Location

Carl-Cranz-Gesellschaft
Argelsrieder Feld 22, bldg. TE 03,
D-82234 Wessling-Oberpfaffenhofen

Participants will receive details to the seminar location as well as a list of nearby accommodations with the confirmation of registration. Please note that the accommodation is not included, and participants are asked to make their own hotel accommodation.

Fee

EUR 2.630,-
CCG is a non-profit organisation, exempt from value-added tax in Germany. For foreign seminar locations the local tax regulations are applicable. Members of CCG receive a discount of 10 %. Student discounts are available on request. Discounts cannot be combined.

Invoice is to be paid within 14 days of invoice issue date by direct deposit only.

Registration

Please register up to 2 weeks before the seminar via E-Mail anmelden@ccg-ev.de or online at www.ccg-ev.de
You will receive a confirmation E-Mail with further information.

Further Information

For more information about our organization please contact:
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For more information on the content of the seminar please contact

Substitutions and Cancellations

Substitutions of participants may be made at any time. Cancellation of an accepted registration later than 14 days prior to the start of the seminar is subject to a 25% cancelation fee. No shows will be billed for the entire seminar fee. CCG reserves the right to cancel a course up to 14 days before the course's beginning in case of low number of participants or for other significant reasons. Furthermore, CCG reserves the right, against the announcement in the programme, to possibly replace at short notice a lecturer and also the lecturer's topic. Any claims for damages shall be excluded.

Who Should Attend

This seminar is designed for the needs of those who want to get more insight in SAR. It's especially recommended for postgraduates in their first year of scientific work.

Focus

The knowledge and skills communicated in the course are covering a broad spectrum of SAR Principles and Application: Introduction to the principle of synthetic aperture radar; system design; introduction to signal processing for synthetic aperture radars, basics and advanced algorithms; overview of polarimetric and interferometric concepts and data analysis; calibration and image quality considerations; geocoding of SAR imagery; differential SAR interferometry and permanent scatterers; SAR applications in forest, agriculture, snow, land ice, coastal and marine environments; status and design of TanDEM-X; overview of bi-static SAR systems; introduction to the DLR airborne SAR facility.

Language

English

Lecturers

Michael Eineder	Prof. Dr.	Remote Sensing Technology Institute, DLR,Oberpfaffenhofen
Anca Anghelea	Dr.	ESA, ESRIN, Frascati (I)
Alessandro Ferretti	Dr.	TRE ALTAMIRA Srl, Milano (I)
Irena Hajnsek	Prof. Dr.	Microwaves and Radar Institute, DLR, Oberpfaffenhofen ETH Zürich (CH)
Sven Jacobsen	Dr.	Remote Sensing Technology Institute, DLR, Bremen
Helmut Rott	Prof. Dr.	University of Innsbruck (A)
Achim Roth		German Remote Sensing Data Center, DLR, Oberpfaffenhofen
Stefan Baumgartner	Dr.	Microwaves and Radar Institute, DLR, Oberpfaffenhofen
Ronny Hänsch	Dr.	
Ralf Horn		
Gerhard Krieger	Prof. Dr.-Ing.	
Alberto Moreira	Prof. Dr.-Ing.	
Kostas Papathanassiou	Dr.	
Matteo Pardini	Dr.	
Pau Prats	Dr.	

Carl-Cranz-Gesellschaft e.V. Weßling

Gesellschaft für technisch-wissenschaftliche Weiterbildung

Seminar SE 2.06

SAR Principles and Application

**October 21 – 25, 2024
Oberpfaffenhofen near Munich**

Scientific Coordination

Prof. Dr. Hajnsek
DLR German Aerospace Center
Oberpfaffenhofen

Sensorik/Erkundung

Seminar Outline

Monday, October 21, 2024
10.15 – 17.45 Uhr

10.15 – 10.30	**Introduction**	
10.30 – 12.00 P. Prats (A. Moreira)	**SAR Basics**	Basics of imaging radar incl. principle of SAR signal and image formation · Overview of applications and existing air- and spaceborne systems
13.00 – 14.30 P. Prats (A. Moreira)	**SAR Theory**	Basic theory for SAR signal modeling and processing · Point and distributed targets, SAR signal and image properties · Overview of SAR systems and technologies
15.00 – 16.00 P. Prats (A. Moreira)	**SAR Theory** (cont.)	
16.15 – 17.45 P. Prats (A. Moreira)	**Advanced and Future SAR Systems**	Overview of future SAR developments and applications

Tuesday, October 22, 2024
08.30 – 17.45 Uhr

Techniques and Applications

08.30 – 10.00 M. Eineder	**SAR Interferometry I**	Different principles of SAR interferometry and the concept of coherence, DEM generation
10.30 – 12.00 M. Eineder	**SAR Interferometry II**	Achievable accuracy, error sources, fundamental limits, e.g. critical baseline, basics of D-InSAR, SAR tomography
13.00 – 14.15 A. Anghelea	**ESA SAR missions and their exploitation for science, applications and services**	Historical missions heritage, sentinel-1 constellation in operation, biomass in development and next generation SAR systems

Online Vortrag

Wednesday, October 23, 2024
08.30 – 16.15 Uhr

Techniques and Applications

14.30 – 16.00 I. Hajnsek	**SAR Polarimetry I**	Background of SAR polarimetry in terms of fundamentals of wave polarimetry, scattering polarimetry and decomposition theorems · Practical examples
16.15 – 17.45 I. Hajnsek	**SAR Polarimetry II**	Examples of the potential of SAR polarimetry for quantitative bio/geo-physical parameter estimation
08.30 – 10.00 K. Papathanassiou	**Polarimetric SAR Interferometry I**	Interferometric observables at different polarizations over natural scatters · Main principles and the basic techniques for the coherent combination
10.30 – 12.00 K. Papathanassiou	**Polarimetric SAR Interferometry II**	Application of Pol-InSAR for model based quantitative estimation of physical parameters of different natural scatters by means of various experimental data sets
13.00 – 14.30 R. Hänsch	**Land Cover Classification**	Machine learning tools for land cover classification · Examples on selected SAR data
15.00 – 16.15 A. Roth	**SAR-Geocoding**	SAR inherent geometric distortions, algorithms, techniques and how these distortions can be corrected · Basics on map projection and cartography as well as different applications

Thursday, October 24, 2024
08.30 – 18.00 Uhr

Applications

08.30 – 10.00 A. Ferretti	**Differential SAR Interferometry**	Impressive precision figures from spaceborne systems · D-InSAR data examples: seismic fault, landslide, volcano, subsidence, monitoring individual buildings and structures
10.30 – 12.00 H. Rott	**Glaciology**	Basics of radar backscattering of snow and ice· Single-pass and repeat-pass InSAR methods for retrieval of snow and glacier parameters· Applications of SAR for snow cover monitoring and studies of ice flow dynamics and glacier mass balance
13.00 – 14.30 S. Jacobsen	**Oceanography**	Theoretical aspects and practical applications · From classic approaches to new machine learning methods to derive maritime information on wind, waves, sea ice, ships, oil spills and underwater topography
15.00 – 16.30 M. Pardini	**Tomography**	Basics and principles of Tomography and applications examples
16.45 – 18.00 S. Baumgartner	**SAR Moving Target Techniques**	Moving target signal properties, influence on SAR imagery, position and motion parameter estimation, single- and multi-channel SAR-GMTI techniques (ATI, DPCA, STAP etc.)

Friday, October 25, 2024
08.30 – 12.00 Uhr

Satellite Concepts and DLR Airborne SAR Activities

08.30 – 10.00 G. Krieger	**Innovative SAR Missions and Sensor Concepts**	Capabilities and limitations of present-day spaceborne SAR systems and missions · New concepts for high-resolution wide-swathSAR imaging· Bistatic and multistatic SAR · Tandem-L
10.30 – 12.00 R. Horn	**DLR Airborne SAR Activities**	System presentation, capabilities and results