

Galgaro Antonio

Assistant Professor

Degree in Geoscience

Phd in Engineering Geology

Prof. Aggr. in Geothermics

- Since 2011 teacher in charge of the course "Geothermics" for the degree in Geological Sciences, University of Padua (Italy)
- Since 2011 person in charge of 3D laboratory of the Dept. of Geoscience-University of Padova, Italy
- Since 2014 member of the International Committee of the Geoscience Dept.
- Since 2006: Assistant Professor
- 2004-2011: teacher in charge of the courses "Applied Geology and Geophysics" and "Environmental monitoring systems" for the degrees in Geological Sciences, Environmental Science (STAM) and Science and technology applied to Cultural Heritage (STBC)
- 2004 - 2014 responsible of the Earth Science Erasmus program of the University of Padua
- Since 2001: researcher in Applied Geophysics at the Dep. of Geosciences - University of Padua
- 1998-2000: PhD in Engineering Geology
- 1990-1998: technician in Geophysics at the Department of Geology, Geophysics and Palaeontology of the University of Padova (Italy)
- 1989-1990: teacher of mathematics and physics at a high school in Padua (Italy)
- 1989: Graduated in Geology – Geophysics at the Department of Geology, Paleontology and Geophysics - University of Padua.

#### **Assignments and committees:**

- Member of European Geothermal Energy Council
- Member of Steering Committee of the European Geothermal Panel – Bruxelles
- Member of the AIGA (Italian Association of Applied and Environmental Geology)
- Member of Italian National Thermo-technical Commission *UNI GL608: National Standard regulation on geothermal plant coupled with heat pump*
- Member of the Scientific Committee of the Center of Geomatics at the University of Padua (Italy)
- Member of the Scientific Committee of the Energy Research Center “Levi Cases”, University of Padua
- Associated Researcher at the National Research Council – Italy, Institute of Geosciences and Earth Resources - UOS of Padua . Geothermal working group (Italy)
- Invited lecturer at the *International School of Geothermics*, Erice 2012 – Italy (Minister of Economy Development – National Institute of Geophysics – National Research Council)
- Invited lecturer AICARR Course “*Geothermal heat pump systems for heating and cooling*”. European Project GROUNDMED 2010-2012,
- Guest lecturer Project Interreg IVC –UE 2010-2011 – Veneto region. “*Climate change adaptation strategies: Geothermal energy for building space heating and cooling*”
- Lecturer at the permanent training course “*Planners of geothermal plants*” DIPTEM, Department of Production Engineering, Thermo-energetic and Mathematical Models, University of Genoa-Italy
- Invited Professor at the Course “*Application of Geophysical exploration to groundwater research*” Asmara 02/2006. State of Eritrea, Ministry of Land Water and Environment (WRD). Participants from Water resource Department, Southern Red Sea Administration, Mines Department, University of Asmara, United Nations, NGO.
- Invited lecturer at del Advance Course of "Mecanica Y Dinamica De Los Flujos Densos", (2004). University of Salta, Argentina

#### **Academic activity:**

- Author of over 120 scientific papers published in national and international journals
- Tutor of over 50 Master and Bachelor degree thesis
- Tutor of over 25 grant and junior research fellowships
- Tutor of 4 Phd's
- Member of the Phd judging commission at the University of Torino and University of Genova (Italy)
- Scientific Coordinator of numerous research projects (total amount of founded projects about Euro 1.500.000 Euro)

- Reviewer of vary International Journals (Geothermics, Journal of Applied Geophysics, Applied Thermal Energy, Sensors, Universal Journal of Geoscience, Energies, Energy and Buildings etc.)
- Invited lecturer-convener in numerous international and national meetings
- Chair at the Italian Geological Society Congress (2014) , Session n. 26. Energy and Earth resources: geology between renewable, sustainable and conventional energy sources

### **Research Projects:**

- Scientific Co-coordinator UE Project 2015-2018 H2020-LCE-2014-2020 *CHEAP-GSHPs “Cheap And Efficient Application Of Reliable Ground Source Heat Exchangers And Pumps”*; and WP leader of University of Padua Unit WP1 *“Geological mapping, climatic data and energy requirements”*.
- Scientific Coordinator of the Project FACE 2015-2018 *“Rational use of groundwater for the purpose of Air conditioning of buildings: preparation of technical tools and scientific mapping support to the authorities and aim to protection of water resources and its sustainable exploitation”*. Founded by Veneto Region (Italy)
- Scientific Coordinator of the Project (2015-2016)-*“Definition of the early warning thresholds of the “Busa del Cristo” landslide phenomenon in the municipality of Perarolo di Cadore (Belluno-Italy) ) ”*, founded by Veneto Region, Dept. of Soil and Forests Defense, Italy.
- Scientific Coordinator of the Padua University Research Project 2014-2016 - prot. CPDA144544, *Hydro-mechanical properties variation due to Thermal stress on Clayey materials*.  
Scientific Coordinator of the Research Project 2014-2015 European founded Project (FSE) Veneto Region (Italy) on the *“Seasonal underground thermal energy storage in solar-assisted geothermal plants”*.
- Coordinator of Project Working package *“Low enthalpy geothermal potential”* National Project *“Vigor – Evaluation Of Geothermal Potential Of South Italy)”* National Research Council – Italian Minister Of Economic Development (2011-2014)
- Scientific Coordinator of the Italian National Research Council Project 2013-2015, founded by Gargano National Natural Park – Italian Ministry of the Environment *“Feasibility analyses of a solar assisted geothermal storage system for the National Gargano Park Head office”*
- Scientific co-coordinator of the Project Geoterm (2015-2016) *“Thermal Energy Storage in Trento province (Italy), voted to map the regional geothermal potential. founded by Energy Agency of Trento province (Italy)*
- Participant to the Padua University Research Unit PRINProject (Research Program of Relevant National Interest- Italy) 2013-2016. *“Dynamics of morphoclimatic Systems in response to global changes and geomorphological risks induced”*
- Scientific Coordinator of the Research project 2014 *“COGET”*: *Geo-mechanical properties changes on clay sediments induced by Borehole heat exchangers (BHE) thermal stress*. Founded by Venice Province (Italy)
- Scientific Coordinator of the Research project 2013 *“GEOTREV”*: *geothermal uses in the Treviso province”, aim to analyze and map the territorial geothermal potential. founded by Treviso Province. (Italy)*
- Coordinator of WP "Laboratory testing" Excellence Project University of Padua-CARIPARO Foundation 2009-2013 "SMILAND" *“Study of precursors of landslides in rock by fiber optic system;*
- Scientific Coordinator of the Research project 2012 *“AGAVE”*: *Analyses of geotechnical effects related to thermal stress on clay sediments of Venice Lagoon area”*. founded by Venice Province. (Italy)
- Scientific Coordinator of the STRIGE Project – Veneto Region – Regional Environmental protection Agency, 2009-2011 *“Rational uses of geothermal resources in Veneto region, ITALY”* - Evaluation of regional deep and shallow geothermal assessment and suggest the best uses voted to energy and heat production.
- Scientific Coordinator Research Project 2010-2011 European founded Project (FSE) – Veneto Region *“Thermal energy in the Geothermal Euganean Basin – Italy”*.
- Scientific Coordinator of the Research project 2011 *“Geoexchange in Treviso province – Italy”*. The project has carried out a detailed field analyses about the local geothermal low enthalpy potential.
- Scientific Coordinator of the Research Project 2009-2010 European founded Project (FSE) cod: 2105/1/8/2215/2009, Veneto Region (Italy) on the *“Geoexchange systems in the Euganean Hills Thermal district (Eastern Pò Plain, Italy)”*.
- Head of research of underground aquifers as part of a project of international cooperation with partnership of the Government of Eritrea and the UN (2006-2007);
- Coordinator of Research Unit of the University of Padua of a Relevant Italian National Project (PRIN) aimed at developing methods of Earth remote sensing for modeling geometric and kinematic phenomena of slope instability- (2004-2006);
- 2000-2003: Member of University of Padova Research Unit, UE Project THARMIT *“Torrent hazard control in the European Alps. practical tools and methodologies for hazard assessment and risk mitigation”*. Project reference: EVG1-CT-1999-00012, Founded under FP5-EESD program
- Collaboration in the installation, operation and testing of the GPS base station of Padova within the IGS, Jet Propulsion Laboratory (NASA-USA) . (1993-1998).;

- Collaboration to the optimization of the satellite ERS1 radio altimeter, European Space Agency, at the oceanographic platform CNR-ISDGM (1992).

## **References**

### **International Journals**

- EMMI G., ZARRELLA A., DE CARLI M., DONÀ M., GALGARO A. (2017). Energy performance and cost analysis of some borehole heat exchanger configurations with different heat-carrier fluids in mild climates. *GEOTHERMICS*, vol. 65, p. 158-169, ISSN: 1879-3576, doi: 10.1016/j.geothermics.2016.09.006
- TREVISANI S, BOAGA J., AGOSTINI L., GALGARO A. (2017). Insights into bedrock surface morphology using low-cost passive seismic surveys and integrated geostatistical analysis. *Science of The Total Environment*, Volume 578, Pages 186-202, ISSN 0048-9697, <http://dx.doi.org/10.1016/j.scitotenv.2016.11.041>
- TOSITTI L., CINELLI G., BRATTICH E., GALGARO A., MOSTACCI D., MAZZOLI C., MASSIRONI M., SASSI R. (2017). Assessment of lithogenic radioactivity in the Euganean Hills magmatic district (NE Italy), *Journal of Environmental Radioactivity*, Volume 166, Part 2, January 2017, Pages 259-269, ISSN 0265-931X, <http://dx.doi.org/10.1016/j.jenvrad.2016.07.011>.
- BRUNO, D. E.; LOMBARDO, G.; D'ARPA, S.; GALGARO, A.; DESTRO, E.; DI SIPIO, E.; URICCHIO, V. F.; MANZELLA. (2016). Mo.nalis.a: a methodological approach to identify how to meet thermal industrial needs using already available geothermal resources. *ENERGY EFFICIENCY* - ISSN:1570-646X, DOI:10.1007/s12053-016-9481-4. pp.1-17.
- SANTILANO A., DONATO A., GALGARO A., MONTANARI D., MENGHINI A., VIEZZOLI A., DI SIPIO E., DESTRO E., MANZELLA A. (2016). An integrated 3D approach to assess the geothermal heat-exchange potential: The case study of western Sicily (southern Italy). *Renewable Energy*, Volume 97, November 2016, Pages 611-624, ISSN 0960-1481, <http://dx.doi.org/10.1016/j.renene.2016.05.072>.
- DALLA SANTA G, GALGARO A., TATEO F. COLA S. (2016). Induced thermal compaction in cohesive sediments around a borehole heat exchanger: laboratory tests on the effect of pore water salinity. *Environ Earth Sci* (2016), 5:181. DOI 10.1007/s12665-015-4952-z
- DALLA SANTA G, GALGARO A., TATEO F. COLA S. (2016). Modified compressibility of cohesive sediments induced by thermal anomalies due to a borehole heat exchanger. *Engineering Geology*, 202 (2016), 143–152. <http://dx.doi.org/10.1016/j.enggeo.2016.01.011>
- GALGARO A., DI SIPIO E., TEZA G., DESTRO E., DE CARLI M., CHIESA S., ZARRELLA A., EMMI G., MANZELLA A. (2015) Empirical modeling of maps of geo-exchange potential for shallow geothermal energy at regional scale. *Geothermics*. Volume 57, September 2015, Pages 173-184. DOI: 10.1016/j.geothermics.2015.06.017.
- EMMI G., ZARRELLA A., DE CARLI M., GALGARO A., (2015). An analysis of solar assisted ground source heat pumps in cold climates. (2015). *Energy Conversion and Management*, Volume 106, December 2015, Pages 660–675. Doi:10.1016/j.enconman.2015.10.016
- ARATO A., BOAGA J., COMINA C., DE SETA M., DI SIPIO E., GALGARO A., GIORDANO N., MANDRONE G. (2015). Geophysical Monitoring for Shallow Geothermal Applications - two Italian case histories. *First break*, volume 33, August 2015
- TEZA, G., GALGARO, A., DESTRO, E., DI SIPIO, E., (2015). Stratigraphy modeling and thermal conductivity computation in areas characterized by Quaternary sediments. *Geothermics*, Volume 57, September 2015, Pages 145-156
- VIERO A., GALGARO A., MORELLI MS, BREDA A., FRANCESE R. (2015): Investigations on the structural setting of a landslide-prone slope by means of three dimensional electrical resistivity tomography. *Natural Hazards*. May 2015. DOI: 10.1007/s11069-015-1777-8, Print ISSN 0921-030X, Online ISSN 1573-0840
- CORO', D., GALGARO, A., FONTANA A., CARTON A. (2015). A regional rockfall database: the Eastern Alps test site. *Environmental Earth Sciences*, 74 (2), pp. 1731-1742. DOI: 10.1007/s12665-015-4181-5.
- AGOSTINI, L., BOAGA, J., GALGARO, A., NINFO, A. (2015). HVSr technique in near-surface thermal-basin characterization: the example of the Caldiero district (North-East Italy). (2015) *Environmental Earth Sciences*, 12 p. DOI: 10.1007/s12665-015-4109-0

GALGARO A., FARINA Z., EMMI G., DE CARLI M. (2015): Feasibility analysis of a Borehole Heat Exchanger (BHE) array to be installed in high geothermal flux area: The case of the Euganean Thermal Basin, Italy. *Renewable Energy*, Volume 78, 2015, doi:10.1016/j.renene.2014.11.076

TEZA, G., MARCATO, G., PASUTO, A., GALGARO, A. (2015). Integration of laser scanning and thermal imaging in monitoring optimization and assessment of rockfall hazard: a case history in the Carnic Alps (Northeastern Italy). *Natural Hazards*, pp.1535-1549, vol. 76, DOI:10.1007/s11069-014-1545-1.

EMMI G., ZARRELLA A., DE CARLI M., GALGARO A., (2015). Solar Assisted Ground Source Heat Pump in Cold Climates, *Energy Procedia*, Volume 82, December 2015, Pages 623-629, ISSN 1876-6102, <http://dx.doi.org/10.1016/j.egypro.2015.12.010>.

DI SIPIO E., GALGARO A., DESTRO E., CHIESA S., GIARETTA A., MANZELLA A. (2014). Subsurface thermal conductivity assessment in Calabria (southern Italy): a regional case study. *Environmental Earth Science* (2014) doi: [10.1007/s12665-014-3277-7](https://doi.org/10.1007/s12665-014-3277-7)

GALGARO, A., EMMI, G., ZARRELLA A., DE CARLI M., (2014). Possible applications of Ground Coupled Heat Pumps in high geothermal gradient zones, *Energy and Buildings*, Volume 79, August 2014, Pages 12-22 <http://dx.doi.org/10.1016/j.enbuild.2014.04.040>

DE CARLI M., GALGARO A., PASQUALETTO M., ZARRELLA A. (2014). Energetic and economic aspects of a heating and cooling district in a mild climate based on closed loop ground source heat pump. *APPLIED THERMAL ENGINEERING*, 71(2), 895-904, ISSN:1359-4311, doi:10.1016/j.applthermaleng.2014.01.064

GALGARO A., BOAGA J., ROCCA M. (2014). HVSR technique as tool for thermal-basin characterization: a field example in N-E Italy. *Environmental Earth Sciences*, 71(10), 4433-4446, ISSN:1866-6280, doi: 10.1007/s12665-013-2838-5

ZARRELLA A., DE CARLI M., GALGARO A. (2013) Thermal performance of two types of energy foundation pile: Helical pipe and triple U-tube, *APPLIED THERMAL ENGINEERING* (2013), Vol. 61(2) (2013) n. 11, pages 301-310. DOI: 10.1016/j.applthermaleng.2013.08.011. ISSN: 1359-4311.

GALGARO, A., CULTRERA, M. (2013) Thermal short circuit on groundwater heat pump, *Applied Thermal Engineering*, Volume 57, Issues 1–2, August 2013, Pages 107-115, ISSN 1359-4311, <http://dx.doi.org/10.1016/j.applthermaleng.2013.03.011>.

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DI SIPIO E., RE V., CAVALERI N., GALGARO A. (2013). Salinization Processes in the Venetian Coastal Plain (Italy): A General Overview. *Procedia Earth and Planetary Science* 7:215–218. DOI:10.1016/j.proeps.2013.03.096

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DE CARLI M., DONÀ M., GALGARO A., JÓHANNESSEN G. A., MARINETTI S., SÆVARSDÓTTIR G., (2012). Analytical and numerical models for determining geothermal energy potential: a case study in India. *Ashdin Publishing, Journal of Fundamentals of Renewable Energy and Applications* Vol. 2 (2012), Article ID R120309, 5 pages , doi:10.4303/jfrea/R120309.

TEZA, G., MARCATO, G., CASTELLI, E., GALGARO, A. (2012). IRTROCK: A MATLAB toolbox for contactless recognition of surface and shallow weakness of a rock cliff by infrared thermography. *Computers & Geosciences*, 45, 109-118.

CAPOZZA A., DE CARLI M., GALGARO A., ZARRELLA A., RSE, (2012). Guidelines of Closed loop Low enthalpy systems for climatization. (In italian) Founded by Italian Electric System Research RSE12000317 (GSE- Ministry of Economic Development). <http://doc.rse-web.it/doc/doc-sfoglia/12000317-314717/12000317-314717.html>.

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- DI SIPIO E., GALGARO A., ZUPPI G.M. (2007). Contaminazione salina nei sistemi acquiferi dell'entroterra meridionale della Laguna di Venezia. Giornale di Geologia Applicata 5 (2007) 5-12, doi: 10.1474/GGA.2007-05.0-01.0165
- DOSSI C., CICERI E., GIUSSANI B., POZZI A., GALGARO A., VIERO A., VIGANÒ' A., (2007). Water and snow chemistry of main ions and trace elements in the karst system of Monte Pelmo massif (Dolomites, Eastern Alps, Italy). Marine and Freshwater Research, 2007, 58, 649–656
- G. TEZA, A. GALGARO, N. ZALTRON N, R. GENEVOIS (2007). Terrestrial laser scanner to detect landslide displacement fields: a new approach.. INTERNATIONAL JOURNAL OF REMOTE SENSING, vol. 28, 16, p. 3425-3446, ISSN: 0143-1161, doi: 10.1080/01431160601024234
- DI SIPIO E., GALGARO A., ZUPPI G.M.(2006): New geophysical knowledge about groundwater systems in a complex estuarine environment: the case of Venice Lagoon. Estuarine Coastal and Shelf Science. Vol. 66, 1-2, pag. 6-12. ISSN: 0272-7714, doi: 10.1016/j.ecss.2005.07.015
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- PIERACCINI M, NOFERINI L, MECATTI D, ATZENI C, TEZA G, A. GALGARO, ZALTRON N (2006). Integration of radar interferometry and laser scanning for remote monitoring of an urban site built on a sliding slope. IEEE Transactions On Geoscience And Remote Sensing, vol. 44, p. 2335-2342, ISSN: 0196-2892, doi: 10.1109/TGRS.2006.873574
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- DEL LONGO M., FINZI E., GALGARO A., GODIO A., LUCHETTA A., PELLEGRINI G. B. & ZAMBRANO R. (2001). Responses of the Val d'Darcia small dolomitic glacier (Mount Pelmo, eastern Alps) to recent climatic changes. geomorphological and geophysical study. Geografia Fis. E Din. Quat., VOL. 24, 2001, PP.43-55

GALGARO A, FINZI E., TOSI L. (2000). An experiment on sand-dunes in southern Venetian coast based on G.P.R., V.E.S. and documentary evidence. *Annali Di Geofisica*, vol. 43, N.2, p. 289-295, ISSN: 1590-1815

STROZZI T., TOSI L., CARBOGNIN L., WEGMULLER U., A. GALGARO (1999). Monitoring Land Subsidence in the Euganean Geothermal Basin with Differential SAR Interferometry. In: *Proceedings of Fringe '99 (ESA)*. p. 1-10, Liège, Bruxelles, Belgio, Nov.

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GALGARO A., *POLINO R., ZAJA A. (1995)*. Magnetotelluric survey at the ALPS-Apennines boundary (Tertiary Piemonte Basin - North-western Italy). *Boll. Geof. Teor. e Appl.*, Vol. XXXVII, N. 147, September 1995, pp. 219-232.

CAPORALI A, A. GALGARO (1994). The permanent GPS station at the University of Padova. *Reports On Geodesy*, vol. 4, p. 139-146, ISSN: 0867-3179

### **National Geological Cartography:**

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### **Abstracts, proceedings, books, reports and National journals papers:**

BRUNO D.E., LOMBARDO G., GALGARO A., DI SIPIO E., DESTRO E., D'ARPA S., URICCHIO V.F., MANZELLA A. (2016). Un modello per soddisfare la richiesta termica nel settore industriale con la geotermia a bassa entalpia. Pagg. 99-104. *La ricerca sulle acque e le nuove prospettive di valorizzazione dei risultati in ambito pubblico e privato*. A cura di E. Brugnoli, V. F. Uricchio. *Tecnologie per l'ambiente*, Pagg.450, ISBN: 8866115169, Cacucci Ed.

GALGARO, A., NINFO A., PIROLA N., CULTRERA M., DI SIPIO E., DE CARLI M., TEFALSASIE F., MONTANARI D., MONTEGROSSI G. (2016). Preliminary remote sensing analyses of the Alid Volcanic Geothermal District (ERITREA). Abstract, 35<sup>TH</sup> International Geological Congress, 27 August - 4 September 2016 -Cape Town, South Africa

GALGARO, A., GREGGIO P., NINFO A., CULTRERA M., DI SIPIO E., DE CARLI M., EMMI G., FELS W., MYRON SUKHA AND MANTOVAN M. (2016). The South Africa geological suitability for underground source heat pump system (USHP). Abstract, 35<sup>TH</sup> International Geological Congress, 27 August - 4 September 2016 -Cape Town, South Africa

BERNARDI A., DE CARLI M., DI TUCCIO M., EMMI G., GALGARO A., GRACI S., PERA S., VIVARELLI A., ZARRELLA A.(2016). A data base for European climatic data for energy potentials and mapping. Heiselberg, P. K. (Ed.) (2016). *CLIMA 2016 - Proceedings of the 12th REHVA World Congress: volume 9*. Aalborg: Aalborg University, Department of Civil Engineering.

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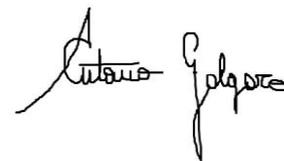
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Prof.. Antonio Galgaro

A handwritten signature in black ink, appearing to read 'Antonio Galgaro', written in a cursive style.