

LUCA PERUZZO - CURRICULUM VITAE AND PUBLICATIONS

Personal Information

Name Luca
Surname Peruzzo
Date of Birth 1989
Nationality Italian



Work Experience

Mar 2023 - Today **Researcher at University of Padova**
Padova - Italy
dept. Geosciences

Expertise Areas Applied geophysics and petrophysics. Soil-plant-atmosphere continuum in agricultural and natural environments. Environmental geochemistry.

May 2022 - Mar 2023 **Geophysicist and Sales Manager at MoHo - Science and Technology**
Venice - Italy

Expertise Areas Applied geophysics and earthquake engineering.

Oct 2019 - May 2022 **Postdoc at Berkeley National Laboratory**
Berkeley - California - USA
dept. of Earth and Environmental Sciences

Expertise Areas Soil-plant-atmosphere continuum in agricultural and watershed environments. Laboratory experiments, field campaigns, and numerical modeling for root phenotyping and evapotranspiration. Hydrogeophysical characterization of geological barriers for nuclear waste confinement. Acquisition, analysis, and synthesis of geophysical, meteorological, and agricultural data.

Projects EcoSENSE - SMARTSoils Testbed
<https://storymaps.arcgis.com/stories/b7fd8402e76e40c89c7e37b301f8d9f7>
<https://smartsoils.lbl.gov>
Watershed Function - Scientific Focus Area
<https://watershed.lbl.gov/>
ARPA-E, Imaging and Modeling Toolbox for Roots
Engineered Barrier System - HotBent
Biogeophysics for Climate Resilient Viticulture

May 2017 - Oct 2019	Grad Student Assistant and Affiliate at Lawrence Berkeley National Laboratory <i>dept. Earth and Environmental Sciences</i>
Expertise Areas	Soil quality and agricultural practices in the cultivation of grapevines, wheat, and maize. Conduct geochemical and geophysical experiments in the laboratory and field. Process and analyze the experimental data. Perform geochemical speciation and surface-complexation modeling. Perform geophysical forward and inverse modeling.
May - Sep 2015	Geophysicist at Studiosisma Vicenza, Italy
Expertise Areas	Geophysics in civil engineering and hydrogeology.

Education

2019	Co-Tutelage PhD in Environmental Geophysics
Oct 2015 - May 2017	University Bordeaux Montaigne <i>dept. Environnement, Géoressources et Ingénierie du Développement durable</i>
May 2017 - Oct 2018	Berkeley National Laboratory <i>dept. Earth and Environmental Sciences</i>
Scholarship	IDEX - Initiative D'EXcellence University of Bordeaux
Subjects	Geophysics, environmental geochemistry, and agroecology
Thesis	Geoelectrical approaches for characterizing soil geochemical processes and soil-root interactions
Supervisors	Prof. Susan Hubbard and Prof. Myriam Schmutz
Committee	Prof. Andrew Binley, Prof. Andreas Kemna, Prof. Muriel Llubes and PhD Yuxin Wu
Invited Guests	Prof. Michel Franceschi and Prof. Giorgio Cassiani
2015	M.S. Geology and Technical Geology cum Laude
	University of Padua, 110/110
Subjects	Applied geology: hydrogeology, environmental geochemistry, geophysics, and geological engineering
Thesis	Combined geophysical surveys for the characterization of a reconstructed river embankment
Supervisor	Prof. Giorgio Cassiani
2012	B.S. Earth Sciences
	University of Padua, 100/110
Subjects	Fundamental sciences, geology, and applied geology
Thesis	Minero-petrographic characterization of sulfide mineralizations in the Boccassuolo ophiolite (Northern Apennines, Italy)
Supervisor	Prof. Paolo Nimis

Teaching

- 2023/24 - Today **Petrophysics** - Convenor
Master in Geophysics for Natural Risks and Resources
dept. of Geosciences
University of Padova
- 2024/25 - Today **Environmental Geophysics** - Lecturer
Master in Environmental Engineering
dept. of Civil, Environmental and Architectural Engineering
University of Padova
- 2024/25 - Today **Applied Geophysics** - Lecturer
Master in Land And Environment Science And Technology
dept. of Agricultural Sciences and Veterinary Medicine
University of Padova

Publications in International Refereed Journals

1. Gu H., Wang Y., **Peruzzo L.**, Li B., Lu Y., and Liu X. (2025). Linking winter wheat (*Triticum aestivum* L) root traits and root water uptake with electrical resistivity tomography. *Agricultural Water Management*. <https://doi.org/10.1016/j.agwat.2024.109247>.
2. Aulenta F., Tucci M., Cruz Viggi C., Milia S., Hosseini S., Farru G., Sethi R., Bianco C., Tosco T., Ioannidis M., Zanaroli G., Ruffo R., Santoro C., Marzocchi U., Cassiani G., and **Peruzzo L.** (2025). Groundwater Electro-Bioremediation via Diffuse Electro-Conductive Zones: A Critical Review. *Environmental Science and Ecotechnology*. <https://doi.org/10.1016/j.ese.2024.100516>.
3. **Peruzzo L.**, Chou C., Hubbard S.S., Brodie E., Uhlemann S., Dafflon B., Wielandt S., Mary M., Cassiani G., Morales A., and Wu Y. (2024). Outdoor Mesoscale Fabricated Ecosystems: Rationale, Design, and Application to Evapotranspiration. *Science of the Total Environment*. <https://doi.org/10.1016/j.scitotenv.2024.177565>.
4. Carrera A., **Peruzzo L.**, Longo M., Cassiani G., and Morari F. (2024). Uncovering soil compaction: performance of electrical and electromagnetic geophysical methods. *SOIL*. <https://doi.org/10.5194/soil-10-843-2024>.
5. Pavoni M., Boaga J., **Peruzzo L.**, Barone I., Mary B., and Cassiani G. (2024). Characterization of a Contaminated Site Using Hydro-Geophysical Methods: From Large-Scale ERT Surface Investigations to Detailed ERT and GPR Cross-Hole Monitoring. *Water*. <https://doi.org/10.3390/w16091280>.
6. Uhlemann S., **Peruzzo L.**, Chou C., Williams H. K., Wielandt S., Falco N., Wu Y., Carr B., Meldrum P., Chambers J., and Dafflon B. (2024). Bedrock and vegetation gradients modulate subsurface water flow dynamics of a mountainous hillslope. *Water Resources Research*. <https://doi.org/10.1029/2023WR036137>.
7. Mary B., Ivàn V., Meggio F., **Peruzzo L.**, Blanchy G., Chou C., Ruperti B., Wu Y., and Cassiani G. (2023). Imaging of the active root current pathway under partial root-zone drying stress: A laboratory study for *Vitis vinifera*. *Biogeosciences*. <https://doi.org/10.5194/bg-20-4625-2023>.

8. Chou C., **Peruzzo L.**, Falco N., Hao, Z., Mary B., Wang J., and Wu Y. (2023). Improving Evapotranspiration Computation with Electrical Resistivity Tomography in a Maize Field. *Vadose Zone Journal*. <https://doi.org/10.1002/vzj2.20290>.
9. Mary B., **Peruzzo L.**, Wu Y., and Cassiani G. (2022). Advanced Potential Field Analysis Applied to Mise-à-la-Masse Surveys for Leakage Detection. *Journal of Geophysical Research: Solid Earth*. <https://doi.org/10.1029/2022JB024747>.
10. Chang C., Borglin S., Chou C., Kneafsey T., Wu Y., Zheng L., Nakagawa S., Xu H., **Peruzzo L.**, and Jens B. (2021). Experimental Study of Coupled THMC Processes in Bentonite Buffer for Geologic Disposal of Radioactive Waste. 55th U.S. Rock Mechanics/Geomechanics Symposium. *American Rock Mechanics Association* <https://onepetro.org/ARMAUSRMS/proceedings-abstract/ARMA21/All-ARMA21/ARMA-2021-1772/468142>.
11. Mary B., **Peruzzo L.**, Ivàn V., Facca E., Manoli G., Putti M., Camporese M., Wu Y., and Cassiani G. (2021). Combining Models of Root-Zone Hydrology and Geoelectrical Measurements: Recent Advances and Future Prospects. *Frontiers in Water*. <https://doi.org/10.3389/frwa.2021.767910>.
12. **Peruzzo L.**, Liu X., Chou C., Blancaflor B.E., Zhao H., Ma X., Mary B., Ivàn V., Weigand M., and Wu Y. (2021). Three-Channel Bioimpedance Spectroscopy for Field-Scale Root Phenotyping. *The Plant Phenome Journal*. <https://doi.org/10.1002/ppj2.20021>.
13. Hubbard S.S., Schmutz M., Balde A., Falco N., **Peruzzo L.**, Dafflon B., Léger E, Wu Y. (2021). Estimation of soil classes and their relationship to grapevine vigor in a Bordeaux vineyard: advancing the practical joint use of electromagnetic induction (EMI) and NDVI datasets for precision viticulture. *Precision Agriculture*. <https://doi.org/10.1007/s11119-021-09788-w>.
14. **Peruzzo L.**, Chou C., Wu Y., Schmutz M., Mary B., Petrov P., Gregory N., Blancaflor B.E., Liu X., and Hubbard S.S. (2020). Imaging of plant current pathways for non-invasive root phenotyping using a newly developed electrical current source density approach. *Plant and Soil Journal*. <http://doi.org/10.1007/s11104-020-04529-w>.
15. Mary B., **Peruzzo L.**, Boaga J., Cenni N., Schmutz M., Wu Y., Hubbard S.S., and Cassiani G. (2020). Time-lapse monitoring of root water uptake using electrical resistivity tomography and mise-à-la-masse: a vineyard infiltration experiment. *Soil Journal*. <https://doi.org/10.5194/soil-6-95-2020>.
16. Wu Y. and **Peruzzo L.** (2020). Effects of salinity and pH on the spectral induced polarization signals of graphite particles. *Geophysical Journal International*. <https://doi.org/10.1093/gji/ggaa087>.
17. **Peruzzo L.**, Schmutz M., Franceschi M., Wu Y., and Hubbard S.S. (2018). The relative importance of saturated silica sand interfacial and pore fluid geochemistry on the spectral induced polarization response. *Journal of Geophysical Research: Biogeosciences*. <https://doi.org/10.1029/2017JG004364>.
18. Mary B., **Peruzzo L.**, Boaga J., Schmutz M., Wu Y., Hubbard S.S., and Cassiani G. (2018). Small-scale characterization of vine plant root water uptake via 3-D electrical resistivity tomography and mise-à-la-masse method. *Hydrology and Earth System Sciences*. <https://doi.org/10.5194/hess-22-5427-2018>.

19. Busato L., Boaga J., **Peruzzo L.**, Himi M., Cola S., Bersan S., and Cassiani G. (2016). Combined geophysical surveys for the characterization of a reconstructed river embankment. *Engineering Geology*. <https://doi.org/10.1016/j.enggeo.2016.06.023>.
20. Cassiani G., Boaga J., Busato L., **Peruzzo L.**, Himi M., and Casas A., (2016). Combined geophysical surveys for the characterization of a reconstructed river embankment. 22nd European Meeting of Environmental and Engineering Geophysics, Barcelona. *Near Surface Geoscience*. <https://doi.org/10.3997/2214-4609.201602071>.

Scientific Reviewer for

1. Geoderma
2. Water Resources Research
3. Soil
4. Engineering Geology
5. Groundwater
6. Scientific Reports
7. Vadose Zone Journal
8. Plant Methods
9. Near Surface Geophysics
10. Geophysics Journal International
11. Archives of Agronomy and Soil Sciences
12. IEEE Transactions on Geoscience and Remote Sensing
13. AGU Journal of Geophysical Research: Biogeosciences
14. Frontiers in Water
15. AGU Book Proposals

Academic Service Roles

Oct 2024 - Feb 2026 Representative for the PNRR - RETURN task 2.5.2: Complements for multiple hazard scenarios from other vertical Spokes. Development of multi-risk scenarios in synergy with the program spokes for predisposing, hydrometeorologic, and triggering factors.

Feb - Jul 2024 Member of the commission for the definition and evaluation of the requirements of the Cascade Funding within the PNRR - RETURN program, multi-risk science for resilient communities under a changing climate.

Conference Talks and Posters

1. Codici per il trattamento di dati elettrici ed elettromagnetici. **Peruzzo L.** Open-Geo: il software libero per la geofisica e la geologia. XXI Workshop di Geofisica | Tra geologia e geofisica. Museo di Scienze e Archeologia di Rovereto. December 2024.
2. Non-seismic geophysical methods. **Peruzzo L.** Summer School - Mass movements under climate change: characterization and monitoring. University of Padova, September 2024.
3. ERT characterization of treated water pathways from large infiltration trenches in unsaturated fractured/karstified calcarenite. **Peruzzo L.**, De Carlo L., Caputo M.C., and Cassiani G. Joint Congress of Società Geologica Italiana and Società Italiana di Mineralogia e Petrologia. Geology for a sustainable management of our Planet. Bari, 2024.
4. EMI and ERT characterization of plant-scale irrigation and ET: an orange orchard-case study and methodological challenges. **Peruzzo L.**, Werban U., Pohle M., Cassiani G., Consoli S., and Vanella D. Joint Congress of Società Geologica Italiana and Società Italiana di Mineralogia e Petrologia. Geology for a sustainable management of our Planet. Bari, 2024.
5. Soil compaction signatures on electromagnetic and DC-current geophysics. Carrera A., **Peruzzo L.**, Cassiani G., and Morari F. European Geosciences Union (EGU) General Assembly 2024.
6. Non-invasive monitoring of plant root activities in the framework of the Earth's Critical Zone and soil-plant-atmosphere interactions. Cassiani G., **Peruzzo L.**, Censini M., Mary B., and Veronika Ivàn. European Geosciences Union (EGU) General Assembly 2024.
7. Accumulation of water and sediments upstream of Tuscan check dams. Preti F., Pini S., Cassiani G., Dani A., Giambastiani Y., **Peruzzo L.**, and Piemontese L. European Geosciences Union (EGU) General Assembly 2024.
8. Combined DAS and seismic nodes acquisition for shallow geophysics purposes around the Scrovegni Chapel in Padua, Italy Nesterova O., Barone I., Pavoni M., Karbala Ali H., Deiana R., Cassiani G., Brovelli A., Rodríguez Tribaldos V., Galtarossa A., Schenato L., Palmieri L., **Peruzzo L.**, and Boaga J. European Geosciences Union (EGU) General Assembly 2024.
9. Identification of long-term irrigation effect on plant water use from geophysical and proximal sensing observations: example of a vineyard. **Peruzzo L.**, Mary B., Burchard Levine V., Guerra J. Herrezuelo M., Lovera R., Casas A., Cassiani G., Nieto H., and Pena J. European Geosciences Union (EGU) General Assembly 2024.
10. Integrated model-data observation of water flow dynamics across bedrock and vegetation variations of a mountainous hillslope. Uhlemann S., **Peruzzo L.**, Chambers J., Dafflon B., Chou C., Williams H. K., Wielandt S., Wang C., Falco N., Wu Y., Carr B., and Meldrum P. European Geosciences Union (EGU) General Assembly 2024.
11. EMI surveys under precision irrigation contexts: an orange orchard-case study and methodological challenges Cassiani G., Werban U., Pohle M., Consoli S., Longo-Minnolo G., Vanella D., and **Peruzzo L.** European Geosciences Union (EGU) General Assembly 2024.
12. 4DERT data assimilation for hydrological modeling in compacted and uncompacted soils Carrera A., Mary B., **Peruzzo L.**, Cassiani G., and Morari F. Aggeo24: Illuminating the subsurface!, ETH Zürich, Switzerland, 2024.

13. Fabricated Ecosystem for ET Validation and Beyond. **Peruzzo L.**, Chou C., Luo L., Kim J., Jardine J.K., Lamb J., Dafflon B., Brodie E., Chakraborty R., Hubbard S., and Wu Y. 2021. American Geophysical Union Fall Meeting, New Orleans, USA (MS).
14. Fine Scale Evapotranspiration Quantification in a Mountainous Watershed. Chou C., Henderson A., Wilmer C., **Peruzzo L.**, Dafflon B., and Wu Y. 2021. American Geophysical Union Fall Meeting, New Orleans, USA (MS).
15. Reconciling Evapotranspiration – Cross Method Synthesis and Uncertainty Quantification at the East River Watershed. Wu Y., Arora B., Berkelhammer M.B., Brodie E., Carroll R.W.H., Chen J., Chou C., Dafflon B., Enquist B.J., Faybishenko B., Gerlein-Safdi C., Gochis D., Henderson A., Kueppers L.M., **Peruzzo L.**, Powell T., Ryken A., Sprenger M., Steltzer H., Tokunaga T.K., Siirila-Woodburn E.R., Xu Z., Williams K.H., Hubbard S.S., and the Watershed SFA Function Team. 2021. American Geophysical Union Fall Meeting, New Orleans, USA (MS).
16. Studying the coupled THMC processes under high temperature in bentonite buffer for geologic disposal of radioactive waste using column tests: real-time monitoring and characterizations after dismantling. Zheng L., Chang C., Borglin S., Chou C., Kneafsey T.J., Wu Y., Nakagawa S., **Peruzzo L.**, and Birkholzer J. 2021. American Geophysical Union Fall Meeting, New Orleans, USA (MS).
17. Development and Assessment of a Quick Subsurface Thermal Characterization Method to Map Soil Thermal and Physical Properties. Lamb J., Wielandt S., McClure P., Uhlemann S., Wang C., **Peruzzo L.**, and Dafflon B. 2021. American Geophysical Union Fall Meeting, New Orleans, USA (MS).
18. Experimental study of coupled THMC processes in bentonite barrier systems for geologic disposal of radioactive waste. Chang C., Borglin S.E., Chou C., Kneafsey T., Wu Y., Zheng L., Nakagawa S., Xu H., **Peruzzo L.**, and Birkholzer J. 2021. 55th US Rock Mechanics/Geomechanics Symposium (ARMA), Houston, Texas, USA.
19. Improving evaporation computation with spatial hydrogeophysical monitoring. Chou C., **Peruzzo L.**, and Wu Y. 2020. 23rd Computational Methods in Water Resources meeting, Stanford, USA (CA).
20. Geophysical monitoring of bentonite response to hydration and heating. Chou C., **Peruzzo L.**, Borglin S., Wu Y., Xu H., and Zheng L. 2020. American Geophysical Union Fall Meeting, San Francisco, USA (CA).
21. Geophysical quantification of hydrological-biogeochemical-ecological interactions across scales: progress and opportunities. Hubbard S.S., Brodie E., Chakraborty R., Chen J., Dafflon B., Falco N., **Peruzzo L.**, Gilbert B., Wainwright H.M., Williams K.H., and Wu Y. 2019. American Geophysical Union Fall Meeting, San Francisco, USA (CA).
22. Highlighting grapevine root activity during a partial root zone drying in rhizotron using geoelectrical methods. Mary B., Meggio F., Blanchy G., Cainelli N., **Peruzzo L.**, Boaga J., Wu Y., Hubbard S.S., Ruperti B., Binley A., and Cassiani G. 2019. American Geophysical Union Fall Meeting, San Francisco, USA (CA).
23. Geophysical monitoring of brine migration in rock salt: results from an in situ heater and tracer experiment at WIPP. Wu Y., Commer M., **Peruzzo L.**, Otto S., Dozier B., Weaver D., Wang J., Rutqvist J., and Birkholzer J. 2019. 21st European Geosciences Union General Assembly, Vienna, Austria.

24. Geoelectrical investigation of root-soil interaction. **Peruzzo L.**, Wu Y., Chunwei C., Riley W., Hao Z., Petrov P., Gregory N., Blancaflor B.E., Ma X., Versteeg R., Dafflon B., Brodie E., Schmutz M., and Hubbard S.S. 2018. Society of Exploration Geophysicists Annual Meeting, Anaheim, USA (CA).
25. The role of small-scale non-invasive monitoring of root systems in the improvement of water use strategies for agriculture. Cassiani G., Boaga J., Vanella D., Consoli S., **Peruzzo L.**, Wu Y., Hubbard S.S., Schmutz M., and Mary B. 2018. Managing Water Scarcity in River Basins, Innovation and Sustainable Development, Agadir, Morocco.
26. Bioelectrical impedance spectroscopy and ERT plant-soil system characterization. **Peruzzo L.**, Chunwei C., Liu X., Petrov P., Gregory N., Blancaflor B.E., Ma X., Schmutz M., Hubbard S.S., and Wu Y. 2018. 5th International Workshop on Induced Polarization, Rutgers Univ. - Newark, USA (NJ).
27. Impact of pore fluid chemistry on the complex conductivity of graphite. Wu Y. and **Peruzzo L.** 2018. 5th International Workshop on Induced Polarization, Rutgers Univ. - Newark, USA (NJ).
28. The use of hydro-geophysical monitoring for the identification of root-water-uptake patterns: ERT and MALM experiments in a vineyard. Mary B., **Peruzzo L.**, Boaga J., Schmutz M., Wu Y., Hubbard S.S., and Cassiani G. 2018. 20th European Geosciences Union General Assembly, Vienna, Austria.
29. Life in the Dark: Roots and how they regulate plant-soil interactions. Wu Y., Chunwei C., **Peruzzo L.**, Riley W.J., Hao Z., Petrov P., Gregory N., Versteeg R., Blancaflor B.E., Ma X., Dafflon B., Brodie E., and Hubbard S.S. 2017. American Geophysical Union Fall Meeting, New Orleans, USA (LA).
30. 3D electrical resistivity tomography and mise-à-la-masse method as tools for the characterization of vine roots. Boaga J., Mary B., **Peruzzo L.**, Schmutz M., Wu Y., Hubbard S.S., and Cassiani G. 2017, American Geophysical Union Fall Meeting, New Orleans, USA (LA).
31. Small scale characterization of vine plant root water uptake via 3D electrical resistivity tomography and mise-à-la-masse method: a case study in a Bordeaux vineyard (France). Mary B., **Peruzzo L.**, Boaga J., Schmutz M., Wu Y., Hubbard S.S., and Cassiani G. 2017. Gruppo Nazionale Della Geofisica Della Terra Solida, National Conference, Trieste, Italy.
32. Spectral induced polarization approaches to characterize reactive transport parameters and processes. Schmutz M., Franceschi M., Revil A., **Peruzzo L.**, Maury T., Vaudelet P., Ghorbani A., and Hubbard S.S. 2017. American Geophysical Union Fall Meeting, New Orleans, USA (LA).
33. Monitoring and modelling of handmade jellified non-polarizing copper sulphate electrodes signal for SIP measurements. Maury T., Schmutz M., **Peruzzo L.**, and Franceschi M. 2017. 19th European Geosciences Union General Assembly, Vienna, Austria.
34. Monitoring the position of a foam front in a 3D pilot. Boeije C., **Peruzzo L.**, Montbrun M., Schmutz M., Bertin H., and Atteia O. 2017. 9th International Conference on Porous Media - Annual Meeting, Rotterdam, The Netherlands.
35. Characterization of copper concentration in sand and clay using SIP measurements. **Peruzzo L.**, Schmutz M., Franceschi M., and Hubbard S.S. 2016. American Geophysical Union Fall Meeting, San Francisco, USA (CA).

36. Evaluation of copper mobility with SIP and geochemical analysis. **Peruzzo L.**, Schmutz M., Franceschi M., and Hubbard S.S. 2016. 4th International Workshop on Induced Polarization, Aarhus, Denmark.
37. Study of a reconstructed river embankment through a combination of non-invasive geophysical methodologies. Busato L., Boaga J., **Peruzzo L.**, Asta G., Cola S., Simonini P., and Cassiani G. 2015. Gruppo Nazionale Della Geofisica Della Terra Solida, National Conference, Trieste, Italy.

Computer Skills

Data Analysis	Python, Rust, SQL, QGIS, C, MATLAB, Web Scraping, ParaView.
Modeling	Gmsh, Geophysical Modeling and Inversion, PHREEQC, PEST, MODFLOW.
Communication	Office/Google Suite, Inkscape, LaTeX, GIT, HTML.
Video Conferencing	Zoom, Skype, OBS- Open Broadcaster Software.

Publicly Released Libraries

[Flintec_lpp](#) Application for logging, processing, and plotting load data from a set of load cells, e.g., lysimeters. The application is written in Rust and targets low-level optimization and long-term stability.

[iCSD](#) Python library for numerical inversion of current source density (iCSD), i.e., locating the current sources from the distribution of the electric potential.

[ERTpm](#) A data pipeline to process, invert, and visualize ERT datasets, with particular focus on time-lapse projects.