chemnitz, Germany).

Admission: The training tutorial is open to all participants registered for the conference and the training tutorial. **The tutorial is free of cost for participants registered for the conference but the capacity is limited.** Admission to the tutorial **will be regulated by the local Gi4DM-2019 conference management and the course presenters.** Persons interested in attending the tutorial, are advised to register in ConfTool.

Computing requirements: As some hands-on features make use of polarimetric radar images, the participants may find it useful to bring along their laptops.

Date, duration and venue: Monday, 3rd September, 2019, from 09:30 hours to 17:30 hours, room on the conference premises will be posted at the conference site.

Tutorial description:

The tutorial will provide insight into radar fundamentals that will enable the participants to understand modern polarimetric radar remote sensing methods, radar images, and their applications, particularly in disaster management.

The course strategy is to familiarise the participants with key radar fundamentals that will enable them to understand radar-methods and to effectively interpret radar images, particularly polarimetric and interferometric images. The course should appeal especially to GIS scientists and engineers interested in gaining trans-disciplinary engineering knowledge for better understanding and using radar remote sensing data in disaster monitoring and management. The course combines oral presentations with some hands-on exercises using real radar data.

Tutorial Schedule:

09:30-10:00, Foreword by Prof. Orhan Altan, Technical University of Istanbul, Turkey.

Part 1: Methods of Radar Remote Sensing

Presenter: Prof. Dr. M. Chandra, Technische Universität Chemnitz, Germany.

Meeting 1: 10:00-11:15; Topics:

Electromagnetic interaction for radar remote sensing
Examples from radar observation from aerospace- and ground-based radars
Polarisation basics for radars and remote sensing
Polarimetric radar measurement schemes
Polarimetric form of radar equations
Understanding key polarimetric radar observables

Short break: 11:15-11:30

Meeting 2: 11:30-12:30; Topics:

Understanding radar I-Q signals: an explanation using basic Physics
'Golden Rules' of radar remote sensing based on Physics of remote sensing
Radar measurement dilemmas that limit range-coverage and Doppler measurements
Why use radar waveforms?
Spatial and Doppler resolution

Lunch break: 12:30-13:30

Meeting 3: 13:30-15:00; Topics:

Radio science of radar signal propagation
Hands-on exercises for understanding and interpreting Doppler and polarimetric weather radar images
Hands-on exercises for understanding and interpreting Doppler and polarimetric SAR images
Outlook: DBF (Digital-Beam-Forming) and MIMO methods for radars: Promise versus hype.

Short break: 15:15-15:30

Part 2: Application-based Approach to Disaster Management and the Role of Radar Remote Sensing.

Presenter: Prof. Dr. Tullio Tanzi, Institut Mines-Telecom - Telecom ParisTech. LTCI UMR, CNRS, Télécom ParisTech-LabSoC, c/o EURECOM, Campus SophiaTech Les Templiers, France; In-Coming URSI Commission-F chair.

Meeting 4: 15:30-17:30 (with a short 10 minute mid-way interval)

Topics:

Introduction
Radio sciences versus disaster management requirements
Radar and optical remote sensing
New approaches and future systems: GPR, UAV, etc.
Design consideration for humanitarian-relief-dedicated systems

Close of tutorial: 17:30