天空地井协同感知空间信息学科建设项目
杰出科学家系列学术报告（短期课程）

题目：（1）**SAR、InSAR 及 DInSAR 基本原理与数据处理**

（2）**InSAR 地灾监测及解译**

时间：2022 年 11 月 12 日下午 14:00-18:00

腾讯会议（ID）：709-8243-4809

主办：中国矿业大学环境与测绘学院、天空地井协同感知空间信息学科建设项目

报告人：

（1）Jordi J. Mallorqui 教授，加泰罗尼亚理工大学（UPC）信号理论与通信学院

Jordi J. Mallorqui 教授，加泰罗尼亚理工大学信号理论与通信学院教授，IEEE Senior Member。长期从事航天、航空、地基合成孔径雷达（SAR）干涉测量地表形变监测技术方法，SAR 影像分类，SAR 系统三维电磁仿真，面向地表形变及滑坡监测的小型无人机 SAR 干涉系统设计与开发等方面研究工作。指导 18 篇博士论文（其中 3 篇正在进行）和 50 多篇硕士论文。拥有发明专利一项，发表国际期刊和会议论文 140 余篇，Google Scholar 的 h 指数为 44，被引近 8300 次。参与 53 个纵向科研项目，其中 27 个担任 PI，参与 20 个企业研发项目，其中 12 个担任 PI。曾任 IEEE Transactions on Geoscience and Remote Sensing 期刊副主编和 Journal of Applied Geophysics 期刊客座编辑，目前担任 SAR 领域多个国际会议科学委员会成员。

（2）José Fernández 教授、Joaquín Escayo 博士，西班牙科学院（CSIC）地学研究中心

José Fernández 教授，西班牙科学院（CSIC）地学研究中心教授，Scientific Reports 和 Remote Sensing 等期刊编委。长期从事大地测量学及其在自然和人为导致地灾方面的应用。所开发的模型已与反演方法相结合，应用于火山、地震、滑坡和沉降等地灾解译研究。参与 90 个科研项目，其中 65 个担任 PI。项目总经费超过 640 万欧元，其中 6 个项目与私企或政府管理部门合作，支持金额超过 100 万欧元。指导 7 篇博士论文。发表论文 200 余篇，其中 SCI 论文 123 篇，Google Scholar 的 h 指数为 36，被引近 5000 次。到国际多所高校和研究院访学与讲座，目前任多个国际地学组织委员。

Joaquín Escayo 博士，西班牙科学院（CSIC）地学研究中心 José Fernández 教授团队研究骨干。研究方向为大地测量学及其在自然和人为导致地灾方面的应用，主要包括 InSAR 地灾监测及解译等方面。参与多项 InSAR 地灾监测与解译相关项目，具有丰富的 InSAR 数据处理、软件开发及地灾监测与解译经验，已发表学术论文多篇。

讲座内容简介：

本讲座将涵盖合成孔径雷达（SAR）基本概念、相关技术和应用。第一部分将介绍 SAR 成像的基本概念、InSAR 和 DInSAR 技术原理和数据处理流程（由 Jordi J. Mallorqui 教授主讲，2 小时）；第二部分将介绍时序 InSAR 技术（PSI）在火山、地震、地表沉降、采矿活动和山体滑坡监测方面的应用（由 José Fernández 教授及 Joaquín Escayo 博士主讲，2 小时）。

Construction Program of Space-Air-Ground-Well Cooperative Awareness Spatial Information Project, Distinguished Scientist Seminar Series (Short Course)

Topic: (1) SAR, InSAR and DInSAR processing principles; (2) Application of Synthetic Aperture Radar Interferometry (InSAR) techniques: case studies in different environments.

Date: 14:00-18:00 (BST), 12-Nov.-2022

VooV Meeting Room ID: 709-8243-4809

Organized and supported by: China University of Mining and Technology, School of Environment Science and Spatial Informatics) and Construction Program of Space-Air-Ground-Well Cooperative Awareness Spatial Information Project.

Speaker:

Prof. Jordi J. Mallorqui, CommSens-Lab, Dept of Signal Theory and Communications, Universitat Politècnica de Catalunya

Prof. Jordi J. Mallorqui was born in Tarragona, Spain, in 1966. He received the Ingeniero degree in telecommunications engineering and the Doctor Ingeniero degree in telecommunications engineering for his research on microwave tomography for biomedical applications in the Department of Signal Theory and Communications from the Universitat Politècnica de Catalunya (UPC), Barcelona, Spain, in 1990 and 1995, respectively. Since 1993, he has been teaching at the School of Telecommunications Engineering of Barcelona, UPC, first as an Assistant Professor, later in 1997 as an Associate Professor and since 2011 as a Professor. From 2018 to 2021, he was the director of the Signal Theory and Communications (TSC) departmet, UPC. His teaching activity involves microwaves, radionavigation systems, and remote sensing at different levels.

He spent a sabbatical year with the Jet Propulsion Laboratory, Pasadena, CA, in 1999, working on interferometric airborne synthetic aperture radar (SAR) calibration algorithms. He is currently working on the application of SAR interferometry to terrain deformation monitoring with orbital, airborne, and ground data; vessel detection and classification from SAR images; and 3-D electromagnetic (EM) simulation of SAR systems. He is also collaborating in the design and exploitation of small SAR interferometers on-board UAVs for subsidence and landslide control.

He holds one patent and has published more than 140 papers in refereed journals and international symposia. He has served as Associate Editor of IEEE Transactions on Geoscience and Remote Sensing and Guest Editor of Journal of Applied Geophysics, and he has also been member of the Scientific Committee of several international symposia. He is also a regular reviewer of many international journals and symposia. He has also directed 18 PhD Thesis (3 of them ongoing) and more than 50 end-of-degree/MSc projects. He has been participated in 53 projects financed with public funds, 27 of them as principal investigator, 20 projects financed by private companies, 12 of them as principal investigator. It can be highlighted the European project NEREIDS (FP7-SPACE-2010-1- 263468) and the release of licenses for its commercial exploitation of the 3D SAR Simulator GRECOSAR to GMV and the DInSAR processing tool SUBSIDENCE-GUI to DARES TECHNLOGY.

Prof. José Fernández and **Dr. Joaquín Escayo，** Institute of Geosciences (IGEO)，Spanish Council for Scientific Research (CSIC)

Prof. José Fernández was born in Málaga in 1963. He has a degree (1986) and a PhD (1992) in Geodesy from the Complutense University of Madrid (UCM). He had been professor at the UCM until 2002 when he becames research staff of the Spanish Council for Scientific Research (CSIC). He is currently Research Full Professor at the Institute of Geosciences (IGEO). His research is developed in the field of Geodesy and its application to natural and anthropogenic hazards, both in the observation and modeling aspects. The developed models have been applied, in combination with inversion methods, for the interpretation of displacements and gravity changes in volcanic, seismic, landslides and subsidence areas. In geodetic monitoring, new observational and data processing methodologies have been developed and applied in collaboration with national and international groups in InSAR, gravimetry, satellite or airborne optical observation and GNSS. He has participated (is participating) in more than 90 research projects, being in 65 of them Coordinator, Responsible Investigator or responsible Co-researcher. These last projects have been supported which more than 6.400.000 €. From that projects 6 have been with private companies or public administration with a support greater than 1.000.000 €.

He has supervised, or co-supervised, 7 doctoral theses. His research results have been described in 219 publications, 123 of them in SCI journals. His works have more than 5000 (Google Scholar)/2500 (Scopus) citations, and a h index of 36 (Google Scholar)/30 (Scopus). Currently he is editor of "Scientific Reports" (Nature group) and "Remote Sensing", and "Contributions to Geophysics & Geodesy", and member of the Editorial Advisory Board of Journal of Geodetic Science.

He have been member of the Spanish Commission of Geodesy and Geophysics (CEGG) in the Volcanology Section; and have formed, and form, part of different Working Groups of the International Association of Geodesy. He has made stays, among others, in the Royal Observatory of Belgium (Belgium); the Lawrence Livermore National Laboratory (Department of Energy, United States) and the China University of Mining and Technology (PR of China).

Dr. Joaquín Escayo, PI, research personnel and PhD candidate, graduated in Physics and MSc in Meteorology and Geophysics. He has experience in InSAR processing and received training in these techniques in the Universidad Politécnica de Cataluña (UPC). Also is working in data integration in the frame of several research projects. He is author of various conference and journal papers.

Abstract:
Part 1: The first section will present, the basic principles of Synthetic Aperture Radar (SAR) and interferometry (InSAR) towards the development of Differential Interferometry (DInSAR) applications for monitoring ground deformation from space. The basic concepts and key points will be reviewed to allow attendees to understand them and learn about both the potential and the limitations of DINSAR products. (Present by Prof. Jordi J. Mallorqui, 2h)
Part 2: The second section will present some case studies focusing on the application of InSAR techniques for the study of different environments like volcanos, mining areas or subsidence due aquifer overexploitation among others. (Present by Prof. José Fernández and Dr. Joaquín Escayo, 2h)