Advanced SAR Data Processing for Ground Surface Movement

(October 14 – 25, 2024)

About the IIRS

Indian Institute of Remote Sensing (IIRS), an establishment of Indian space Research Organisation (ISRO), is a premier institute with a primary aim to build capacity in Remote Sensing and Geoinformatics technologies and their applications through training & education, research and outreach programmes in southeast Asia. Since its inception in 1966, the Institute has enhanced its programmes to meet the requirements of various stake-holders, ranging from fresh graduates to policy makers including academia, industry, different government departments, and NGOs for effective utilization of earth observation data. IIRS also hosts the headquarters of the Centre for Space Science & Technology Education in the Asia and Pacific (CSSTEAP), affiliated to the United Nations (UN), and conducts its training and education courses in RS & GIS.

Course Significance

The overall objective of this two weeks training programme is to generate critical understanding among researchers / working level professionals / academicians on SAR data processing for ground surface movement (GSM) related studies. The participants will be familiarized with the SAR concepts, SAR interferometry (InSAR), advanced InSAR techniques (DInSAR, PSI, SBAS and Hybrid InSAR), complete InSAR processing chain, SAR data processing in open source software environment (ISCE, SNAP, Mintpy, EZ-InSAR and StaMPS), GSM time-series, graphical data analysis, and visualization of GSM time-series. The course will include theory and hands on sessions to facilitate in-depth learning.

About This Course

The ground surface movement (GSM) is affected by geometrical changes on the earth's surface due to various geological, topographical, geomorphological, hydrological, and anthropogenic activities. Due to these geometrical changes and resulted GSM (landslide, land subsidence, glacier melting, volcanic eruption, earthquake, plate tectonics etc.), every year a huge amount of loss of property and lives takes place across the world. Therefore, it is of utmost importance to monitor such GSMs in a robust way. Modern space based synthetic aperture radar (SAR) systems acquire the remote sensing images all over the earth surface in all weather and illumination conditions. SAR interferometry (InSAR) and its recent developments give the opportunity to detect and monitor GSM in long time-series with great accuracy (up to few mm) over large areas. This course is designed to process SAR datasets in an open source computational environment to detect GSM in long time-series.

How to Apply

Eligible candidates are requested to apply online through IIRS website https://admissions.iirs.gov.in/ only on or before September 20, 2024 (17:30 hrs). Candidates are advised to fill their correct and active e-mail address in the application form, and check regularly for the communication from the Institute. All correspondence will be made by the Institute through email only. No separate communication will be made.

Course Fee, Boarding and Lodging

There is NO course fee for the nominated candidates. A Nomination Form (available with the online application) duly signed by the Head of the Organization/Institution or his/her authorized representative needs to be submitted with the online application. Selected candidates will be provided 2nd AC train fare (to and fro), and free boarding and lodging in IIRS Hostel/Guest House. In case of large number of applications being received, the selection will be done based on criteria decided by IIRS.

Indian Institute of Remote Sensing (IIRS)
Indian Space Research Organisation (ISRO)
Department of Space, Government of India
4, Kalidas Road, Dehradun, India
www.iirs.gov.in

Mode of Training

This in-person training will consists of theory lectures and practical by senior and experienced faculty of the institute using state-of-the-art hardware and software facilities. Everyday, lectures will be in the forenoon and practical hands on in the afternoon sessions. More focus will be on practical hands on and demonstrations for better understanding of the course content by the participants. The entire SAR data processing will be done in open source software environment for GSM related studies such as land slides, land subsidence, earthquake, tectonics etc.

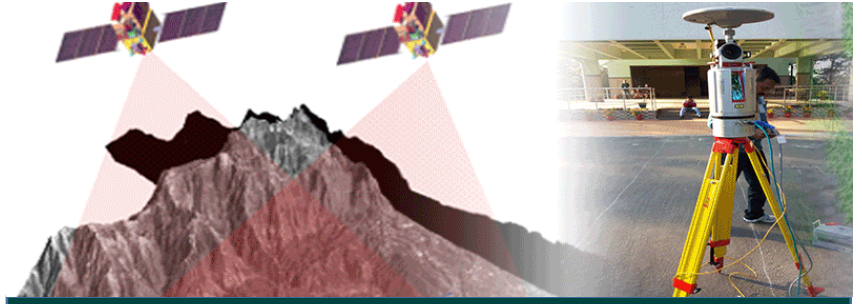
Target Groups

The course will be targeted at researchers / working level professional / project leaders / academicians working in the field of SAR remote sensing and highly interested in processing time-series SAR data in open sources software environment for SAR interferometric applications for ground surface movement related studies. There are total 25 seats in this short course.

Important Dates

Announcement of course: August 30, 2024

Last date for application: September 20, 2024 (17:30 Hrs)



Highlights of the Course

First Week

- Characteristics of Microwaves radiation; radar working principle; Radar in Remote Sensing
- Interaction of Microwaves with atmosphere and targets on the earth surface
- SAR system parameters; Nature of SAR Images; SAR image geometries and acquisition modes; Overview of SAR Polarimetry and backscattering processes
- Overview of Linux OS; Installation of softwares and their dependencies for SAR data processing
- SAR time-series data download; Interferometric processing chains in SNAP & ISCE SAR Processors

Second Week

- Overview of SAR interferometry; Overview of interferometric processing; Sources of interferometric decorrelations; Advanced techniques of differential SAR interferometry (PSI, SBAS, and Hybrid-InSAR)
- Deformation measurement; vector formulation and decomposition of the deformation vector.
- Pre-processing of SAR time-series data in SNAP and ISCE Processors
- Deformation Analysis using PSI, SBAS, and combination of PSI and SBAS Techniques
- Visualization of time-series GSM results

Eligibility Criteria and Prerequisite

Candidates having P.G. Deg. in Science/ Engineering (Civil Engg./ Comp. Sci. & Eng./ Electron. & Commun. Engg./ Earth Sci./ Earthquake Engg./ Geo-Engg./ Mining Engg./ Petroleum Engg./ Architecture/ Planning / Geology/ Geoscience/ Geophysics/ Physics/ Mathematics/ Remote Sensing/ Geoinformatics or equivalent) can apply in the course. The candidates should have the basic knowledge of remotely sensed images, SAR remote sensing, python programming, Linux operating system, mathematics and statistics. Candidates nominated by the govt. organizations & professionals working in the field of SAR remote sensing will be given preference for admission.

Contact Detail

For any further course related query, please contact:

Hari Shankar
(Course Coordinator)

Disaster Management Studies Department
Indian Institute of Remote Sensing, Dehradun
Email: harishankar@iirs.gov.in
Phone: 0135-2524330 (O), 9897832618 (M)