

PERSONAL PROFILE

The main focus of my research for more than twelve years has been 1) solving very hard image/shape reconstruction and data-inversion problems, 2) solving these problems using complex datasets collected from a multitude of non-invasive sensors, and 3) solving these problems using advanced computational techniques. My expertise spans Physics, Geophysics, signal processing, inversion, computer programming, computer sciences, Machine Learning and Deep Learning. My most significant contributions have been made in my research in the development of Geophysical algorithms for modeling and inversion applied to seismic signals (acoustic/elastic propagation) in solids and electromagnetic signals (air/solid propagation). Additionally, I have also investigated remote sensing techniques, such as radar-based shape reconstruction, Synthetic Aperture Radar (SAR) and I have employed (and published) machine learning and deep learning techniques for medical imaging. The result of this work has been 21 publications in refereed journals, almost 40 conference contributions, and two state-of-the-art software packages I've developed that have been cited 67 times and are currently being used by 40 groups all across the world. I am a passionate researcher who enjoys collaborating with other researchers through the full spectrum of innovation, going from ideas conceived on the whiteboard, to publication, to working software tools and prototypes. Finally, I am passionate about teaching and have gone out of my way to create several opportunities to do so despite not being formally required in any of my research oriented job positions thus far. I gained teaching experience at both undergraduate and graduate level, mentored students, at different levels, during the preparation of their graduation exams and even co-authored a textbook on Applied Geophysics as part of this endeavor.

Relevant Professional Skills

Physics and Engineering: Signal analysis, Computational Modeling, Inversion, Algorithms engineering and implementation

Geophysical methods: HVSR, SASW, MASW, ReMi, ESAC, ERT, GPR, P-wave tomography, Seismic Reflection, FWI

Programming: C/C++, Matlab, Python, Fortran, Basic, Tcl/Tk, LabVIEW, Bash

Computational Mechanic: Finite Element Method (FEM), Boundary element Method (BEM), Spectral Finite Elements (Spec-FEM), Finite Difference Method (FDM)

Additional techniques: Active Contours, Level set Method, Machine Learning and Deep Learning

Languages Italian, English.

Scopus: 55152395400

WOS ResearcherID: M-3147-2015

ORCID: 0000-0002-5970-6265

URL: www.samuelbignardi.com/

URL: <https://www.unich.it/ugov/person/460187>

Education

M. Sc.	in Physics, Obtained in 2006 <i>University of Ferrara (Italy)</i> Evaluation: 105/110
Ph.D.	Earth Sciences. Obtained in 2011 <i>University of Ferrara (Italy)</i> Title: Complete waveform inversion approach to seismic surface waves and adjoint active surfaces Evaluation: Excellent
2019	The "24CFU" teacher training. One-year mandatory course required for Italian teachers, comprising: pedagogy and inclusion in didactic environments; psychology; anthropology; teaching methodologies

Professional qualifications

2020 | May 14. **National Scientific Qualification (ASN)**
Discipline 04/A4: **Geophysics** Role: Associate Professor. Valid through: 2029.
Scientific qualification (art.16 of the law 30 Dec. 2010, n.240) granted to scholars holding the requisites to function as associate or full professor in Italian Universities
<https://abilitazione.miur.it/public/index.php?lang=engz>

Work Experience

2023 | September 2023 - Present. **Associate Professor of Applied Geophysics**
University of Chieti and Pescara "A. D'Annunzio" (Italy).
National classification 04/GEOS04-B, former 04/A4 - GEO11

2017 | May 2017 - June 2023. **RESEARCH ENGINEER II**
Georgia Institute of Technology (USA). Dep. of Electrical and Computer Engineering (ECE)
Geometric PDE methods (i.e. active surfaces and level set methods) and their use in connection with radar signals for remote sensing, shape reconstruction and reflectivity analysis.
Standard Occupation Classification:
* Remote Sensing Scientists and Technologists, January 2020 - June 2023.
* Computer and Information Research Scientist, May 2017 - December 2019.

2016 | October 2016 - April 2017. **Postdoctoral Researcher**
University of Ferrara (Italy). Dept. of Physics and Earth Sciences
Development of numerical methods and algorithms for the two- and three-dimensional modeling and inversion of surface waves

2014 | September 2014 – July 2016. **Postdoctoral Researcher**
University of Ferrara (Italy). Dept. of Physics and Earth Sciences (Italy)
Development of numerical methods and algorithms for the two- and three-dimensional modeling and inversion of surface waves

2014 | March 2014 – August 2014. **POST DOCTORAL FELLOW**
Georgia Institute of Technology (USA). Joint position: Dept. of Electrical and Computer Engineering (ECE) & Dept. of Civil and Environmental Engineering (CEE)
Boundary Element Method Adjoint-based Active Surfaces for Next-Generation Surface Wave Testing

2011 | February 2011 – February 2014. **Postdoctoral Researcher**
University of Ferrara (Italy). Dept. of Physics and Earth Sciences
Development of numerical methods and algorithms for the two- and three-dimensional modeling and inversion of surface waves

2010 | January 2010 - July 2010. **RESEARCH SCHOLAR (visiting)**
Georgia Institute of Technology (USA). Dept. of Civil and Environmental Engineering (CEE)

2009 | March 2009 - August 2009. **SHORT-TERM SCHOLAR (visiting)**
Georgia Institute of Technology (USA). Dept. of Civil and Environmental Engineering (CEE)

2008 | January, 2008 – December 2010. **Ph. D. student**
University of Ferrara (Italy). Dept. of Physics and Earth Sciences
Corso di Dottorato in Scienze della Terra

2007 | May 2007 – October 2007. **Research fellowship for Ms. graduates in Physics**
University of Ferrara (Italy) Joint position: Department of Earth Sciences and Department of computer Sciences (Italy) University of Ferrara (Italy).
Development of elaboration algorithms of electric and acoustic tomography for the Hydro-Geology

Consulting activity

2017 | November 18-30.
Activity: Unconventional data processing surface waves at a test site.
Client: Futura in Research Consortium (Ferrara, Italy)

2016 | August 2016 – September 2016.
Activity: Construction of subsurface models for the production of seismic shaking scenarios in the area of the upper Ferrarese.
Client: Future in Research Consortium (Ferrara, Italy)

Scientific Software Created

OpenHVSr-Processing-Toolkit (Matlab) **Published as open-source** Signal processing, and visualization, toolkit for microtremor (HVSr method), evaluation of the signal's directionality, accelerated creation of maps for the seismic microzonation, and investigation of bedrock morphology in the sedimentary context

OpenHVSr-Inversion (Matlab) **Published as open-source** Modeling and inversion of microtremor spectral ratio curves for 2D and 3D subsurface elastic parameters evaluation

DIPL (Matlab) Direct interpretation of surface waves propagation phase lags for (2D and 3D) subsurface characterization of Ryleigh waves velocity.

S3D / S3Di (C++ and QT) Spectral finite element (Galerkin) method-based software for the Full wavefield simulation in geometrically complex solids (Full waveform inversion under development). The software handles propagation in 3D mesh with high degree of geometrical complexity and heterogeneous materials.

OpenSW (Matlab) Laterally constrained Inversion of surface waves dispersion curves (MASW, ReMi) for reconstructing 2D/3D subsurface models.

B2D (Matlab, and C++) Boundary element-based modeling and Full waveform inversion of elastic and acoustic wave propagation in 2D.

PTOMO (Matlab) Huygens principle-based P waves first arrival simulation P-waves simulator. Tomographic inversion under development. Propagation in 3D mesh with high degree of geometrical complexity is included.

OpenSPlaneTEM (Matlab) Modeling and inversion of Transient Electromagnetic (TEM) curves for 2D and 3D characterization of the subsurface electromagnetic parameters.

Patents and Intellectual Property

2018 | **Intellectual property (sole holder)** of the "OpenHVSr - Processing Toolkit" software.
<https://www.github.com/sedysen/OpenHVSr-Processing-Toolkit>
Published as OPEN-SOURCE, License: GNU General Public License v3.0

2016 | **Intellectual property (sole holder)** of the "OpenHVSr - Inversion" software.
<https://www.github.com/sedysen/OpenHVSr-Inversion>
Published as OPEN-SOURCE, License: GNU General Public License v3.0

2014 | **Patent:** Method for the evaluation of the mechanical properties of soil. **S. Bignardi**, F. Fischangher, D. Gualerzi, G. Morelli, A. Occhi, M. Occhi, M. Russo, G. Santarato. Application PD2014A000001(IT) submitted on January 3, 2014. Patent granted on March 29, 2016 with code 0001421631 (UIBM).

Honors and Awards

2022 | Recipient of US green card based on an EB-1 petition: "Employment-based, First Preference workers: Outstanding Professor or Researcher".

2016 | Invited speaker at the 29th Symposium on the Application of Geophysics to Engineering and Environmental Problems (SAGEEP 2016). March 20-24, Denver CO, USA
Section: The best of the Near Surface 2015

2015 | Best paper at "Near Surface Geoscience 2015 - 21st European Meeting of Environmental and Engineering Geophysics". September 6-10. Turin (Italy).

Publications

Books

- 2015 | Lectures of applied Geophysics (In Italian)
G. Santarato, N. Abu Zeid, **S. Bignardi**. Editor: libreriauniversitaria.it ISBN:8862926405













Journal Articles (✉ Corresponding Author)









- 2022 ✉ | **S. Bignardi**, R. Sandhu, A. J. Yezzi. (2022). *Radar-Based Shape and Reflectivity Reconstruction Using Active Surfaces and the Level Set Method*. **IEEE Transactions on Pattern Analysis and Machine Intelligence**. DOI:10.1109/TPAMI.2022.3178969
Scopus:2-s2.0-85131758075 WOS:–
- 2021 ✉ | **S. Bignardi**, A. J. Yezzi, A. Yildirim, C. F. Barnes, R. Sandhu. (2021). *A Feasibility Study of Radar-Based Shape and Reflectivity Reconstruction Using Variational Methods*. **Inverse Problems**. Vol. 37 (2), Article number 025004 DOI:10.1088/1361-6420/abd299
Scopus:2-s2.0-85100589342 WOS:000610055200001
- 2021 | S. Maghami, A. Sohrabi-Bidar, **S. Bignardi**, A. Zarean, M. Kamalian. (2021). *Extracting the Shear Wave Velocity Structure of Deep Alluviums of “Qom” Basin (Iran) Employing HVSR Inversion of Microtremor Recordings*. **Journal of Applied Geophysics**. Vol. 185, Article number 104246 DOI:10.1016/j.jappgeo.2020.104246
Scopus:2-s2.0-85099862850 WOS:000637337800002
- 2020 | M.R. Gallipoli, T.A. Stabile, G. Massolino, M. Mucciarelli, N. Abu Zeid, L. Chiauzzi, **S. Bignardi**, A. Rebez. (2020). *Structural health monitoring of the Ferrara University building by ambient vibration tests and earthquake recordings before the 2012 Emilia (Italy) earthquake, after the damage and after the damage repair intervention*. **Structural Health Monitoring**. Vol. 19 (3), pp 838-853. DOI:10.1177/1475921719866439
Scopus:2-s2.0-85071145894 WOS:000532399100010
- 2020 | A. Comelli, **S. Bignardi**, A. Stefano, G. Russo, M. G. Sabini, M. Ippolito, A. Yezzi. (2020). *Development of a new fully three-dimensional methodology for tumours delineation in functional images*. **Computers in Biology and Medicine**. Vol. 120, May 2020, 103701 DOI:10.1016/j.combiomed.2020.103701
Scopus:2-s2.0-85081755872
- 2020 | A. Stefano, M. Gioè, G. Russo, S. Palmucci, S. E. Torrisi, **S. Bignardi**, A. Basile, A. Comelli, V. Benfante, G. Sambataro, D. Falsaperla, A.G. Torcitto, M. Attanasio, A. Yezzi, C. Vancheri. (2020). *Performance of Radiomics Features in the Quantification of Idiopathic Pulmonary Fibrosis from HRCT*. **Diagnostics (MDPI)** 2020, 10 (5) DOI: 10.3390/diagnostics10050306
Scopus:2-s2.0-85084826257 WOS:000541022500010
- 2019 | N. Abu Zeid, **S. Bignardi**, G. Santarato. (2019). *Expeditious seismic methods for noninvasive diagnostics of the dynamic characteristics of the subsoil in urban centers using Rayleigh waves: The case of the city of Ferrara. (in Italian)* **Bollettino di Geofisica Teorica ed Applicata**. Vol. 60, pp s61-s67
Scopus:2-s2.0-85089273431
- 2019 | N. Abu Zeid, **S. Bignardi**, P. Russo, M. Peresani. (2019). *Deep in a Paleolithic archive: Integrated geophysical investigations and laser-scanner reconstruction at Fumane Cave, Italy*. **Journal of Archaeological Science: Reports**. Vol. 27, Oct. 2019, 101976 DOI:10.1016/j.jasrep.2019.101976
Scopus:2-s2.0-85070828474 WOS:000498920800041
- 2019 ✉ | A. Mantovani, N. Abu Zeid, **S. Bignardi**, G. Tarabusi, G. Santarato, R. Caputo. (2019). *Seismic noise-based strategies for emphasizing the recent tectonic activity of blind thrusts: the case of the Ferrara Arc, Northern Italy*. **Pure and Applied Geophysics**, Vol. 176 (6), pp 2321–2347. DOI:10.1007/s00024-019-02120-8
Scopus:2-s2.0-85067605649 WOS:000472228900006
- 2019 | A. Comelli, A. Stefano, **S. Bignardi**, G. Russo, M. G. Sabini, M. Ippolito, S. Barone, A. Yezzi. (2019). *Active Contour Algorithm with Discriminant Analysis for Delineating Tumors in Positron Emission Tomography*. **Artificial Intelligence in Medicine**, Vol. 94, pp. 67-78. DOI:10.1016/j.artmed.2019.01.002.
Scopus:2-s2.0-85060845265 WOS:000462694600006












- 2019 A. Comelli, A. Stefano, G. Russo, **S. Bignardi**, M. G. Sabini, G. Petrucci, M. Ippolito, A. Yezzi. (2019). *K-Nearest Neighbor driving Active Contours to Delineate Biological Tumor Volumes*. **Engineering Applications of Artificial Intelligence**, Vol. 81, pp. 133-144. DOI:10.1016/j.engappai.2019.02.005. Scopus:2-s2.0-85062149434 WOS:000468721700011
- 2018 A. Comelli, A. Stefano, G. Russo, M. G. Sabini, M. Ippolito, **S. Bignardi**, G. Petrucci, A. Yezzi. (2018). *A Smart and Operator Independent System to delineate the Biological Tumor Volume*. **Computers in Biology and Medicine**, Vol. 102, pp. 1-15. DOI:10.1016/j.compbimed.2018.09.002. Scopus:2-s2.0-85053215870 WOS:000449892200001
- 2018 ☒ **S. Bignardi**, A. Yezzi, S. Fiussello, A. Comelli. (2018). *OpenHVSr - Processing Toolkit: Enhanced HVSr processing of distributed microtremor measurements and spatial variation of their informative content*. **Computers & Geosciences**, Vol. 120, pp. 10-20. DOI:10.1016/j.cageo.2018.07.006. Scopus:2-s2.0-85050984805 WOS:000447577900002
- 2017 ☒ **S. Bignardi**. (2017). *The uncertainty of estimating the thickness of soft sediments with the HVSr method: A computational point of view on weak lateral variations*. **Journal of Applied Geophysics**, Vol. 145C, pp. 28-38. DOI:10.1016/j.jappgeo.2017.07.017. Scopus:2-s2.0-85026922763 WOS:000412251800004
- 2017 N. Abu Zeid, E. Corradini, **S. Bignardi**, V. Nizzo, G. Santarato. (2017). *The passive seismic technique "HVSr" as a reconnaissance tool for mapping paleo-soils: the case of the Pilastris archaeological site, Northern Italy*. **Archaeological Prospection** DOI:10.1002/arp.1568. Scopus:2-s2.0-85011955327 WOS:000409863300005
- 2016 V. Y. Hallbauer-Zadorozhnaya, G. Santarato, N. Abu Zeid, **S. Bignardi**. (2016). *A non-linear induced polarization effect on transient electromagnetic soundings*. **Journal of Applied Geophysics**, Vol. 133, pp. 16-24. DOI:10.1016/j.jappgeo.2016.07.014. Scopus:2-s2.0-84979955535 WOS:000383937300003
- 2016 ☒ **S. Bignardi**, N. Abu Zeid, A. Mantovani. (2016). *OpenHVSr: Imaging the subsurface 2D/3D elastic properties through multiple HVSr modeling and inversion*. **Computers & Geosciences**, Vol. 93, pp. 103-113. DOI:10.1016/j.cageo.2016.05.009. Scopus:2-s2.0-84969664329 WOS:000379561600012
- 2014 N. Abu Zeid, A. Afattato, L. Baradello, **S. Bignardi**, D. Nieto Yabar, G. Santarato. (2014). *High resolution shallow geophysical methods for the investigation of the liquefaction phenomena: case study of the ML 5.9 May 20th, 2012 Emilia earthquake (Italy)*. **Annals of the University of Ferrara**, Section: Earth Sciences, Vol. 2(1), pp. 1-11.
- 2013 ☒ **S. Bignardi**, F. Fedele, G. Santarato, A. J. Yezzi, G. J. Rix. (2013). *Surface waves in laterally heterogeneous media*. **Journal of engineering mechanics**, Vol. 139 (9), pp. 1158-1165. DOI:10.1061/(ASCE)EM.1943-7889.0000566. Scopus:2-s2.0-84883208685 WOS:000325214400002
- 2012 N. Abu Zeid, **S. Bignardi**, R. Caputo, G. Santarato, M. Stefani. (2012). *Electrical Resistivity Tomography investigation on co-seismic liquefaction and fracturing at San Carlo, Ferrara Province, Italy*. **Annals of Geophysics**, Vol. 55, pp. 713-716. DOI:10.4401/ag-6149. Scopus:2-s2.0-84868106454 WOS:000311455400027
- 2012 ☒ **S. Bignardi**, F. Fedele, A. Yezzi, G. Rix, G. Santarato. (2012). *Geometric Seismic-Wave Inversion by the Boundary Element Method*. **Bulletin of the Seismological Society of America**, Vol. 102, pp. 802-811. DOI:10.1785/0120110091. Scopus:2-s2.0-84859129749 WOS:000302071800026












Conferences (S Speaker I International)

- 2024 I **ISC07 2024**
S. Amoroso, C. Comina, L. Minarelli, K. M. Rollins, **S. Bignardi**, F. Vagnon, F. Di Buccio. (2024). *Combined use of CPTU-SDMT and geophysical test to assess liquefaction: case studies in Emilia-Romagna (Italy)* Proceedings of the 7th International Conference on Geotechnical and Geophysical Site Characterization, 18 - 21 June 2024, Barcelona, Spain.

- 2024   **ESC 2024**
S. Bignardi, N. Florio, D. Attolico D, L. Grosso L, D. Bruno, A. Valerio, D. Milella, G. Vessia. (2024). *Valorisation of archive HVSR data for seismic microzonation studies*. Proceedings of the 39th General assembly of the European Seismological Commission22 - 27 September 2024, Corfu, Greece.
- 2022   **ICIAP 2022**
S. Bignardi, A.Y. Yezzi, N. Dahiya, A. Comelli, A. Stefano., M. Piccinelli, E. Garcia. (2022). *Combining Convolutional Neural Networks and Anatomical Shape-Based priors for Cardiac Segmentation*. Workshop AIRCAD 2022, in conjunction with the 21st International Conference on Image Analysis and Processing. Proceedings in: Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) May 2022, Lecce, IT. DOI:10.1007/978-3-031-13321-3_37 Scopus:2-s2.0-85135801397 WOS:000870468300037
- 2022  **ICIAP 2022**
Cairone, V. Benfante, **S. Bignardi**, F. Marinozzi, A. Yezzi, B. Tuttolomondo, P. Salvaggio, F. Bini, A. Comelli (2022). *Robustness of Radiomics Features to Varying Segmentation Algorithms in Magnetic Resonance Images*. Workshop AIRCAD 2022, in conjunction with the 21st International Conference on Image Analysis and Processing. Proceedings in: Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) May 2022, Lecce, IT. DOI: 10.1007/978-3-031-13321-3_41 Scopus:2-s2.0-85135865840 WOS:000870468300041
- 2020  **ICPR 2020**
N. Dahiya, Y. Fan, **S. Bignardi**, R. Sandhu, A. Yezzi. (2020). *Independently Coupled Principal Component Analysis for Bivariate Inversion Problems*. Proceedings of the 25th International Conference on Pattern Recognition. Article number 9413305, pp. 10592-10599. January 10-15, Milan, IT. DOI:10.1109/ICPR48806.2021.9413305 Scopus:2-s2.0-85110554163 WOS:000681331403015
- 2020  **ICPR 2020**
Y. Fan, N. Dahiya, **S. Bignardi**, R. Sandhu, A. Yezzi. (2020). *Directionally Paired Principal Component Analysis for Bivariate Estimation Problems*. Proceedings of the 25th International Conference on Pattern Recognition. Article number 9412245, pp. 10180-10187. January 10-15, Milan, IT. DOI:10.1109/ICPR48806.2021.9412245 Scopus:2-s2.0-85110522786 WOS:000681331402091
- 2019   **SAGEEP 2019**
S. Bignardi, A. Mantovani, N. Abu Zeid, R. Caputo, G., A. Yezzi. (2019). *Emphasizing the recent tectonic activity of blind thrusts using natural seismic noise: the case of the Ferrara Arc*. Proceedings of the 32nd Symposium on the Application of Geophysics to Engineering and Environmental Problems. March 17-21, Portland, Oregon, USA. DOI:10.4133/sageep.32-039 Scopus:2-s2.0-85070832982
- 2019   **SAGEEP 2019**
S. Bignardi, A. Mantovani, D. Rapti, S. Valkaniotis, R. Caputo, A. Yezzi. (2019). *Mapping and investigating directional effects through analysis of microtremors: the case of palaeo-Piniada valley, central Greece*. Proceedings of the 32nd Symposium on the Application of Geophysics to Engineering and Environmental Problems. March 17-21, Portland, Oregon, USA. DOI:10.4133/sageep.32-040 Scopus:2-s2.0-85070806796
- 2019  **MIUA 2019**
A. Comelli, A. Stefano, **S. Bignardi**, C. Coronello, G. Russo, M. G. Sabini, M. Ippolito, A. Yezzi. (2019). *Tissue Classification to Support Local Active Delineation of Brain Tumors*. Proceedings of the 23rd Conference on Medical Image Understanding and Analysis. July 24-26, Liverpool, UK. Published in: Communications in Computer and Information Science, Vol. 1065 CCIS, 2020, pp 3-14 DOI:10.1007/978-3-030-39343-4_1 Scopus:2-s2.0-85079100937 WOS:000769651500001

- 2019  **EANM 2019**
P. Alongi, A. Stefano, A. Comelli, **S. Bignardi**, M. Sabini, A. Yezzi, M. Ippolito, G. Russo. (2019). *A Machine Learning Segmentation Approach For The Extraction Of Radiomic Features In PET Studies*. Proceedings of the 32nd Annual Congress of the European Association of Nuclear Medicine (EANM). October 12-16, Barcelona, SPAIN. Published in: *European Journal Of Nuclear Medicine And Molecular Imaging*, Vol. 46 (1), pp S764-S764 WOS:000492444407055
- 2018  **AGU 2018**
S. Bignardi, A. J. Yezzi. (2018). *OpenHVSR: Processing Toolkit and Inversion; Two Computer Programs engineered for the complete workflow of the Horizontal-to-Vertical Spectral Ratio (HVSR) Method and for the Investigation of Lateral Variation of the Informative Content of Data*. AGU Fall meeting, section: A tour of open-source software packages for the geosciences. December 10-14, Washington D.C., USA.
- 2018  **16ECEE**
M. R. Gallipoli, T. A. Stabile, G. Massolino, N. Abu Zeid, L. Chiauzzi, **S. Bignardi**, A. Rebez, M. Mucciarelli. (2018). *Ambient Vibration Tests on a Building Before and After the 2012 Emilia (Italy) Earthquake, and After Seismic Retrofitting*. Proceedings of the 16th European Conference on Earthquake Engineering. June 18-21, Thessaloniki, Greece.
- 2018  **SAGEEP 2018**
S. Bignardi, A. Yezzi, S. Fiussello. (2018). *Free and improved computer codes for HVSR processing and inversions*. Proceedings of the 31st Symposium on the Application of Geophysics to Engineering and Environmental Problems. March 25-29, Nashville, Tennessee, USA. DOI:10.4133/sageep.31-024 Scopus:2-s2.0-85048396173
- 2018
N. Abu Zeid, M. Obradović, **S. Bignardi**, M. Bolognesi, A. Furini, P. Russo, G. Santarato, M. Peresani. (2018). *Deep into a Paleolithic archive. Results from an integrated 3D geophysical and topographic survey at Fumane Cave. (Italy) (In Italian)*. Annals online of the University of Ferrara, Museologic Scientific and Naturalistic section, Vol. 13, pp. 50-52. DOI:10.15160/1824-2707/1508
- 2017  **SEG 2017**
S. Bignardi, N. Abu Zeid, E. Corradini, G. Santarato. (2017). *The HVSR technique from array data, speeding up mapping of paleo-surfaces and buried remains. The case of the Bronze-Age site of Pilastrì (Italy)*. International Exposition and 87th Annual Meeting. September 24-29, Houston, Texas, USA. Technical Program Expanded Abstracts 2017: pp. 5119-5124. DOI: 10.1190/segam2017-17746745.1 Scopus:2-s2.0-85037156825
- 2017  **SEG 2017**
N. Abu Zeid, **S. Bignardi**, G. Santarato, M. Peresani. (2017). *Exploring the paleolithic cave of Fumane (Italy): Geophysical methods as planning tool for archaeology*. International Exposition and 87th Annual Meeting. September 24-29, Houston, Texas, USA. Technical Program Expanded Abstracts 2017: pp. 5125-5129. DOI: 10.1190/segam2017-17729320.1 Scopus:2-s2.0-85039973322
- 2017  **EGU 2017**
N. Abu Zeid, L. Dall'Olio, **S. Bignardi**, G. Santarato. (2017). *Past, present and future improvements of the efficiency of the local seismic network of the geothermal reservoir of Casaglia, Ferrara (North Italy)*. 19th General Assembly, 23-28 April, Vienna, Austria. Proceedings, pp.19172
- 2017
GNGTS 2017
G. Massolino, M. R. Gallipoli, T. A. Stabile, N. Abu Zeid, L. Chiauzzi, **S. Bignardi**, A. Rebez, M. Mucciarelli. (2017). *Ambient seismic noise and Earthquake records at a building of the Ferrara University, before and after the 2012 Emilia seismic sequence. (In Italian)* Proceedings of the 36th National Conference. National Institute of Oceanography and Experimental Geophysics, November 16-17, Trieste, Italy.
- 2016  **EAGE 2016**
N. Abu Zeid, E. Corradini, **S. Bignardi**, N. Morandi, V. Nizzo, G. Santarato. (2016). *Unusual Geophysical Techniques in Archaeology-HVSR and Induced Polarization, A Case History*. Proceedings of the 22nd European Meeting of Environmental and Engineering Geophysics; Near Surface Geoscience 2016, September 4-8, Barcelona, Spain. DOI:10.3997/2214-4609.201602027 Scopus:2-s2.0-85007385376

- 2016   **SAGEEP 2016 (Relatore invitato)**
S. Bignardi. (2016). *Near foundation soil stiffening evaluation after resins injection by a novel 3d interpretation of surface waves data.* Proceedings of the 29st Symposium on the Application of Geophysics to Engineering and Environmental Problems, section :“The Best of Near Surface 2015”. March 20-24, Denver, Colorado, USA.
- 2015 **NGGTS 2015**
A. Mantovani, N. Abu Zeid, **S. Bignardi**, G. Santarato. (2015). *A geophysical transect across the central sector of the Ferrara arc: passive seismic investigations - part II.* Proceedings of the 34th National Conference, pp. 114-120. National Institute of Oceanography and Experimental Geophysics. November 17-19, Trieste, Italy. DOI:10.13140/RG.2.1.3213.7687
- 2015  **NGGTS 2015**
S. Bignardi, N. Abu Zeid, G. Santarato. (2015). *Direct interpretation of surface waves for 2-D and 3-D subsurface imaging.* Proceedings of the 34th National Conference. National Institute of Oceanography and Experimental Geophysics, pp. 82-88. November 17-19, Trieste, Italy). DOI: 10.13140/RG.2.1.1182.1527
- 2015   **SEG 2015**
S. Bignardi, N. Abu Zeid, G. Santarato. (2015). *Direct interpretation of phase lags of MASW data: An example for evaluation of jet grouting for soil stiffening enhancement against soil liquefaction.* *Technical Program Expanded Abstracts 2015: pp. 2218-2223.* International Exposition and 85th Annual Meeting, 18-23 November novembre 18-23 New Orleans, Louisiana, USA. DOI: 10.1190/segam2015-5925998.1. Scopus:2-s2.0-84978035595
- 2015   **EAGE 2015**
S. Bignardi, N. Abu Zeid, M. D'Attoli, G. Morelli, M. Occhi, M. Russo, G. Santarato. (2015). *Near foundation soil stiffening evaluation after resins injection by a novel 3D interpretation of surface waves data* Near Surface Geoscience 2015 - 21st European Meeting of Environmental and Engineering Geophysics. September 6-10, Turin, Italy. DOI: 10.3997/2214-4609.201413799. Scopus:2-s2.0-84958087603
- 2015  **EAGE 2015**
M. Obradović, N. Abu Zeid, **S. Bignardi**, M. Bolognesi, P. Russo M. Peresani, G. Santarato. (2015). *High Resolution Geophysical and Topographical Surveys for the Characterization of Fumane Cave Pre-historic Site, Italy.* Near Surface Geoscience 2015 - 21st European Meeting of Environmental and Engineering Geophysics. September 6-10, Turin, Italy. DOI: 10.3997/2214-4609.201413676. Scopus:2-s2.0-84958057231
- 2015  **EAGE 2015**
V. Zadorozhnaya, N. Abu Zeid, **S. Bignardi**, L. Maré, R. Mantsa e G. Santarato. (2015). *Observed Linear and Non-linear IP Effects - A Summary of Joint Italy-South Africa Bilateral Projects 2007-2014.* Near Surface Geoscience 2015 - 21st European Meeting of Environmental and Engineering Geophysics. September 6-10, Turin, Italy. DOI: 10.3997/2214-4609.201413778. Scopus:2-s2.0-84958068893
- 2014 **NGGTS 2014**
N. Abu Zeid, **S. Bignardi**, R. Caputo, A. Mantovani, G. Tarabusi, G. Santarato. (2014). *Shear-wave velocity profiles across the Ferrara arc: a contribution for assessing the recent activity of blind tectonic structures.* 33th National Conference. National Institute of Oceanography and Experimental Geophysics, November 25-27, Bologna, Italy.
- 2014 **NGGTS 2014**
V. Hallbauer-Zadorozhnaya, G. Santarato, N. Abu Zeid, **S. Bignardi**. (2014). *Membrane polarization by constrictivity of pores: its effects on DC and TEM geo-electromagnetic measurements.* Proceedings of the 33th National Conference, Vol. 3, pp. 158-165. National Institute of Oceanography and Experimental Geophysics, November 25-27, Bologna, Italy.
- 2014   **EAGE 2014**
S. Bignardi, G. Santarato, N. Abu Zeid. (2014). *Thickness Variations in Layered Subsurface Models - Effects on Simulated MASW.* 76th Conference & Exhibition, Experience the Energy. June 16-19, Amsterdam, Netherlands. DOI:10.3997/2214-4609.20140540 Scopus:2-s2.0-84907371221

- 2014  V. Zadorozhnaya, N. Abu Zeid, G. Santarato, **S. Bignardi**. (2014). *New shape of TEM: membrane polarization, mechanism and possible interpretation*. Proceedings of the 3rd International Workshop on Induced Polarization. April 6-9, Ile d'Oléron, France.
- 2013 **NGGTS 2013**
N. Abu Zeid, F. Albertin, **S. Bignardi**, G. Santarato. (2013). *Preliminary HVSR analysis in the historical center of Ferrara, North Italy*. Proceedings of the 32th National Conference, Vol. 2, pp. 167-172. National Institute of Oceanography and Experimental Geophysics. November 19-21, Trieste, Italy.
- 2013 N. Abu-Zeid, F. Albertin, **S. Bignardi**, L. dall'Olio, G. Santarato. (2013). *Subsurface geophysical reconstruction of the Casaglia urban area*. Conference at the "Polo Scientifico-Tecnologico", July 14, University of Ferrara, Italy.
- 2013 N. Abu-Zeid, F. Albertin, **S. Bignardi**, G. Santarato, A. Zecchi. (2013). *Subsurface geophysical reconstruction of the northern Ferrara*. Conference at the "Polo Scientifico-Tecnologico", July 14, University of Ferrara, Italy.
- 2012  **AGE 2012**
N. Abu Zeid, **S. Bignardi**, G. Santarato, R. Caputo. (2012). *Geophysical characterization of co-seismic fractures due to liquefaction: case study following the ml 5.9 magnitude earthquake that hit the Emilia on May 20, 2012*. 7th AGE. Applied Geophysics for Environment and Territorial System Engineering. October 10-12, Iglesias, Cagliari, Italy. Proceedings Vol. 1, pp. 1-6.
- 2012   **AGE 2012**
S. Bignardi, N. Abu Zeid, G. Santarato, R. Caputo. (2012). *Lateral heterogeneity effects on Rayleigh wave dispersion: Investigation on numerically simulated MASW frameworks*. 7th AGE. Applied Geophysics for Environment and Territorial System Engineering. October 10-12, Iglesias, Cagliari, Italy.
- 2012  **AIAR 2012**
S. Bignardi, N. Abu Zeid, G. Santarato. (2012). *Non-destructive investigations for characterization of historical walls: the case of the left wall of the 1500a. Cloister of the Certosa of Bologna*. Proceedings of the 7th Congress of the Italian Association of Archaeometry, pp. 702-713. February 22-24, Bologna, Italy.
- 2012  **NGGTS 2012**
S. Bignardi, N. Abu Zeid, G. Santarato. (2012). *Lateral heterogeneity effects on Rayleigh wave dispersion: Investigation on numerically simulated MASW frameworks*. Proceedings of the 31th National Conference, Sezione 3: Geofisica Applicata, pp. 11-17. National Institute of Oceanography and Experimental Geophysics. November 20-22, Potenza, Italy.
- 2012   **Geo-Congress 2012**
S. Bignardi, F. Fedele, A. J. Yezzi, G. J. Rix, G. Santarato. (2012). *Two-dimensional Seismic Wave Modeling and Inversion by the Boundary Element Method*. American Society of Civil Engineers. March 25-29, Oakland, California, USA. Proceedings, Vol. 225, pp. 2796-2805. DOI:10.1061/9780784412121.286Scopus:2-s2.0-84888318268
- 2011  **NGGTS 2011**
S. Bignardi, F. Fedele, G. Santarato. (2011). *Two-Dimensional seismic wave modeling and inversion using the boundary element method*. Proceedings of the 30th National Conference, pp. 466-469. National Institute of Oceanography and Experimental Geophysics, November 14-17. Trieste, Italy.
- 2011  **AGE 2011**
N. Abu Zeid, **S. Bignardi**, G. Santarato, R. Caputo. (2011). *On Possible ambiguity of Vs30 estimation by means of spectral analysis of Love and Rayleigh waves*. 6th AGE. Applied Geophysics for Environment and Territorial System Engineering. 28-30 April, Iglesias, Cagliari, Italy.
- 2010  **EGU 2010**
S. Bignardi, R. Caputo, L. Minarelli, N. Abu-Zeid, G. Santarato. (2010). *Late Quaternary activity along the Ferrara thrust inferred from stratigraphic architecture and geophysical surveys*. **EGU General assembly**. May 2-7, Vienna, Austria. Geophysical Research Abstracts. Vol. 12, pp. 13138-13138.

SEMINARS

- 2019 | January 25: **(Invited speaker) Georgia Institute of Technology**, School of Earth and Atmospheric Sciences. Atlanta, Georgia, USA. Geophysics and Planetary seminars.
Title: An overview of geophysical methods for the near surface characterization, with special focus on active and passive surface waves in presence of lateral heterogeneity.
- 2018 | December 5: **(Invited speaker) Western University**, Department of Earth Sciences, London, CANADA.
Title: Integrated geophysical methods as low cost and efficient investigation tool at different scales.
- 2018 | November 29: **(Invited speaker) Ottawa-Carleton Geoscience Center (OCGC) in conjunction with the Geological Survey of Canada's Logan Club (NRCAN)**, Ottawa, CANADA. Geoscience Seminar Series.
Title: Integrated geophysical methods as low cost and efficient investigation tool at different scales (Part 1). The Horizontal to Vertical Spectral Ratio technique (HVSr): status of the art, limitations, exploring its true potential (Part 2).
- 2017 | September 29: **(Invited speaker) Georgia institute of Technology, Atlanta, USA**. CSIP/CeGP Seminar series.
Title: Non-invasive investigation techniques: The contribution of geophysics to engineering.
- 2009 | September 9: **(Invited speaker) Georgia institute of Technology**, Atlanta, Georgia, USA. Geotechnical Seminars series.
Title: Surface Wave Dispersion in Laterally Heterogeneous Media.

FACULTY SERVICES

- 2020 | **Invited doctoral committee member.** University of Kiel (Christian-Albrechts-Universität zu Kiel), Kiel, Germany. October 5, 2020
- 2012-15 | **Representative of research fellows in the department council.** University of Ferrara, Department of Physics and Earth Science.

TEACHING

Classes

- 2024 | **Instructor: (Doctoral program) University of Chieti and Pescara "G. d'Annunzio"**. Course: Geophysical Methods and their Applications to Geology, Environment and Cultural Heritage.
- 2024 | **Instructor: (Graduate program) University of Chieti and Pescara "G. d'Annunzio"**. Course: Integration and Analysis of Geological and Geophysical Data (in Italian).
- 2023-24 to date | **Instructor: (Graduate program) University of Chieti and Pescara "G. d'Annunzio"**. Course: Applied Geophysics (in Italian).
- 2023-24 to date | **Instructor: (Graduate program) University of Chieti and Pescara "G. d'Annunzio"** International Course: Geophysical Exploration of the Solar System. (in English)
- 2023 | **Instructor: (Undergraduate program) Georgia Institute of Technology, Atlanta, Georgia (USA). Course ECE3084: "Signals and Systems"** (including Fourier and Laplace Transforms). Spring semester, 2023.
- 2021 | **Instructor: (Graduate program) Georgia Institute of Technology, Atlanta, Georgia (USA). Course ECE6560: "Advanced Computer Vision & Image Processing using PDEs and Active Contours"**, Spring 2021, January - May 2021.
- 2017 | **Professional upgrading course: Beyond the Vs30 for seismic microzonation -the combined use of active and passive seismic.** Organized by IND.A.G.O. snc. (Italy)
- 2016-17 | **Instructor: (Graduate program): Support to the class activity for the course of Applied Geophysics.** Theory and field application of geophysical methods. University of Ferrara (Italy).
- 2015-16 | **Instructor: (Graduate program): Support to the class activity for the course of Applied Geophysics.** Theory and field application of geophysical methods. University of Ferrara (Italy).
- 2013-14 | **Instructor: (Graduate program): Support to the class activity for the course of Applied Geophysics.** Theory and field application of geophysical methods. University of Ferrara (Italy).

2012-13	Instructor: (Graduate program): Support to the class activity for the course of Applied Geophysics. Theory and field application of geophysical methods. University of Ferrara (Italy).
2007	Teacher of Math, High School level. "Istituto di Istruzione Superiore C.Colombo", Via S. Francesco 33, 45011 Adria (RO), Italy.

Students Mentoring

2017 Thesis co-advisor for M.S. degree (official)

Master Degree program in Geological Sciences, Georesources and Territory. University of Ferrara (Italy).
Title: Contributing to the seismic subsurface characterization in the urban area of Ferrara (Italy) (In italian).

2016 Thesis co-advisor for M.S. degree (official)

Master Degree program in Geological Sciences, University of Ferrara (Italy).
Title: The contribution of innovating geophysical methodologies for the reconstruction of the geological subsurface model for seismic induced liquefaction risk assessment: the case of the Crevalcore town hall (Bologna, Italy) (In italian).

2015 M.S. Thesis supervision and scientific counseling

Master Degree program in Geology, University of Ferrara (Italy), in collaboration with ENI.
Title: The Ferrara-Casaglia Ridge: seismo-stratigraphic interpretation and reconstruction of the 3D subsurface model in the structural framework of the north-eastern Ferrara arc (In italian).

2015 Scientific counseling

Doctoral program in sciences and technologies for archaeology and cultural heritage. University of Ferrara (Italy).
Title: Interdisciplinary three-dimensional investigation of the Early Prehistoric deposits of Fumane Cave (Verona, Italy)

2015 M.S. Thesis supervision and scientific counseling

Master Degree program in quaternary, prehistory and archaeology. University of Ferrara (Italy).
Title: New, direct and indirect insight on the "terramare" archaeological site of Pilastri (Bondeno, Ferrara, Italy) (In italian).

2011 M.S. Thesis supervision and scientific counseling

Bachelor Degree program in technologies for cultural heritage, University of Ferrara (Italy).
Title: Electric resistivity tomography on the left wall of the 1500 c.a. Cloister of the historical cemetery of Bologna (In italian).

2011 M.S. Thesis supervision and scientific counseling

Bachelor Degree program in technologies for cultural heritage, University of Ferrara (Italy).
Title: Acoustic and GPR investigations on the left wall of the 1500 c.a. Cloister of the historical cemetery of Bologna (In italian).

PARTICIPATION IN RESEARCH PROJECTS

2022 (USA) Co-Principal Investigator. Independent Research and Development program (IRAD), the Georgia Tech Research Institute (GTRI). Project n. DE00021522: Partial Differential Equation (PDE) Active Surfaces Applied to Radar and Sonar Volumetric Imaging.

2022 (USA) Army Research Office (ARO). New Enabling Uses of Variational Active Surfaces and PDE's for 3D Sensor Fusion and Constrained Optimal Transport. Funding Approved, project n. not available. One of two co-authors. Included as "Research Personnel"

2020-2021 (USA) U.S. Air Force Office of Scientific Research (AFOSR). Grant FA9550-18-1-0130: Interactive Feedback Control for 2D/3D Autonomous Systems.

2020-2021 (USA) National Science Foundation (NSF). Grant ECCS-1749937: Network Geometry for Analyzing Dynamical Systems.

2018-2019 (USA) Army Research Office (ARO). Grant W911NF-18-1-0281: Extending Accelerated Optimization into the PDE Framework. Included as "Senior Personnel"

2017-2019 (USA) National Science Foundation (NSF). Grant NSF-2106 DHO: Geometric, Variational Algorithms for Radiometric-Based Shape Reconstruction.

2015-2017 (ITALY) Italian Government (MIUR) sponsored Project for Smart Cities and Communities: CLARA - CLOUD pLATFORM and smart underground imaging for natural Risk Assessment. url: <http://www.smartcities-clara.eu/>

2014-2017 (ITALY – SOUTH AFRICA) Joint International Project, Italia-South Africa: Estimating key hydrological properties through acquisition and modeling of electrical parameters. Project number M01488, Ministry of Foreign Affairs of Italy.

2014-2015 (ITALY) INGV-DPC, Project S1: Base-knowledge improvement for assessing the seismogenic potential of Italy. url: <https://sites.google.com/site/ingvdpcprojects1>

2012-2013 (ITALY) INGV-DPC, Project S1: Base-knowledge improvement for assessing the seismogenic potential of Italy. (Deliverable: D15.b2)
url: <https://sites.google.com/site/ingvdpcprojects1>

2012-2013 International project: Integrated study for the historic village of Apice Vecchia. Part of Unit 2: Preliminary geological analyses

EDITORIAL ACTIVITY

Conference organization (🌐 International relevance)

- 2024 🌐 **ESC2024: Session organizer and Principal Convener:** SESSION 38: Geophysical testing and modelling of seismic site effects in complex geomorphological environments. Within the 39th General assembly of the European Seismological Commission. 22 - 27 September 2024, Corfu, Greece
- 2022 🌐 **AIRCAD Workshop (within ICIAP 2021):** Technical Program Committee member in the 1st International Workshop on Artificial Intelligence and Radiomics in Computer-Aided Diagnosis (AIRCAD 2022), held in conjunction with the 21st International Conference on Image Analysis and Processing (ICIAP 2021). May 2022, Lecce, Italy.
- 2019 🌐 **AGU Fall Meeting.** Fall Meeting Program Committee member for the conference “American Geophysical Union (AGU) Fall Meeting 2019 e AGU’s Centennial”, December 9-13, 2019. San Francisco, California (USA).

Reviewer Activity

IEEE - Transactions on Geoscience and Remote Sensing
AGU/WILEY - Journal of Geophysical Research: Solid Earth
SSA - Seismological Research Letters
WILEY - Near Surface Geophysics
SPRINGER NATURE - Bulletin of Earthquake Engineering
SPRINGER NATURE - Mathematical Geosciences
SPRINGER NATURE - Surveys in Geophysics
OXFORD UNIV. PRESS - Journal of Geophysics and Engineering
OXFORD UNIV. PRESS - Geophysical Journal International
ELSEVIER - Journal of Applied Geophysics
ELSEVIER - Engineering Geology
ELSEVIER - Transportation Geotechnics
ELSEVIER - Journal of Archaeological Science: Reports
ELSEVIER - EBioMedicine
MDPI - Geosciences
IOP - Measurement Science and Technology

Memberships

AGU - American Geophysical Union. url: <https://www.agu.org/>

SEG - Society of Exploration Geophysicists. url: <https://seg.org/>

EEGS - Environmental and Engineering Geophysical Society. (2018-21) url: <https://www.eegs.org/>

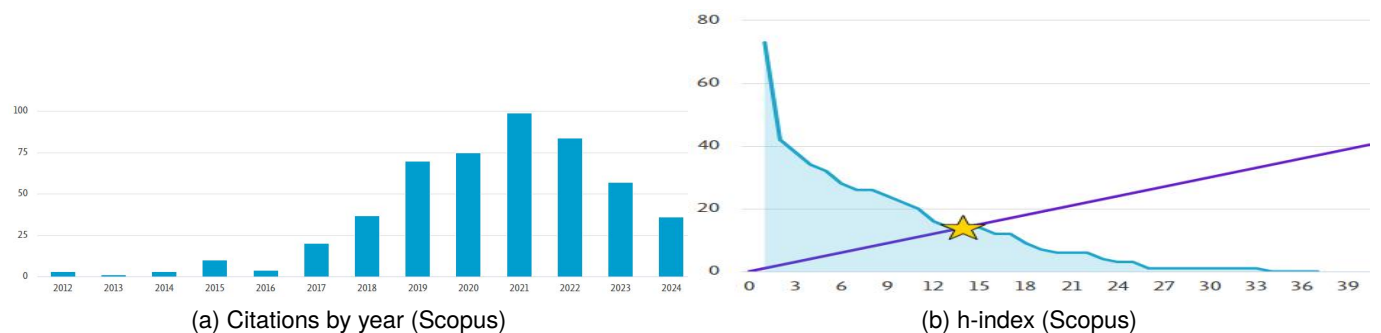
CRUST-Interuniversity Center for 3D Seismotectonics with territorial applications (Italy). Qualification: Applied Geophysicist. url: <https://www.crust.unich.it>

UDA-TechLab Research Center, University "G. d'Annunzio" of Chieti and Pescara. url: <https://www.unich.it/udatechlab>

LCCV-Laboratory of Computational Computer Vision: Dept. of Electrical and Computer Engineering (ECE), Georgia Institute of Technology, USA.

METRICS (14 maggio 2024)

	Documents	Citations	h-index	i10-index
Google Scholar		664	16	18
Scopus	37	499	14	



Date: May 14, 2024

Samuel Bignardi