

## PERSONAL INFORMATION

### Bianca Federici



📍 University of Genoa  
Department of Civil, Chemical and Environmental Engineering  
Via Montallegro 1, 16145 Genova

☎ +39 010 33 52421 📠 +39 328 8369856

✉ bianca.federici@unige.it

🌐 <https://dicca.unige.it/rubrica/BiancaFederici>  
<http://www3.dicca.unige.it/geomatica/ricerca/>

- ORCID: 0000-0002-4598-4758
- Google scholar profile: Ph0JXBUAAAAJ
- Scopus Author ID: 7006862054
- Publons / Web of Science Researcher ID: AAF-4872-2021

Sex Female | Date of birth 25/07/1974 | Nationality Italy

## WORK EXPERIENCE

1<sup>st</sup> December 2019 – today

**Associate Professor in Geomatics (SSD ICAR/06)**  
University of Genoa, Italy

1<sup>st</sup> December 2008 – 30<sup>th</sup>  
November 2020

**Researcher (RTI) in Geomatics (SSD ICAR/06)**  
University of Genoa, Italy

## EDUCATION AND TRAINING

2003-2008

**Research assistant (Assegnista di ricerca)**  
Polytechnic of Turin and University of Genoa, Italy

- Galileo and modernised satellite positioning: new perspectives and new services (2008 at the Polytechnic of Turin)
- Land monitoring using GPS and GIS techniques (2005-2007 at the University of Genoa)
- Fluvial morphodynamics models (2003-2005 at the University of Genoa)

2000-2003

**PhD in Hydraulic Engineering and Environmental Systems Modelling**  
University of Padoa, Italy

- Topics on fluvial morphodynamics

1999

**Master degree in Engineering for the Environment and the Territory, specialising in Soil Defence, 110/110 cum laude and honours for the experimental thesis**  
University of Genoa, Italy

- Title "Experimental observations on bifurcations in braided riverbeds" carried out at the St. Anthony Falls Laboratory, Minneapolis (MN, USA), partly financed by a scholarship from the University of Genoa for training in scientific research.

## WORK ACTIVITIES

### Main interest

- 3D geomatic surveying and monitoring,
- analysis of geospatial data and remote sensing,
- geographical applications for emergency management and decision support systems

<b>Sectors</b>	Research, teaching, technology transfer and cultural dissemination in Geomatics
<b>Main projects</b>	<p>Scientific coordinator or scientific advice of the following projects in the last 10 years:</p> <ul style="list-style-type: none"> <li>▪ 2023-2024: INTERREG V-A France – Italie ALCOTRA 2021-2027 Concert-Eaux OPERA (Concerted operational adaptations to the impacts of extreme meteo-hydrological events correlated with climate change in the Roia Valley and surrounding areas) mainly focused on capitalizing experience gained in the recent ALCOTRA Concert-Eaux and Ad-Vitam projects by expanding the installed sensor networks and upgrading them technologically;</li> <li>▪ 2017-2021: INTERREG V-A France – Italie ALCOTRA 2014-2020 CONCERT-EAUX (Cross-border Concertation of the Roia Valley for Climate Change adaptation Strategies) mainly focused on the application of innovative techniques for measuring rainfall and water vapour in the atmosphere, analysis of flood flows and river morphodynamics, and webGIS visualisation of monitoring data in the Roia river basin;</li> <li>▪ 2017-2020: INTERREG V-A France – Italie ALCOTRA 2014-2020 AD-VITAM (Analysis of the Vulnerability of Mediterranean Alpine Territories to Natural Hazards) for the development of actions aimed at defining systems for forecasting landslides triggered by rainfall;</li> <li>▪ 2019-2020: Collaboration with the company T&amp;G Technology and Groupware Ltd in the framework of the project "Safe Genova" founded by Ligurian Por Fesr (2014-2020), for the identification of the parameters to be acquired and of the types of accurate and reliable sensors, as well as of the methods of their calibration, for the feeding of hydrological-geotechnical models in GIS for the evaluation of the propensity to landslide instability;</li> <li>▪ 2015-2017: NARVALO project "Precision satellite navigation for safety and viability in logistics areas", co-founded by ASI (Italian Space Agency) for the development of an anti-collision warning system between vehicles and people within interport areas, based on real-time knowledge of the precise positioning, speed and acceleration of vehicles and people equipped with appropriate GNSS - IMU receivers, and a real-time control centre for collision risk assessment, developed in a GIS environment;</li> <li>▪ 2012: contract with the Province of Imperia within the strategic project Alcotra 2007-2013 "RiskNat", concerning the design and creation of a functional GeoDB for the realization of thematic cartographies related to the quantitative analysis of the elements at risk in the Roja basin and its publication on geoportal.</li> </ul>
<b>Active collaborations</b>	<ul style="list-style-type: none"> <li>▪ Bureau de Recherches Géologiques et Minières (BRGM) – France;</li> <li>▪ Centre national de la recherche scientifique (CNRS) – France;</li> <li>▪ Institut des Sciences de la Terre (ISTerre) - Université Joseph Fourier, Grenoble – France;</li> <li>▪ Istituto scienze della Terra - Scuola Universitaria Professionale della Svizzera Italiana (SUPSI) - Switzerland</li> <li>▪ Italian Hydrographic Institute of the Navy (IIM) and International Hydrographic Organization (IHO)</li> <li>▪ Reference for regional territorial authorities for issues related to Geomatics.</li> </ul>
<b>Research topics</b>	<p>The Research activities are mainly focused on the monitoring of infrastructures and environment, and on the development of automatic systems to store observed data, to feed models and analyse phenomena, becoming decision support systems (DSS) for both the management and the prevention of natural hazards or emergency scenarios.</p> <p>In particular the activity concerns the following topics:</p> <ul style="list-style-type: none"> <li>▪ geomatic monitoring of bridges for static tests or structural verifications;</li> <li>▪ geomatic monitoring of structures and environments in emergency conditions, such as in the presence of collapses that have occurred (e.g. post-earthquake or post-collapse of the Morandi Bridge) or expected;</li> <li>▪ development of suites for optimised management of photogrammetric survey and production of orthophotos even on complex surfaces;</li> <li>▪ 3D reconstruction of complex urban or natural geometries (such as emerged and submerged coastal environments);</li> <li>▪ development of dedicated and automated Open Source procedures in GIS environment for the assessment of hazard scenarios (such as risk of collision of man-vehicle, river flooding, tsunami flooding, glacier melting, ...) or for the optimised management of the territory and its resources (territorial accessibility in mountain environment for tourism or missing persons search, site selection of offshore marine fish farm, the realistic planning of GNSS satellite visibility);</li> <li>▪ monitoring, analysis and prediction of rain-induced landslide phenomena by integrating data from smart sensor networks and dedicated modelling in GIS environment also in real time;</li> <li>▪ GNSS Meteorology, by means of a GIS procedure for the integration of GNSS and environmental data, to support the interpretation and now-casting of significant meteorological events;</li> <li>▪ satellite and aerial image processing to identify sea turbidity or reconstruct bathymetry.</li> </ul>

- Research skills**
- Excellent knowledge of traditional and innovative geomatic instrumentation, including spirit level, total station, GNSS receiver, laser scanner, drone for photogrammetric survey, owned by Geomatic Lab.
  - Expert in GIS (Geographic Information System), GeoDataBase and satellite image processing.
  - Use of smart sensor networks for environmental monitoring, also in real time, automatically and with "self-adaptive" features both in terms of spatial-temporal resolution and precision.
  - Development of automatic systems to store observed data, to feed models and analyse phenomena in GIS environment, becoming decision support systems (DSS) for both management and prevention of natural hazards, including for the assessment of susceptibility to landslides triggered by rainfall.

- Training skills**
- Teacher (currently and in the past years) of the following Bachelor or Master courses: "Geomatics for monitoring", "Geomatics applied to constructions", "Numerical cartography and GIS", "Operative GIS tools", "Electronic Cartography", "Electronic Navigation", "Navigation".
  - Teacher of "Positioning" at the Second level Master in Marine Geomatics for Hydrography.
  - Teacher of PhD courses on "Geospatial data and their processing in GIS", on "Satellite and aerial images: automatic processing and analysis" and on "Processing tools and techniques for Digital Elevation Models and extraction of parameters for flood hazard analysis".

- Technology Transfer skills**
- She is involved in technology transfer and cultural dissemination in Geomatics, including experiential activities aimed to raise the population awareness of the metric knowledge of the territory and the built environment.
  - In 2010 she promoted the activation of the university spin-off Gter LTD Innovation in Geomatics, GNSS and GIS, of which she is a member and scientific supervisor.
  - Co-author of an Italian and European patent on: System and method for monitoring a territory

- Management skills**
- Responsible for Teaching and Research Laboratory Activities (RADRL) in the Geodesy, Geomatics and GIS Laboratory of the University of Genoa since 2019.
  - Scientific coordinator for the University of Genoa of several EU and ITA projects.
  - Scientific supervisor of the GNSS positioning service of Regione Liguria.

- Academic career**
- Since 2017 member of the Peer Commission for Didactic Quality Assessment of the Polytechnic School
  - Since 2019 member of the Faculty Committee of the PhD programme in Civil, Chemical and Environmental Engineering; currently tutor of 2 PhD students.
  - Since 2020 member of the Quality Assessment Committee of the Maritime Science and Technology Course Council.
  - Since 2021 member of CLOE - Training to complexity: multidisciplinary approaches to rural and mountain sustainable development and conservation, PhD programme funded under the H2020-MSCA-COFUND-2020 scheme; currently tutor of 1 PhD student.
  - Since 2023 member of the board of the Association of University Researchers in Topography and Cartography (AUTeC).
  - Since November 2023 coordinator of the Fluid dynamic and Environmental engineering curriculum of the PhD school in Civil, Chemical and Environmental Engineering at the University of Genoa.

- Geographic Free Open Source Software and Open Geo Data**
- Promote the use of open geo data and free and open source geospatial software, through the Italian Association for Free Geographic Information GFOSS.it; she is a member of the Directive Board.
  - Co-chair of the international conference FOSS4G 2022, the 16th annual conference of the Open Source Geospatial Foundation (OSGeo), the non-profit organization that promotes the collaborative development of free and open source geographic technologies and open geospatial data.
  - Organiser of the Italian GRASS GIS Users Meeting in 2007 and 2013, the Italian OSMit2010 conference and several Italian FOSS4G conferences since 2017, of which she was member of the scientific committees.

## PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s) English C1-level (self-assessment); French A2-level (self-assessment)

## PUBLICATIONS

## Bibliometric indicators

- Web of Science: 34 papers, 346 citations, H-index 9;
- Scopus: 49 papers, 538 citations, H-index 12;

## Publications

Relevant publications of the last 10 years:

- Bernardis M, Nardini R, Apicella L, Demarte M, Guideri M, Federici B, Quarati A, De Martino M. Use of ICESat-2 and Sentinel-2 Open Data for the Derivation of Bathymetry in Shallow Waters: Case Studies in Sardinia and in the Venice Lagoon. *Remote Sensing*. 2023; 15(11):2944. <https://doi.org/10.3390/rs15112944>.
- Apicella L, De Martino M, Ferrando I, Quarati A, Federici B. Deriving Coastal Shallow Bathymetry from Sentinel 2-, Aircraft- and UAV-Derived Orthophotos: A Case Study in Ligurian Marinas. *Journal of Marine Science and Engineering*. 2023; 11(3):671. <https://doi.org/10.3390/jmse11030671>
- Magri, S., Ottaviani, E., Prampolini, E., Besio, G., Fabiano, B., Federici, B. Application of machine learning techniques to derive sea water turbidity from Sentinel-2 imagery. *Remote Sensing Applications: Society and Environment*, 2023, 30, 100951
- Ferrando, I., Berrino, E., Federici, B., Gagliolo, S., Sguerso, D., PHOTOGRAMMETRIC PROCESSING AND FRUITION OF PRODUCTS IN OPEN-SOURCE ENVIRONMENT APPLIED TO THE CASE STUDY OF THE ARCHAEOLOGICAL PARK OF POMPEII. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives*, 2022, 48(4/W1-2022), pp. 143–149
- Pisanti, A., Magri, S., Ferrando, I., Federici, B., SEA WATER TURBIDITY ANALYSIS FROM SENTINEL-2 IMAGES: ATMOSPHERIC CORRECTION AND BANDS CORRELATION. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives*, 2022, 48(4/W1-2022), pp. 371–378
- Viaggio, S., Iacopino, A., Bovolenta, R., Federici, B. LANDSLIDE SUSCEPTIBILITY ASSESSMENT: SOIL MOISTURE MONITORING DATA PROCESSED BY AN AUTOMATIC PROCEDURE IN GIS FOR 3D DESCRIPTION OF THE SOIL SHEAR STRENGTH. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives*, 2022, 48(4/W1-2022), pp. 517–523
- Bisi, F., Ferrando, I., Pirlone, F., Federici, B., Soft Mobility in Mountain Areas: Methodological Approach and GIS Analysis for the Fruition of the Forts System in Genoa (Italy). *Communications in Computer and Information Science*, 2022, 1651 CCIS, pp. 448–461
- Gagliolo, S., Federici, B., Ferrando, I., Passoni, D., Sguerso, D., 2022. Methodological report on emergency surveys for Cultural Heritage, in print on ASITA Proceedings in Springer "Communications in Computer and Information Science Series – CCIS"
- Botto, M., Federici, B., Ferrando, I., Gagliolo, S., Sguerso, D., 2022. Innovations in geomatics teaching during the COVID-19 emergency. DOI:10.1007/s12518-022-00416-4. pp.1-14. In *APPLIED GEOMATICS* - ISSN:1866-9298
- Ferrando I., Brandolini P., Federici B., Lucarelli A., Sguerso D., Morelli D., Corradi N., 2021. Coastal Modification in Relation to Sea Storm Effects: Application of 3D Remote Sensing Survey in Sanremo Marina (Liguria, NW Italy). DOI:10.3390/w13081040. pp.1-19. *WATER* - ISSN:2073-4441 vol. 13
- Vaccaro, D., Ferrando, I., Federici, B., 2021. Melting of italian glaciers: analysis of the phenomenon in GIS environment. pp.10-18. In *GEAM. GEOINGEGNERIA AMBIENTALE E MINERARIA* - ISSN:1121-9041 vol. 162
- Bovolenta R., Iacopino A., Passalacqua R., Federici B., 2020. Field Measurements of Soil Water Content at Shallow Depths for Landslide Monitoring. DOI:10.3390/geosciences10100409. pp.409-435. In *GEOSCIENCES* - ISSN:2076-3263 vol. 10
- Benvenuto, L., Ferrando, I., Federici, B., Sguerso, D., 2020. The GNSS for Meteorology (G4M) Procedure and Its Application to Four Significant Weather Events. DOI:10.1007/1345\_2020\_111. pp.1-9. In *International Association of Geodesy Symposia* - ISBN:978-3-030-54267-2. In *INTERNATIONAL ASSOCIATION OF GEODESY SYMPOSIA* - ISSN:0939-9585
- Bovolenta, R., Passalacqua, R., Federici, B., Sguerso, D., 2019. Monitoring of rain-induced landslides for the territory protection: the AD-VITAM project. In *Lecture Notes in Civil Engineering*, ISSN:2366-2557, vol. 40, pp. 138-147, DOI:10.1007/978-3-030-21359-6\_15
- Federici B., Corradi N., Ferrando I., Sguerso D., Lucarelli A., Guida S., Brandolini P., 2019. Remote sensing techniques applied to geomorphological mapping of rocky coast: the case study of Gallinara Island (Western Liguria, Italy). *EUROPEAN JOURNAL OF REMOTE SENSING*, Volume 52, Issue sup4, 18 December 2019, Pages 123-136, DOI: 10.1080/22797254.2019.1686957
- Gagliolo, S., Passoni, D., Federici, B., Ferrando, I., Sguerso, D., 2019. U.ph.o and mago: Two useful instruments in support of photogrammetric uav survey. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives* Volume 42, Issue 2/W13, 4 June 2019, Pages 289-296 4th ISPRS Geospatial Week 2019; Enschede; Netherlands; 10 June

2019 through 14 June 2019; Code 148406

- Ferrando I., Federici B., Sguerso D., 2018. 2D PWV monitoring of a wide and orographically complex area with a low dense GNSS network. In *EARTH, PLANETS AND SPACE*, pp. 1-21, <https://doi.org/10.1186/s40623-018-0824-6> <http://rdcu.be/KAge>
- Gagliolo S., Fagandini R., Passoni D., Federici B., Ferrando I., Pagliari D., Pinto L., Sguerso D., 2018. Parameter optimization for creating reliable photogrammetric models in emergency scenarios. *APPLIED GEOMATICS*, 10(4), pp. 501-514, Springer Berlin Heidelberg, ISSN 1866-9298, <https://doi.org/10.1007/s12518-018-0224-4>
- Bovolenta R., Federici B., Berardi R., Passalacqua R., Marzocchi R., Sguerso D., 2017. Geomatics in support of geotechnics in landslide forecasting, analysis and slope stabilization. In *GEAM - Geoingegneria Ambientale e Mineraria*, Anno LIV, n. 2, pp. 57-62, agosto 2017.
- Ferrando I., Federici B., Sguerso D., 2017. Zenith total delay interpolation to support GNSS monitoring of potential precipitations. *GEAM -Geoingegneria Ambientale e Mineraria*, Anno LIV, n. 2, pp. 85-90, agosto 2017.
- Marzocchi R., Leotta M., Federici B., Delzanno G., 2017. The NARVALO project: real time collision avoidance system in a GIS environment based on precise GNSS positioning. *GEAM - Geoingegneria Ambientale e Mineraria*, Anno LIV, n. 2, pp. 33-38, agosto 2017.
- Fagandini R., Federici B., Ferrando I., Gagliolo S., Pagliari D., Passoni D., Pinto L., Rossi L., Sguerso D., 2017. Evaluation of the Laser Response of Leica Nova MultiStation MS60 for 3D Modelling and Structural Monitoring. In: Gervasi O. et al. (eds) *Computational Science and Its Applications – ICCSA 2017*. ICCSA 2017. Lecture Notes in Computer Science, vol 10407. Springer, Cham
- Ciolli M., Federici B., Ferrando I., Marzocchi R., Sguerso D., Tattoni C., Vitti A., Zatelli P., 2017. FOSS tools and Applications for Education in Geospatial Sciences, *ISPRS Int. J. Geo-Inf.* 2017, vol 6(7), article n.225, pp. 1-16; doi:10.3390/ijgi6070225 PDF: <http://www.mdpi.com:8080/2220-9964/6/7/225/pdf>
- Federici B., Bovolenta R., Passalacqua R., 2015. From rainfall to slope instability: an automatic GIS procedure for susceptibility analyses over wide areas. In *GEOMATICS, NATURAL HAZARDS AND RISK*, Volume 6, Special Issue 5-7, Publisher: Taylor and Francis Ltd., ISSN: 1947-5705, DOI: 10.1080/19475705.2013.877087, pp. 454-472. Published online: 30 Jan 2014
- Dapuzeto G., Massa F., Costa S., Cimoli L., Olivari E., Chiantore M., Federici B., Povero P., 2015. A spatial multi-criteria evaluation for site selection of offshore marine fish farm in the Ligurian Sea, Italy. *OCEAN & COASTAL MANAGEMENT*, Elsevier Ltd, ISSN 0964-5691, Vol. 116, pp. 64-77
- Marzocchi R., Federici B., Cannata M., Cosso T., Syriou A., 2014. Comparison of one-dimensional and two-dimensional GRASS GIS models for flood mapping, *APPLIED GEOMATICS*, Volume 6, Issue 4, pp 245-254, DOI: 10.1007/s12518-014-0140-1, ed. Springer Verlag, ISSN: 1866-9298
- Federici B., Giacomelli D., Sguerso D., Vitti A., Zatelli P., 2013. A Web Processing Service for GNSS realistic planning. *APPLIED GEOMATICS*, vol. 5, p. 45-57, ISSN: 1866-9298, doi: 10.1007/s12518-011-0058-9.

Genoa, 7<sup>th</sup> March 2024