

CURRICULUM VITAE

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Nationality	ITALY
Birth date	20/04/1969



1 Main details

1.1 Italian National Scientific Qualifications awarded for Full Professor positions (“Abilitazioni Scientifiche Nazionali di I fascia”)

Academic Recruitment Field (“ <i>Settore Concorsuale</i> ”)
08/A4 Geomatica (Geomatics)

1.2 Academic Position

Qualification/Title	Full Professor
University	Politecnico di Torino
Department	DIATI
Academic Recruitment Field (if the candidate holds a position in an Italian University, she/he should insert the “ <i>Settore Concorsuale</i> ”)	08/A4 Geomatics (“ <i>Geomatica</i> ”)
Academic Discipline (formally named “ <i>Settore Scientifico Disciplinare</i> ”, only for candidates who hold a position in an Italian University)	ICAR/06 Surveying and Cartography (“ <i>Topografia e Cartografia</i> ”)

1.3 Working experience

Dates	From 1999 to 2006
Name and address of the Employer	Politecnico di Torino C.so Duca degli Abruzzi 24 10129 Torino (TO), ITALY
Position held	Researcher “Settore Scientifico Disciplinare”: ICAR/06 Surveying and Cartography (“ <i>Topografia e Cartografia</i> ”) I Faculty of Engineering Department of Georesources and Land (DIGET), then Department of Land, Environment and Geotechnologies Engineering (DITAG)

Main activities/responsibilities	Member of some boards of department: - Building Board (from 2003 to 2006); - Information and Communication Technology board
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Dates	From 2006 to 2017
Name and address of the Employer	Politecnico di Torino C.so Duca degli Abruzzi 24, 10129 Torino (TO), ITALY
Position held	Associate Professor “Settore Scientifico Disciplinare”: ICAR/06 Surveying and Cartography (“ <i>Topografia e Cartografia</i> ”) I Faculty of Engineering (from 2006 to 2011) Former Department of Land, Environment and Geo-technologies Engineering (DITAG), now Department of Environment, Land and Infrastructure Engineering (DIATI)
Main activities/responsibilities	From 2006 to 2010, Member of Departmental board (“ <i>giunta di dipartimento</i> ”, elective position). Member of some boards of department: - Building Board (from 2006 to today); - Information and Communication Technology board (from 2006 to today). Person in charge of the laboratory of Photogrammetry Geomatics and GIS (GeoGIS Lab) from 2007. Responsible for Politecnico di Torino (directly nominated by the Rector) of X-team project (International Centre of Cultural Heritage Security, ICCHS)

Dates	From 2017 to today
Name and address of the Employer	Politecnico di Torino C.so Duca degli Abruzzi 24, 10129 Torino (TO), ITALY
Position held	Full Professor “Settore Scientifico Disciplinare”: ICAR/06 Surveying and Cartography (“ <i>Topografia e Cartografia</i> ”) Department of Environment, Land and Infrastructure Engineering (DIATI)
Main activities/responsibilities	Member of some boards of department: - Building Board (from 2006 to today); - Information and Communication Technology board (from 2006 to today).

	Person in charge of the laboratory of Photogrammetry Geomatics and GIS (GeoGIS Lab) from 2007. Proposer and Member of Management board of PIC4SeR (Polito Interdipartimental Centre of Service Robotics)
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Dates	From 2008 to 2014
Name and address of the Employer	SIR srl, Innovative Solution for surveying (“Soluzioni Innovative per il Rilevamento”) From 2014, SIR srl has been included in Ad Hoc 3D solutions s.r.l., Current address: Fraz. La Roche, 8 - 11020 Gressan (AO), Aosta
Position held	Company President
Main activities/responsibilities	President of board of Governors Business partner In addition, the main practical activities were: - Design and development of the commercial version of Solid Image visualization software tool (SIRio); - 3D survey of hydraulic system related to the hydroelectric power station of HONE (Aosta) for CVA (Compagnia Valdostana delle Acque, Compagnie Valdôtaine des Eaux S.p.A.); - 3D GIS generation of castle of Buronzo (VC) using primary data acquired by photogrammetric techniques - 3D survey using terrestrial LiDAR techniques of the Cathedral of Vercelli (VC); - 3D Survey using terrestrial LiDAR techniques and Solid Images for rock face stability analysis in IPOH (Malaysia) - Solid Images generation using long range LiDAR data for rock face stability analysis in Gondo (Switzerland); - Innovative solution of 3D LiDAR survey and Solid Images Database for the subway of Algeri (Maroc).

1.4 Education and Training (please use the following table to describe Degrees awarded, by only indicating the information concerning Bachelor's Degree, Master of Science's Degree or/and PhD)

Date	22/02/1994
Institution which issued the degree	Politecnico di Torino
Type of Degree awarded (only Bachelor's Degree, Master of Science's Degree, PhD)	Master of Science's Degree in Civil Engineering, specializing in transport, sub-specialization Territory and Surveying

Date	17/04/1998
Institution which issued the degree	Politecnico di Milano
Type of Degree awarded (only Bachelor's Degree, Master of Science's Degree, PhD)	PhD in Geodetic and Topographic Sciences ("Geodesia e Topografia"), X cycle

2 Scientific Activity

2.1.1 Some considerations on the impact of my scientific contributions

Figure 1 shows the trend of citations (excluding self-citations) that I received for my papers in the data base Scopus. You can note:

- a substantially upward trend that shows an increasing impact in the scientific studies of the research which I proposed and/or in which I have been involved;
- a maximum of 146 citations in 2017;
- in 2018 the number of citations is obviously lower for the temporal proximity issues with newer and innovative studies;
- my *autor h-index* is equal to 10 and also shows an upward trend.

2.2 Coordination of research and technology transfer groups and projects.

I am in charge of the Laboratory of Photogrammetry, Geomatics and GIS at DIATI - Politecnico di Torino. In this role and on issues related to the laboratory I created (under the approval of Ambrogio Manzino) a research group (*DIATI Geomatics Group*) that I'm coordinating from some years. This group is composed by:

- 1 associate professors (Paolo Dabove);
- 2 researcher (Irene Aicardi, Vincenzo Di Pietra);
- 1 technical photogrammetrist (Paolo Maschio);
- 1 technical surveyor (Horea Bendea) in the form of project work, financed and coordinated in collaboration with other colleagues from the Geomatics Group of DIATI;
- 3 research fellow ("*assegnisti di ricerca*") for post-PhD position (Luigi Mazzara, Francesca Matrone, Nives Grasso) of which I am currently tutor. In the past years I were be tutor of following research fellow: 3 years for Filiberto Chiabrando (post doctorate, with six months financed by the department DAD), 1 year for Simone Balbo (post PhD and Paolo Dabove post PhD), 1 year for Paul Dabove (post PhD), 5 years for Francesca Noardo (during PhD course), 2 years for Irene Aicardi (post-graduate), ecently we were financed some scholarships for one year (Chiara Danna, Nives Grasso, Stefano Angeli, Valeria De Ruvo, Ilaria Bonfanti, Gloria Rizzo, ...);

- 4 students of current PhD course (Elisabetta Colucci, Ilaria Tonti, Ornella Salimbene, Emanuele Pontoglio) of which I am tutor. Recently I was the tutor of 6 doctoral students (Francesca Noardo, Andrea Biasion, Eros Agosto, Irene Aicardi, Vincenzo Di Pietra, Francesca Matrone) and co-tutor of 2 PhD students (Davide Marenchino, Francesco Nex);



Figure 1- Sintetic parameters of my papers indexed in SCOPUS

- 3

- many trainees (*"tirocinanti"*, Fabiola Viola, Manuel Cazzola, Albana Dervishi, Chiara Tosti, Stefania, Federica Noardo, Mariangela Musci, Marco Costabello, Elena Piovano, Francesca Sileci, ...).

The group was formed in a stable manner for the past two years by about 15 people.

Our collaborations are related to the research projects financed (see specific paragraph) including these main international collaborations:

- United Kingdom:
 - University of Cambridge - Department of Physics - Cavendish Laboratory, observatory Mullard (as part of the SKA project, see letter of invitation);
 - EFPCConsulting- European Framework Program Consulting Ltd. (AF3 project);
 - The University of Westminster (AF3 project);
- Holland:
 - ASTRON, Dwingeloo radio telescope LOFAR array and in Exloo (letter of invitation)
 - University of Twente, ITC, Faculty of Geo-Information Science and Earth Observation, Enschede;
- South Korea:
 - Electronic and Communications Research Institute, Indoor Positioning Group, Seoul and Daejeon (in the context of international research agreement, invitation letter);
- Spain:
 - the Universidad Politecnica, Escuela Tecnica Superior de Ingenieros Agronomos Madrid (endorsement letter for collaboration on National research project);

- University of Jaén - Departamento de Ingenieria Cartographic, geodesic y Fotogrammetria (endorsement letter for collaboration on National research project);
 - Pyro Fire Extinction (AF3 project);
 - The Universidad Politécnica de Valencia (UPV) (AF3 project);
 - TRAGSA (AF3 project);
- Sweden:
 - Linköping University (AF3 project);
- Germany:
 - Bochum University of Applied Sciences, Department of surveying and geomatics, Laboratory of Photogrammetry (endorsement letter for collaboration on National research project)
 - Technische Universität Berlin –TUB (DG ECHO Rescult);
 - The Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut – EMI (AF3 project);
 - The Fraunhofer Institute – ICT (AF3 project);
- Greece:
 - INTRACOM TELECOM (AF3 project);
 - The National Centre for Scientific Research “Demokritos” -NCSRD (AF3 project);
 - The Hellenic Ministry of Defence (MOD) (AF3 project);
- Turkey:
 - survey of Hierapolis archaeological site, along with Spanò and Chiabrando of the Architecture and Design Department (DAD);
- France:
 - Institut national de l'information géographique et forestière (IGN) - laboratoire "Méthodes d'Analyses pour le Traitement d'Images et la Stéréorestitution" (MATIS) – Paris;
 - Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture (IRSTEA) – Grenoble (Alpine Space Newfor),
 - SDIS (Service départemental d'incendie et de secours) - Alpes de Haute-Provence 04 - Digne Les Bains (DG ECHO Rescult);
 - AIRBUS Defence & Space (AF3 project);
 - ARIA Technologies SA (AF3 project);
 - Métropole Nice Côte-d’Azur (NCA) (ALIRHYS ALCOTRA project);
- Switzerland:
 - The United Nation Office for Disaster Risk Reduction (UNISDR) also part of the projects Xteam and DG ECHO Rescult;
- Israel:
 - Elbit System Ltd (AF3 project);
 - The Ministry of Public Security (AF3 project);
- Ireland:
 - Skytek (AF3 project);

- Poland:
 - o The Space ReseCBKarch Centre of the Polish Academy of Sciences (SRC PAS) (AF3 project)
- Italy:
 - o The Ministry of Interior – Department of Fire Corps, Public Rescue and Civil Defence (AF3 project);
 - o Selex ES, a Finmeccanica compay (AF3 project);
 - o National Research Center – Institute of Electronic, Informatics and Telecommunication “*Centro Nazionale delle Ricerche – Istituto di Elettronica, di Ingegneria dell’Informazione e delle Telecomunicazioni*” (CNR-IEIT), Torino (associate, a research agreement);
 - o National Research Center-Institute of Environmental Geology and Geoengineering “*Centro Nazionale delle Ricerche – Istituto di Geologia Ambientale e Geoingegneria*” (CNR-IGAG), Torino (associate, endorsment letters);
 - o “Istituto di Radio Astronomia, Istituto Nazionale di AstroFisica” -IRA-INAF (associate, 2 research agreement);
 - o Centro interregionale per le Informazioni Territoriali, CISIS (contratti di ricerca);
 - o local governments (some research agreement with Regione Piemonte, Regione Valle d’Aosta, Provincia di Cuneo, provincia VCO, Arpa Piemonte, Municipality of Mondovì, Mountain authority of valli Po, Bronda e Infernotto, Unione Comuni del Lago Maggiore, Municipality of Mappano, ...);
 - o Telecom Italia (2 research agreement);
 - o Magneti Marelli (a research agreement);
 - o Fiocchi Munizioni (a research agreement);
 - o Filippetti S.p.A. (IDEM project);
 - o ACS srl (IDEM project);
 - o CSP – Innovation in ICT scarl (IDEM project);
 - o Gaia srl (IDEM project);
 - o Sia srl (IDEM project);
 - o FAI service (research agreement);
 - o IREN (3 research agreement).

They are in place for PhD students exchange activities with the Massachusetts Institute of Technology (MIT) of Boston (USA), University of Twente (Nederland), Institut National des sciences appliquées (INSA) of Lyon (FR) and Finnish Geodetic Institute of the National Land Survey Institute.

In the past, the research group coordinated by me has worked with the spinoff SIR (“Soluzioni innovative per il rilevamento”) in which I managed the activities of 5 people all PhDs positions (Leandro Bornaz, Andrea Biasion, Eros Agosto, Paul Ardisson, Fabio Dago). In this context I also funded a research grant for 2 years Fabio Dago (Protein project) and collaborated with some international activities including:

- Three-dimensional surveying using terrestrial laser scanner and generation of solid images for analysis of the stability of rock face along the highway in the area IPOH (Malaysia)

- Generation of three-dimensional model in the form of solid images acquired by terrestrial long range LiDAR for the analysis of the stability of the rock walls in Gondo (Switzerland);
- Innovative solutions for three-dimensional detection using terrestrial LiDAR and generation of solid image database of the Algiers metro (Morocco).
- 3D Survey using terrestrial LiDAR techniques and Solid Images for rock face stability analysis in IPOH (Malaysia)
- Innovative solution of 3D LiDAR survey and Solid Images Database for the subway of Algeri (Maroc).

2.3 Scientific Projects

2.3.1 Scientific responsibility (Principal Investigator) of competitive National and International research projects, awarded through a peer-review process.

- principal Investigator for local unit of Politecnico di Torino of research project of national relevance funded from Italian Ministry of University and Research, PRIN 2010-2011 *“Tecniche geomatiche innovative ed emergenti di rilievo, telerilevamento (da aereo, satellite, UAV) e webGIS per la mappatura del rischio in tempo reale e la prevenzione del danno ambientale”*
- principal Investigator for the geomatics group of Politecnico di Torino European research project: ALCOTRA 2007-2013 *“Alpi Latine – Identificazione delle Risorse HYdriques Sotterranee”* (ALIRHYS) (<http://areeweb.polito.it/ricerca/ALIRHYS/progetto/>)
- principal Investigator for local unit of S3+lab of Politecnico di Torino of European research project POR FESR di Regione Piemonte *“IDEM, Internet of Data for Environmental Monitoring”* (<http://www.progettoidem.com/progetto/>)
- principal Investigator for local unit of Politecnico di Torino of European research project DG ECHO *“RESCULT: Increasing Resilience of Cultural heritage: a supporting decision tool for the safeguarding of cultural assets”* <https://www.rescult-project.eu/>
- Scientific Manager of the whole project of research project of national relevance funded from Italian Ministry of University and Research, SMART CITIES, COMMUNITIES AND SOCIAL INNOVATION *“SMARTOUR intelligent platform for tourims”* (2019-2020)
- principal Investigator for local unit of Politecnico di Torino of Research project of MANUNET MANUNET, a network of national and regional agencies under the European Framework Programme: *“SEI Spectral Evidence of ICE”* in collaboration with PIC4SeR (2019-2020)

2.3.2 Participation of research project with national/international relevance

- European project INTERREG Italy-Suisse *“MAIN10ANCE”*, Principal Investigator for local unit of Politecnico di Torino prof. Marco Zerbinatti (2020-2022) (<https://main10ance.eu/>)
- European project INTERREG HELIDEM *“HELvetia-Italy Digital Elevation Model”*, Principal Investigator for local unit of Politecnico di Torino Prof. Ambrogio Manzino, (2012-2014) (<http://helidem.eu/>)
- European project FP7: *“AF3 - Advanced Forest Fire Fighting”*: Collaborative Project (CP) – Large scale integrating project (IP). Topic SEC-2013.4.1-6 Preparedness for and management of large scale forest fires - Integration

Project, Principal Investigator for local unit of Politecnico di Torino Prof. Emilio Paolucci, (2014-2017) (<http://af3project.eu/>)

- Reserch project of national relevance funded from Italian Ministry of University and Research, PRIN *"Use of high resolution satellite images for territorial analysis"*, Principal Investigator at national level Prof. Sergio Dequal, Years: 2001-2002
- Reserch project of national relevance funded from Italian Ministry of University and Research, *"Laser scanning acquisitions for the production of digital models for 3D digital map and true orthophotos"*, Principal Investigator at national level prof. R. Galetto, (1998-1999);
- Reserch project of national relevance funded from Agenzia Spaziale Italiana (ASI, Spatial Italian Agency) *"High precision measurements and methods of spatial geodesy"*, Principal Investigator for Politecnico di Torino Prof. Ambrogio Manzino, (1999-2004)
- Reserch project of national relevance funded from Italian Ministry of University and Research, *"Digital methods of surveying, GIS and multimedia network for Architectonic/Environmental Heritage"*, Principal Investigator at national level prof. C. Monti, Principal Investigator for local unit of Politecnico di Torino prof. Sergio Dequal (2000-2001)
- Reserch project of national relevance funded from Italian Ministry of University and Research, *"Integration of survey techniques on GIS for recording, conservation and management of Cultural Heritage"*, Principal Investigator at national level prof. C. Monti, Principal Investigator for local unit of Politecnico di Torino prof. Fulvio Rinaudo (2002-2003);
- Reserch project of national relevance funded from Italian Ministry of University and Research, *"Innovative techniques for forecast, management and mitigation of environmental emergencies"*

Principal Investigator at national level prof. Sergio Dequal
Years 2003-2004

- Reserch project of national relevance funded from Italian Ministry of University and Research, *"Analysis, comparing and integration of images acquired by aerea and stellite platforms"*

Principal Investigator at national level prof. Sergio Dequal
Years 2006-2007

- Reserch project of national relevance funded from Italian Ministry of University and Research, *"MAPPER – procedures for acquisition and processing of multisources data for the emergency response"*

Principal Investigator at national level prof. Piero Boccardo
Years 2009-2010

- Reserch project on "Smarcities & Communities" of Italian Ministry of University and Research, topic: Cultural Heritages, *"INTOUR, Intelligent Platform for Tourims"*

Principal Investigator for local unit of Politecnico di Torino prof. Alberto Cina
Time period: the project won the tender in 2014 but have not yet reached the structural funds.

2.3.3 Scientific responsibility of research agreements with national/international relevance

- International research agreement with ETRI, South Korea *"A solution of Image Recognition Based Positioning using database of solid images"*

I am Principal investigator for the Politecnico di Torino.
Funding: about 72 k€ in 6 months (2016)

- International research agreement with ETRI, South Korea *"A solution of Image Recognition Based Positioning using database of solid images"*

I am Principal investigator for the Politecnico di Torino.
Funding: about 72 k€ in 6 months (2016)

- Research agreement with municipality of Mappano (Torino, Italy) "Large scale 3D GIS data production for urban planning"

I am Principal investigator for the Politecnico di Torino.
Funding: about 90 k€ in 2 years (2021-2022)

- Research agreement with Unione Comuni del Lago Maggiore "Acquisition of high-resolution spatial data in a complex environment by integrating innovative techniques / tools into a multi-resolution and multi-scale approach"

I am Principal investigator for the Politecnico di Torino.
Funding: about 250 k€ in 1 years (2018-2019)

- 3 Research agreement with IREN "Innovative systems (UAV, UGV, submarine ROV), tools and methods for surveying and inspecting infrastructures in complex environments " and "Geospatial Artificial Intelligence for district heating network"

I am Principal investigator for the Politecnico di Torino.
Funding: about 130 k€ in 4 years (2017-2021)

- Research agreement with TELECOM Italia "Algorithms and procedures for Image Recognition Based Localisation in indoor/outdoor contexts"

I am Principal investigator for the Politecnico di Torino.
Funding: about 25 k€ in 1 year (2013-2014)

- Research agreement with TELECOM Italia "Image based navigation using smartphone"

I am Principal investigator for the Politecnico di Torino.
Funding: about 35 k€ in 1.5 years (2014-2016)

- Research agreement with IRA-INAF for SKA project "Geomatics activities on the use of drones for the characterization of antennas for radioastronomy"

I am Principal investigator for the Politecnico di Torino.
Funding: about 25 k€ in 1 year (2013-2014)

- Research agreement with IRA-INAF for SKA project "Geomatics and drones for Square Kilometres Array (SKA)"

I am Principal investigator for the Politecnico di Torino
Funding: about 31 k€ in 1 year (2014-2015)

- Research agreement with CNR-IEIT nell'ambito di SKA "Geomatics techniques and use of UAV for the measurements of antenna radiation diagrams of low frequencies antennas array"

I am Principal investigator for the Politecnico di Torino.
Funding: about 25 k€ in 1 year (2015-2016)

- Research agreement with CISIS "Italian guidelines for the generation of orthophoto and DTM/DSM at large scale"

I am Principal investigator for the Politecnico di Torino insted of original retired PI, prof. Sergio Dequal.
Funding: about 25 k€ in 1.5 year (2010-2011)

- Research agreement with regione Valle d'Aosta "Scenario definitions of rock fall problems"

I am Principal investigator for the geomatics group of Politecnico di Torino.
Funding for geomatics activities: about 141 k€ in 3 years (2014-2016)

- Research agreement with Fondazione Centro Studi Logistica e Trasporti "*Design and realization of a datawarehouse for statistical analysis of transport and logistics*"

I am Principal investigator for the Politecnico di Torino.
Funding: about 10 k€ in 1 year (2014-2015)

- Research agreement with Regione Piemonte "*Quality testing of cartographic product generation for the whole Regione Piemonte*"

I am Principal investigator for the Politecnico di Torino.
Funding: about 32 k€ in 2 years (2014-2015)

- Research agreement with ARPA Piemonte "*LiDAR survey from car*"

I am Principal investigator for the Politecnico di Torino.
Funding: about 32 k€ in 2 years (2014-2015)

- Research agreement with Fiocchi Munizione spa "*3D survey of bullet trajectories using high- speed videogrammetric techniques*"

I am Principal investigator for the Politecnico di Torino.
Funding: about 10 k€ in 2 years (2006)

2.3.4 Outcomes obtained in the field of technology transfer, in terms of participation in start-ups and spin-offs, development, use and commercialization of patents/licenses.

- I was the promoter of the spin-off of the Politecnico di Torino, SIR, Innovative solutions for surveying Ltd.

*The initial idea was devoted to do the technological transfer of two innovative products proposed by the geomatics group of the Politecnico di Torino: **the solid image (SI)** and **the Solid True OrthoPhotos (STOP)**. These two products form a useful result still to properly use the point clouds acquired by laser scanning (aerial/terrestrial) or by photogrammetry and dense matching techniques. In fact, these products can be produced in a substantially automatic way, are not pre-interpreted in the form of a 3D model and then retain throughout the metric /informative original content, can be simple to use even unskilled within the geomatics (restorers, conservators, archaeologists, geologists, ...).*

- In the period I were President of SIR srl, we allowed the production of an innovative software (SIRio).

SIRio allowed the generation of SI and STOP in an automatic way and the visualization of them in an effective, complete, without the need for special hardware or the need to special training. This software was also used for many years by the Geomatics Group of Politecnico di Torino for the performance of specific teaching lessons, processing for master thesis and PhD thesis, development of specific research projects (eg. Research agreement with ARPA described in 2.3). Thanks to SIRio have been carried out numerous 3D surveying activities and preparation of three-dimensional database based on SI or OSP in Italy (Hone-AO, Buronzo - VC, of Vercelli Cathedral, Ipo - Malaysia, Gondo - Switzerland, Algeria - Morocco, ...). SIRio allowed to create in 3 years a company that is self-sustaining and provide work and wages to five members. SIR has been acquired by the company Ad Hoc 3D Solutions in 2007 that continued development of the software now called Ad Hoc.

- Ghinamo G., Lingua A.M. (2016) System for generating 3D images for image recognition based positioning. **First request of International Patent** PCT International Application No. PCT/EP2015/081455, Telecom ID: I15042-WO/FC-MM, DTEL14030

As you can see in the first page of the attached document: "... The patent applications are published after 18 months from the date of first deposit, and then during that period they are secret". The patent is owned by TELECOM property but between the two inventors (me and George Ghinamo) the contribution the proposal was equivalent. International interest in the topic is highlighted in the third product presented (1.1.4), in other publications reported on this issue previously, the interest of ETRI for Technological transfer activities related to the main process (not the one linked to the patent).

2.4 National and international reputation and professional activity for the scientific community

2.4.1 *Editorship of Journals with international reputation (in the role of Editor in Chief – EIC), editorship of book series, encyclopedias and essays of recognized prestige.*

"Bollettino della Società Italiana di Fotogrammetria e Topografia (SIFET)" ISSN 1721-971X) from 2014 to today (according to the position of President of Scientific Board of SIFET). This journal, published since 1951, was historically the reference journal for the topics of geomatics at national level. While it is not indexed, the Bollettino of SIFET imposes a double blinded revision to guarantee a high scientific contents. The Scientific Committee has been launched this year the demand for indexing Scopus.

2.4.2 *Participation in the Editorial Board of Journals with international reputation (in the role of Associate Editor or equivalent), participation in the Editorial Board of book series, encyclopedias and essays of recognized prestige.*

Participation of Editorial Board of these journals:

- Bollettino della Società Italiana di Fotogrammetria e Topografia (ISSN 1721-971X) from 2011 to today;
- Applied Geomatics ISSN: 1866-9298 (Print) 1866-928X (Online) editor Springer;

I am reviewer for these journals:

- Sensors;
- Remote Sensing;
- European Journal of Remote Sensing;
- ISPRS Journal of Photogrammetry and Remote Sensing;
- Rock Mechanics and Rock Engineering;
- International Journal of Digital Earth;
- Journal of Cultural Heritage;
- Applied Geomatics.
- Bollettino della Società Italiana di Fotogrammetria e Topografia.

2.4.3 *Official research and/or teaching and/or fellowship roles, positions as Scholar/ Visiting Professor in international highly qualified universities and research centres.*

ETRI (Electronic and Telecommunications Research Institute) is one of the most important research institutes of South Korea recently named for the third consecutive year in first place in the "US evaluation of patents" (https://www.etri.re.kr/engcon/sub1/sub1_08.etri). As described in 2.3 ETRI recently commissioned research agreement to my geomatics group (I am the principal investigator) for the evaluation of the performance of the algorithm of Image Recognition Based Location using a synthetic solid image database (funding of about 72 K € for 6 month agreement). We are compiling a new research agreement for investigate the use of smartphones for indoor navigation in an attempt to propose a hybrid navigation solution

that integrates all sensors available beginning in September and lasting one year (research agreement in title)

ASTRON (<https://www.astron.nl/>) is the Netherlands Institute for Radio Astronomy. Its mission is to make discoveries in radio astronomy happen, via the development of novel and innovative technologies, the operation of world-class radio astronomy facilities, and the pursuit of fundamental astronomical research. As part of the SKA project, I was invited (in April 2016), with geomatics group, at the installation LOFAR (LOW Frequency Array) in Exloo for advanced research related to the characterization of the antenna array (the letter invitation is in the titles).

The University of Cambridge - Cavendish Laboratory (<http://www.phy.cam.ac.uk/>) is English institute which cooperates under the SKA project as regards the characterization of arrays of antennas. I was invited in September 2014, with the geomatics group at the Astronomical Observatory Mullard, near Cambridge, for an advanced research activities related to the characterization of the antenna array system based on the antenna SKALA (invitation letter in title).

2.4.4 Offices in the Governing bodies of national and international scientific societies.

- From 2019, President of Italian Society of Photogrammetry and Surveying (*Società Italiana di Fotogrammetria e Topografia, SIFET*) (elective position)
- From 2019, member of Directive Committee of Italian Scientific Associations for Land and Environment (*Associazioni Scientifiche Italiane per il Territorio e l'Ambiente, ASITA*);
- From 2014, President of Scientific Committee and member of Directive Committee of Italian Society of Photogrammetry and Surveying (*Società Italiana di Fotogrammetria e Topografia, SIFET*) (elective position)
- From 2014, member of Scientific Committee of Italian Scientific Associations for Land and Environment (*Associazioni Scientifiche Italiane per il Territorio e l'Ambiente, ASITA*);
- From 2016, Co-chair of Working Group I/6 of International Society of Photogrammetry and Remote Sensing (ISPRS)
- From 2013, member of Working Group V/2 ISPRS "Cultural heritage data acquisition and processing"

2.4.5 Prizes and awards awarded.

- Best Poster awards for Andrea Lingua and Fulvio Rinaudo "for the excellent poster presentation of the paper *The statue of Ramsete II – Integration of Digital Photogrammetry and Laser Scanning Techniques for 3D Modelling*" (2001);
- Best Poster awards for Sergio Dequal and Andrea Lingua "for the excellent poster presentation of the paper *True Orthophoto for Architectural Surveys*" (2001);
- Best Poster awards of VI conferenza nazionale ASITA 2005 for the paper "The Laser scanner data processing for terrestrial application" authors: Bornaz L., Lingua A., Rinaudo F.;
- Best Poster awards of IX conferenza nazionale ASITA 2002 for the paper "Innovative techniques for multispectral survey of frescos" authors: Borgogno Mondino E., Grua M., Lingua A., Giulio Tonolo F.;
- Best Poster awards of VI conferenza nazionale ASITA 2008 for the paper "A new on-line instrument of 3D geometric and radiometric data of territorial survey: the web viewer of Solid True OrthoPhoto" authors: Agosto E., Lingua A., Picco L..
- 5th Prize on Sensors Best Paper Award 2013;

- CCB Paper Awards of Politecnico di Torino, years 2009-2010;
- CCB Paper Awards of Politecnico di Torino, years 2011-2012;

2.4.6 **Invited speaker**

- Invited speaker for a workshop in ETRI Daejeon in may 2016 with a specific lecture on *"Image Recognition Based Location (IRBL)"* and an invited presentation on *"the adopted solution for the generation of the Synthetic Solid Image database of the Bangbae Subway Station in Seoul"* (2016).
- Invited speaker on *"Innovative instruments for the acquisition of territorial information"* at the international workshop MIMOS 2011 "Virtual Earth Simulation" in L'Aquila (Italy), (2011);
- Invited Speaker on *"Unmanned Aerial Vehicles: state of the art and operative limits"* at SIFET workshop "We adopt our monuments" in Ragusa (Italy), 2015

2.4.7 **Member of scientific committees of International Conferences**

- Member of Program Committee at 2nd International Conference on Geographical Information Systems Theory, Applications and Management (GISTAM 2016, *certificato nei titoli*);
- Member of Workshop Committee at International Congress FOSS4G Europe 2015;
- Member of Scientific Committee of International Workshop "SIFET-SNPT" (Società Nazionale de Photogrammétrie et Télédétection) at 2016;
- Member of local Committee of XX CIPA Symposium, 2005;
- Member of local Directive Committee of SIFET congress 2014;
- Member of Scientific Committee of ASITA congress 2015;
- Member of Scientific Committee of ASITA congress 2016;
- Member of Scientific Committee of ASITA congress 2017;
- Member of Scientific Committee of SIFET congress 2016;
- Member of Scientific Committee of SIFET congress 2015;
- Member of Scientific Committee of SIFET congress 2014;
- Member of Scientific Committee of SIFET congress 2013;
- Member of Scientific Committee of SIFET congress 2012;
- Member of Scientific Committee of SIFET congress 2011;
- Member of Directive Committee of SIFET congress 2015;
- Member of Directive Committee of SIFET congress 2016;
- Member of Directive Committee of SIFET congress 2017;
- Member of Directive Committee of SIFET congress 2018.

2.4.8 **Management and organisation of exhibitions, compositions, drawings, design, hand-crafted items, prototypes, artwork and their projects, databases and software, thematic maps, for the Academic Fields ("Settori Concorsuali"), where this is appropriate.**

- **Dataset** for benchmark SIFET
I organized this year (2016) to the definition of a dataset for a benchmark activities on photogrammetry drone also through action cam available for SIFET member. During the National Congress SIFET of this year these results were presented.
- **On the shoulders of giants** (historical database of scientific paper)

I am following the initiative "On the Shoulders of Giants" of SIFET devoted to the digitalization of the historical scientific paper related to all historical numbers (from 1951) of Bollettino della SIFET, available only on paper.

3 Teaching activity

3.1 Formal responsibility of Bachelor's (Laurea) and Master of Science's (Laurea Magistrale) degree courses in Italian and/or foreign universities.

In the most recent courses I put in bold the results of the questionnaires completed by the students for the Didactic Quality Board (CPD, *Comitato Paritetico per la Didattica*). I return an evaluation of the teaching expressed in the scale from 1 (minimum) to 4 (maximum). I excluded from the following the positions for exercise part of other courses. CFU is an acronym of the Italian version of European Credit Transfer and Accumulation System (ECTS). The first part of each course description define the course code of the Politecnico di Torino.

Academic year 2017/2021

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito)
8 CFU, mean teacher quality index **3.70**

01SAOMN, 01SAOPW, 01SAONX, Drones for land and architectural survey (all Bachelor's degrees programmes in the Politecnico di Torino), 6 CFU, mean teacher quality index **3.66**

Academic year 2017/2018

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito)
8 CFU, CPD teacher quality index **3.72**

01SAOMN, 01SAOPW, 01SAONX, Drones for land and architectural survey (all Bachelor's degrees programmes in the Politecnico di Torino), 6 CFU, teacher quality index **3.66**

Academic year 2016/2017

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito)
8 CFU, CPD teacher quality index **3.76**

03FMCMX Geomatica (Master of science-level of the Bologna process in Civil Engineering, Polito), 6 CFU, CPD teacher quality index **3.74**

Academic year 2015/2016

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito)
8 CFU, CPD teacher quality index **3.76**

Academic year 2014/2015

03FMCMX Geomatics (Master of science-level of the Bologna process in Civil Engineering - Torino) 6 CFU, CPD teacher quality index **3.60**

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito)
8 CFU, CPD teacher quality index **3.82**

03QBOMI Disciplinary teaching (Active Internship Training In General Topography, Rural Construction And Representation - Torino), 2 CFU

Academic year 2013/2014

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito)
8 CFU, CPD teacher quality index **3.74**

Academic year 2012/2013

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito)
8 CFU

Academic year 2011/2012

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito)
8 CFU

Academic year 2010/2011

- 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5
- 01CWYFB Surveying e cartography (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6

Academic year 2009/2010

- 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5
- 04BALFY Photogrammetry (Master of science-level of the Bologna process in Engineering of Land Protection - Torino) CFU 6
- 01CWYFB Surveying e cartography (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6

Academic year 2008/2009

- 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5
- 04BALFY Photogrammetry (Master of science-level of the Bologna process in Engineering of Land Protection - Torino) CFU 6
- 01CWYFB Surveying e cartography (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6
- 01IMEFZ, 01IMEGD Digital mapping and GIS (Master of science-level of the Bologna process in Environmental Engineering; Master of science-level of the Bologna process in Building Engineering,- Torino) CFU 6

Academic year 2007/2008

- 02BAMFB, 02BALFU Applied Photogrammetry, Photogrammetry (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) 6 CFU
- 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5

Academic year 2006/2007

- 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5
- 02BAMFB, 02BAMBX, 2BAMEO Applied Photogrammetry, Photogrammetry (1st degree and Bachelor-level of the Bologna process in Architectural Sciences - Torino; 1st degree and Bachelor-level of the Bologna process in Civil Engineering - Torino; 1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino), CFU 6

Academic year 2005/2006

- 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5
- 01IKWEW Surveying I PRLP(1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 6.

Academic year 2004/2005

- 02FIJBX Surveying e cartography C (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6

Academic year 2003/2004

- D2200, R2200 Applied Photogrammetry (Master of science-level of the Bologna process in Environmental and Land Engineering, Pre 2000 - Torino; Master of science-level of the Bologna process in Civil Engineering, Pre 2000 -- Torino) CFU 10
- 03FBH Fundamental of GIS/LIS (Master of science-level of the Bologna process in Environmental and Land Engineering - Mondovi') CFU 10
- 02FIH Surveying e cartography B (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6

Academic year 2002/2003

- 01FCM Laboratory of geomatics (Master of science-level of the Bologna process in Civil Engineering - Torino) CFU 6

01FIH Surveying e cartography B (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6

Academic year 2001/2002

9706S Digital mapping (1st degree and Bachelor-level of the Bologna process in GIS- Torino) CFU 6

3.2 Formal responsibility of PhD courses in Italian and/or foreign universities.

Academic year 2020-2022

01TRIRS Drones for 3D multiscale modelling and planning of city and territory (PhD course in Urban And Regional Development – Politecnico di Torino)

Academic year 2014-2020

01QTZRS Geomatics and gis for environmental application and regional planning (PhD course in Urban And Regional Development – Politecnico di Torino)

Academic year 2014-2015

01QTZRS Geomatics and gis for environmental application and regional planning (PhD course in Urban And Regional Development – Politecnico di Torino)

Academic year 2013-2014

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

Academic year 2012-2013

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

Academic year 2011-2012

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

Academic year 2010-2011

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

Academic year 2009/2010

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

Academic year 2008/2009

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

I want also indicate numerous tutoring activities for academic stages (on average 5-6 per year) and numerous supervisor activities of several bachelor level thesis/ master's degree level thesis, in total over 120 dissertations since 2000, an average of 8 per year.

3.3 Formal responsibility of Specializing Master's courses and Life Learning courses in Italian and/or foreign universities in PhD courses.

I organized and taught in the following continuing education courses formalized through appropriate educational agreement of the Politecnico di Torino:

- in 2015, "*Geomatics Technologies – 3D Laser Scanner 3D*" (30 hours) for the College of Surveyors of Torino;
- in 2014 *Geomatics Technologies – 3D Laser Scanner 3D*" (30 hours) for the College of Surveyors of Torino;
- in 2013 "*Photogrammetry from drone, the automation of surveying process*", (20 hours) for the College of Surveyors of Cuneo;
- in 2012, "*Practical course of digital 3D stereo- plotting*" (16 hours) for the University of Torino and Superintendent of Archaeologic Heritage of Regione Valle d'Aosta

Ho tenuto i seguenti corsi per le associazioni SIFET e ASITA con crediti professionali riconosciuti:

- in 2012, “*Specializing course of LIDAR*” (12 hours) during the National Conference of SIFET;
- in 2011, “*3D elevation model*” (4 hours) during the National Conference of SIFET;
- in 2015 “*Photogrammetry and Drone*” (12 hours), during the National Conference of ASITA;

I should like to mention here the educational activities carried out, in view of the role of University for Public Engagement, related to student teams. It is now four years that, with some colleagues prof.ssa Nannina Spano, prof. Piero Boccardo, prof. Marco Piras, we manage a student team, Disaster Recovery Team (DIRECT), for the creation of crisis mappers, specialists can produce the basic map information quickly and accurately to enable a correct setting of the procedures early impact;

3.4 Institutional offices and roles in Italian and foreign Universities and/or public and private institutions with scientific and/or technology transfer aims

3.4.1 Institutional offices in teaching and research structures of Italian and Foreign Universities.

- from 2019 to 2022, I was the Coordinator of the *Collegio* of Building Engineering, the teaching structure devoted to organize Bachelor and Master of Science courses in Building Engineering;
- from 2019 to 2020, I was the Coordinator for the Strategic Plan of the Department of Environment, Land and Infrastructure Engineering of Politecnico di Torino;
- from 2007 to 2015, I was the Secretary of the *Collegio* of Building Engineering;
- From 2015 to now, I am the Vice Coordinator of *Collegio* of Building Engineering;
- From 2015 to now (the project is going to evolve), I have been directly nominated by the Rector as representative for the Politecnico di Torino to follow the X-team project (“International Centre for Cultural Heritage Security”, ICCHS). As described in the paper included in the next issue of the journal *Universitas* (<http://www.rivistauniversitas.it/>) and on the project website (<http://www.ichsteam.eu/>), in 2016 Politecnico di Torino, Università Ca’ Foscari, IUAV, CORILA and SiTI have formalized a framework agreement to develop X-Team through a multidisciplinary training course aims to enhance the complementarity between the knowledge of the universities and strengthen the synergies between the relational systems, allowing the formation of technical experts in the cultural heritage security. The students, mostly refugees or displaced persons, will be chosen from students and researchers of the countries in conflict, with particular attention to young people who have been forced to interrupt their training process, and among the officials of cultural systems (museums, archaeological parks, etc.).
- from 2006 to 2010, member of Departmental board (“*giunta di dipartimento*”, elective position);
- in 2012, I was a reviewer for the National Agency for the Evaluation of University and Research (*Agenzia Nazionale di Valutazione del Sistema Universitario e della Ricerca*, ANVUR) as part of the Quality Assessment Research (*Valutazione della Qualità della Ricerca*, VQR).

3.4.2 Management roles in Universities, as part of Faculty duties:

From 2000 to 2006, members of didactic board of *Collegio* of Building Engineering;

From 2006 to 2011, members of some boards of of *Collegio* of Building Engineering;

- didactic board;
- Self Evaluation board;

- Stage board.

From 2011 to 2015,

- representative for ERASMUS incoming/outgoing programs for *Collegio* of Building Engineering,
- members of some boards of *Collegio* of Building Engineering:
 - o didactic board;
 - o quality board;
 - o stage board;
 - o internationalization board.

From 2015 to today:

- representative for *Collegio* of Building Engineering of:
 - o ERASMUS incoming/outgoing programs;
 - o evaluation foreign students careers;
 - o International students apply.
- members of some boards of *Collegio* of Building Engineering:
 - o didactic board;
 - o quality board;
 - o stage board;
 - o Internazionalization board.

Torino, 25.08.2021

A handwritten signature in blue ink, appearing to read 'Andrea Liguori'.

4 List of publications

2021

- [1] Belcore, E.; Pittarello, M.; Lingua, A.M.; Lonati, M. Mapping Riparian Habitats of Natura 2000 Network (91E0*, 3240) at Individual Tree Level Using UAV Multi-Temporal and Multi-Spectral Data. **REMOTE SENSING** 2021, 13, 1756. <https://doi.org/10.3390/rs13091756>
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- [3] Teppati Losè, L., Chiabrando, F., Giulio Tonolo, F., and Lingua, A., "Uav Photogrammetry and Vhr Satellite Imagery for Emergency Mapping. The October 2020 Flood in Limone Piemonte (italy)", **INTERNATIONAL ARCHIVES OF THE PHOTOGRAMMETRY, REMOTE SENSING AND SPATIAL INFORMATION SCIENCES**, vol. 43B3, pp. 727–734, 2021. doi:10.5194/isprs-archives-XLIII-B3-2021-727-2021.
- [4] Lingua, A.M. e Parizia, F. 2021. Uso di immagini iperspettrali per l'agricoltura di precisione. **BOLLETTINO DELLA SOCIETÀ ITALIANA DI FOTOGRAMMETRIA E TOPOGRAFIA**. 2 (lug. 2021), 1–11
- [5] Casabona, M., Grasso, N. e Lingua, A.M. 2021. Deep learning basato su immagini da drone per la super risoluzione di scene multispettrali acquisite da satellite. **BOLLETTINO DELLA SOCIETÀ ITALIANA DI FOTOGRAMMETRIA E TOPOGRAFIA**. 1 (giu. 2021), 35–45
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- [7] Musci, Maria Angela, Mazzara, Luigi, Lingua, Andrea Maria (2020). Ice Detection on Aircraft Surface Using Machine Learning Approaches Based on Hyperspectral and Multispectral Images. **DRONES**, vol. 4, p. 1-26, ISSN: 2504-446X, doi: 10.3390/drones4030045
- [8] Pontoglio, Emanuele, Aicardi, Irene, Calantropio, Alessio, Colucci, Elisabetta, Di Pietra, Vincenzo, Grasso, Nives, Lingua, Andrea, Maschio, Paolo Felice (2020). UAV data acquisition and analysis for a Cultural Landscape Heritage: the emergency area of the Vallone d'Elva.. In: Barba S. Parrinello S. Limongiello M. Dell'Amico A.. **PROSPETTIVE MULTIPLE: STUDI DI INGEGNERIA, ARCHITETTURA E ARTE. PROSPETTIVE MULTIPLE: STUDI DI INGEGNERIA, ARCHITETTURA E ARTE**, vol. *Prospettive Multiple. Studi di Ingegneria, Architettura e Arte*, p. 296-305, Pavia: Pavia University Press, ISBN: 978-88-6952-129-4
- [9] Musci, M. A., Persello, C., Lingua, A. M. (2020). UAV images and deep-learning algorithms for detecting flavescence dooree disease in grapevine orchards. In: International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives. **INTERNATIONAL ARCHIVES OF THE PHOTOGRAMMETRY, REMOTE SENSING AND SPATIAL INFORMATION SCIENCES**, vol. XLIII-B3-2020, p. 1483-1489, International society for photogrammetry and remote sensing, ISSN: 2194-9034, 31/08/2020 - 2/09/2020, doi: 10.5194/isprs-archives-XLIII-B3-2020-1483-2020
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