

Coordinator of PhD@DICAM

Prof. Luca Vittuari

Full Professor in Geomatics, member of the Department of Civil Chemical, Environmental and Materials Engineering (DICAM).

- Coordinator of the PhD Programme in Civil, Chemical, Environmental and Materials Engineering (PhD@DICAM) and scientific coordinator of Curriculum 1 (Engineering Infrastructure, Resources and Territory).
- Scientific Coordinator of The Laboratory Land Surveying and Geomatics of the Department of Civil, Chemical, Environmental and Materials Engineering DICAM) - University of Bologna.

Scientific activities: Responsibility in financed competitive projects, European projects

- SPARTACUS - A collaborative project Small or medium-scale focused research project Aimed to a Satellite Based Asset Tracking for Supporting Emergency Operations in Crisis Management. FP7-SEC-2012-1 (Grant Agreement Number 313002, 2013-2016).
- Beyond EPICA - Oldest Ice (BE-OI), SC5-05-2016 - A 1.5 million year look into the past for improving climate predictions. H2020-SC5-2016-OneStageB, CSA - Coordination and support action, Project ID: 730258, 2016-2019.

European projects - Member of UNIBO Research Units:

- ARCHAIA: Training Seminars on Planning Research, Conservation, Characterization and Management in Archaeological Sites ", Prof. Nicolò Marchetti, University of Bologna (FP6-2005-SSP-5 A-ID: 44365, 2007-2008)
- EU-CHIC European Cultural Heritage Identity Card ", coordinator R. ŽARNIĆ, University of Ljubljana (FP7-ENV-2008-1 ID: 226995, 2009-2012)
- SubCoast - A collaborative project Aimed at developing a GMES service for monitoring and forecasting subsidence hazards in coastal lowland areas around Europe "(FP7-SPACE-2009-1, 2010-2013);
- Ebla Chora - The early state and its chora. Towns, villages and landscape at Ebla in Syria During the 3rd Millennium BC. Royal archives, visual and material culture, remote sensing and artificial neural networks "(FP7-IDEAS-ERC-2009-MA, 2010-2014)

Competitive projects MIUR, PNRA, ASI, FARB

National Principal Investigator (PI) of the Project or Coordinator of local Research Units:

- Responsible at National level for the two-year competitive project (2014-2015) of National Program of Research in ANtarticca PNRA 2013/AC2.01: Integrated Geodetical and Geophysical site modeling and analysis for deep ice core interpretation (IGG@Dome).
- Responsible of local Unit of Research on Geodesy within the two-year project (2012-2013) PNRA 2009/A2.21 PRIDE - paleoclimate record from the processing of data from ice cores.
- Responsible of local Unit of Research on Geodesy - (2008-2009-2010), within the Project PNRA 2004/5.1 Glaciology and Paleoclimate.
- PRIN 2007 - Coordinator of a Local Research Unit of the Project of National Relevance PRIN 2007 entitled: "Use of observers co-located geodetic VLBI-GPS for the homogenization and the comparison of time series derived from PS INSAR and geometric leveling, in the study of the movements of the soil on a regional scale
- National Coordinator Prof. Alessandro Capra.
- PRIN 2004 - Coordinator of a Local Research Unit of the Project of National Relevance PRIN 2004 entitled: Integration techniques of terrestrial surveying, photogrammetric and satellite for the purpose of monitoring of structures and architectural interest and archaeological areas, as part of the Scientific Research Program Relevant national Interest (PRIN 2004).
- PI of the Project Category 1: (project ID 5410) DICAM triggered in 2007 by the University of Bologna with the European Space Agency (ESA): "Integration of GPS surveys and SAR interferometry for the study of the kinematic of a fault system Victoria Land, Antarctica.
- PI of the project: COSMO-SkyMed Announcement of Opportunity" (project ID 2283) triggered in 2008 by DICAM the University of Bologna with the Italian Space Agency (ASI): "Integration of classical and space geodetic techniques for the study of ground movements.
- PI of the project: COSMO-SkyMed / RADARSAT-2 Joint Announcement of Opportunity (project id 2873/5247) launched in 2014 by the University of Bologna DICAM with Italian and Canadian space agencies (ASI and CSA respectively): Integrated GPS-InSAR analysis for ice monitoring bodies at Dome C and David Glacier sites (East Antarctica).

LV is also responsible for numerous research activities and technology transfer related to institutional agreements and contracts with public bodies (such as Municipalities and Regions) or private entities. He is also responsible for scientific activities for third parties and execution of special tests carried out by the Laboratory of Land Surveying and Geomatics (LARIG) of the DICAM Department.

Scientific activities: Assignments and participation in working groups:

- Member of the Working Group of the International Earth Rotation and Reference Systems Service (IERS) on Site Survey and Co-locations (IERS WG 2) IAG Sub-Commission 1.2
- Associate editor of the ISI journal Applied Geomatics ISSN: 1866-9298 Springer.
- Delegate of the Italian Ministry in the Management Committee of COST Action ES0701 Improved Constraints on Models of Glacial Isostatic Adjustment. In this context, he has been involved also in control measurements for deformation analysis as part of the Working Group 1, Geodetic observation-level modelling and systematic biases.
- From 2012 to 2015 he was member of the Commission MIUR-SIFET-CNGeGL for the evaluation of projects submitted in the competition among Secondary Technical Institutes, concerning demonstrated activities of integrated geomatics surveying.
- Member of the Working Group 1 of the European Construction Technology Platforms: Assessment, Monitoring and Diagnosis, Integration of Technologies for Building Diagnostics and Monitoring in the Preservation of Cultural Heritage.
- Member of the Alma Heritage Science Integrated Research Team (IRT) - group of experts from the University of Bologna who deal with technologies applied to cultural heritage covering different technical and scientific areas of investigation, such as diagnostics and monitoring of goods, the study of materials and methods of restoration, to considerations relating to territorial, structural, energy and environmental.
- Member of CODE³: Center established in 2010 as an organ of DICAM - University of Bologna, dedicated to the promotion and coordination of activities and initiatives related to international development cooperation, in the fields of Civil Engineering and Environmental Materials.
- Elected member of the Scientific Committee of the Italian Society of Photogrammetry and Topography (SIFET) for two terms, and member in the same period of the editorial board of the Bulletin of SIFET.

Scientific activities: responsibility in international and national projects:

- LV deals with research in the polar area since his first scientific expedition in Antarctica carried out as part of the National Programme of Research in Antarctica in 1990. LV has participated in 10 scientific expeditions in Antarctica and one in the Arctic (Svalbard) in 2002. he contributed in International Antarctic GPS measurements for the study of crustal dynamics of the Antarctic continent, in particular participating to various projects: GIG-91, GPS Pilot project, SCAR Epoch, etc.
- Responsible for the implementation of the measurement and analysis of a GPS geodetic network for the ice surface velocity field study within a radius of 25 km around the deep drilling site of the European Project for Ice Core in Antarctica, EPICA, in Dome C (East Antarctica).
- LV has also worked on GPS kinematic measurements over long-distance, in support to the activities of the International Trans-Antarctic Scientific Expedition (ITASE) program, which provided precise positioning and navigation of vehicles on the Antarctic plateau for glaciological, geodetical and geophysical data collection. In particular testing the integration of different sensors (such as GPR and GPS) on board of helicopters and tracked tractors, using differential positioning techniques such as Continuous kinematic, multi-Kin, RTK, NRTK and undifferentiated Precise Point Positioning (PPP).

In Antarctica he has contributed to the installation of tide gauges probes at Mario Zucchelli Station, which are particularly important instruments for Italian Geodetic Observatory. He also covered the role of Scientific Coordinator for the Observer Sector during the XVI Antarctic Campaign of PNRA.

- LV is actively involved in the design and realization of the set of procedures for the measurement and statistical estimate of eccentricity vectors existing between the reference points (RP) of different geodetic co-located instruments, such as VLBI and GPS, within a close range (<500 m). Deepening in the definition of the reference points of each technique (tracking points, geodetic markers and conventional points). Problem of stability of the local network and local ties themselves. Study of the deformations induced by the weight of the structures of VLBI antennas installed at the observatory of Noto (SR) and Medicine (BO), by means of photogrammetric measurements with calibrated cameras and terrestrial laser scanning surveys. Following these researches it was established in 2003 a Working Group of IERS (International Earth Rotation and Reference Systems Service (ERS WG 2) IAG Sub-Commission on 1.2 Site Survey and Co-locations.

- LV is an expert in the integration of different surveying methods in the field of Cultural Heritage. Extensive case of surveying problems at different scales (regional single-site-building-single object) was addressed through participation in the research activities of the numerous archaeological expeditions of the University of Bologna in Italy, Egypt, Uzbekistan, Tajikistan, Turkey and Albania. Realization of systems for photogrammetric survey taken from low-heights systems. Use of digital photogrammetry, for the production of orthomosaics of archaeological sites. From 2004 he follows the surveying activities of the countryside of some archaeological structures associated with the transition of nomads along the Silk Road in Samarkand region, as part of the project coordinated by Prof. Maurizio Tosi and Prof. Timur Shirinov, Director of 'Institute of Archaeology of the Academy of Sciences of Uzbekistan, for the realization of the "Archaeological map of the Middle Zeravshan valley".

- LV deals with joint uses of SAR Interferometry (PS-InSAR techniques) geometric leveling and GNSS permanent networks, for analysis of the vertical movements of subsidence induced by natural or human causes in the whole territory of the Po Valley, Emilia Romagna Region. Study of methodologies for monitoring the stability of the velocity Datum (derived by geometric leveling and SAR integration).

GIS applications for the detection of outliers in the set of Permanent and Distributed Scatterers extracted from multi temporal series of radar satellite images and processed with PS-InSAR technique patented by the Politecnico di Milano. In this context GIS applications, we have been prepared in order to allow comparison of datasets having planimetric distributions do not coincide (eg cornerstones leveling and Permanent Scatterers SAR). Use of GPS altitude as a detection technique for monitoring subsidence anthropogenic. Implementation of information systems for the management of repeated geodetic campaigns.

- LV he is author or co-author of more than 185 national and international scientific publications.

LV has been Advisor of over 100 students for their final Thesis (BA and MA). LV received the: "Best Teacher Award" organized by the Department and assigned by the students in two academic years, for the three-year Course of Studies in Civil Engineering. Inherent in the fundamental course: Topography T.

3 March 2021

Prof. Luca Vittuari