



DEPARTMENT  
OF GEOSCIENCES

YEARBOOK 2020

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UNIVERSITY OF PADOVA

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OF GEOSCIENCES

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## A WORD FROM OUR DIRECTOR



The year 2020 was a year like no other, and it was one that deeply changed our lives. From online lectures, meetings and conferences to empty offices, everyone at the Department of Geosciences quickly adapted to this new normality, trying to make the best of it. In this second edition of the Yearbook of the Department of Geosciences, we want to highlight the numerous activities that we managed to put into place during this pandemic year, as well as what we learned from this critical time. Although the first guess at our focus here would be all the activities that were hindered by the pandemic, which undeniably affected our Department as well, the focus of this Yearbook is instead on how we faced this unexpected challenge from different perspectives. First of all, in 2020, the Department of Geosciences counted 15 Full Professors, 32 Associate Professors and 11 Researchers (including RU, RTDa ed RTDb), 40 Postdoc and 43 PhDs. As our activities continued, 3 professors retired, and 25 new researchers were employed. This staff provided teaching in 17 BSc and 35 MSc courses, while contributing to major activities within the three courses relating to the Department,

namely the bachelor's degree in Geological Sciences, the master's degree in Geology and Technical Geology and a new master's degree completely in English in Geophysics for Natural Risks and Resources. These three degrees hosted a total of 280 students, while during its first year, the new master's degree course alone gathered 26 students from all over the world, thus not only broadening the educational offer of the Department, but also widening it to the international level. As in any other field, teaching was strongly impacted by the pandemic, which imposed remarkable restrictions for laboratories and field activities, which are crucial elements in the education of new geoscientists. To address this, we provided our students with several virtual activities and materials. An example is the virtual collection consisting of 3D models of fossils, minerals and rock specimens. We also introduced virtual outcrop models to lead students in the framework of virtual geological fieldtrips. A total of 27 and 31 students received their degrees in Geological Sciences (BSc) and in Geology and Technical Geology (MSc), respectively, and 31 additional students were supervised by our researchers to get their degrees in other courses from other departments. High-quality research carried out at the Department

attracted graduate students from abroad, and in 2020, 24 postdocs and 9 PhD students were recruited. Additionally, in 2020, the Department counted on 24 research laboratories, delivering a volume of approximately 3,000 sample preparations and 3,700 analyses, and part of the research activities were supported by 46 national and 25 international projects. The Department also hosts the CIRCe Centre, which is the only centre in Italy for investigating cement materials and the formulation of construction binders. This centre not only collaborates with several companies and institutions at the national and international levels, but it is also involved in the training and support of African students and researchers and in consultancy for small companies in line with UNESCO's Sustainable Development Goals. The efficiency of our laboratories, combined with successful activities in fundraising, allowed the Department to develop and maintain a relevant number of collaborations, which are estimated to include more than 90 European and extra-European and 50 Italian universities, institutions and private companies. During the pandemic emergency, this complex network of collaborations developed by the Department allowed us to organise a number of high-quality webinars in the frame of our PhD courses. A total of 209 papers were published in 2020, and our Department ranked first in Italy in the Nature Index international ranking, which is only based on the number of papers published in high-impact journals; we have the 92nd position in the world in terms of score. However, the Department is also involved in the museums network of the University of Padua, thanks to its collection of Italian and foreign rocks, fossils and minerals housed in the Museum of Geology and Palaeontology and in the Museum of Mineralogy. Despite the COVID-19 pandemic, the realisation of the new 'Museum of Nature and Humankind' is underway, and it will represent the main legacy of the celebrations in 2022 to mark 800 years of Padua University. Finally, the Department has been actively committed to promoting and offering the dissemination and divulgation of scientific knowledge through TV and radio interviews and laboratories with local schools and exhibits. In total, more than 20 events were organised, such as the Night of the Research 2020, thus demonstrating the specific dedication of the Department to outreach and communication.



Prof. Fabrizio Nestola

Head of the Department of Geosciences



# History



## HISTORY *by L. Capraro*

The University of Padova played a fundamental role in promoting and advancing the development of modern Geology as we know it. Teaching of Earth Sciences at the University of Padova dates back to 1734, when A. Vallisneri Jr. bestowed to the “Magistrato dei Riformatori dello Studio di Padova” the extensive naturalist collections previously owned by his late father. In view of that, the course of study in “Storia Naturale Speciale” was established, thus representing the ancestor of the modern Natural Sciences curriculum. Separation between biological and non-biological sciences occurred in 1869, when G. Ombroni was awarded the Chair of Mineralogy and Geology. In 1883, the geo-mineralogic collection, hitherto stored in the main building of the University (Palazzo del Bo), were further subdivided into a mineralogic and a geologic collection and transferred to Palazzo Cavalli, where they are currently hosted. The former Chair of “Storia Naturale Speciale” was accordingly split into an Institute and Museum of Mineralogy (Chair R. Panebianco) and an Institute and Museum of Geology (Chair G. Ombroni). In the 1980s, Institutes were reformed into Departments, with further separations between the former institutions. At that time, Geosciences at Padova were structured into three separate Departments: the Department of Mineralogy and Petrology and the Department of Geology, Paleontology and Geophysics, both located at Palazzo Cavalli, and the Department of Geography, which was hosted in a separate building. In 2007, the Departments housed at Palazzo Cavalli merged into the Department of Geosciences, which is nowadays located in a building launched in late 2010. Since 2012, the Department also includes Physical Geographers previously afferent to the Department of Geography.



# Management



**FABRIZIO NESTOLA**  
Head of the Department



**NICOLA SURIAN**  
Vice-Head of the Department



**PAOLA SARACINO**  
Head of the Administrative Staff



**CLAUDIA AGNINI**  
Coordinator of the PhD Programme





**BERNARDO CESARE**

Coordinator of first cycle degree in Geological Sciences and second cycle degree in Geology and Technical Geology (until October 2020)



**PAOLO MOZZI**

Coordinator of first cycle degree in Geological Sciences and second cycle degree in Geology and Technical Geology (since October 2020)



**GIORGIO CASSIANI**

Coordinator of the second cycle degree in Geophysics for Natural Risks and Resources



# Technical and Administrative Staff

# ADMINISTRATION AND GENERAL SERVICES



PAOLA SARACINO  
Head of the  
Administrative staff



ANNA RITA BASTIANELLI



LAURA CORAIN



CRISTIAN IOZZIA



CRISTINA MAGRO



MARIA LETIZIA MINOTTO



GIADA MIOTTO



MICHELA NORDIO



AMABILE PELOI

# SERVICES TO TEACHING, POST-LAUREAM, RESEARCH AND OUTREACH

PAOLA SARACINO  
Head of the  
Administrative staff



ANGELA DE FALCO



ELISA FACCIOLO



CRISTINA FREGONESE



SARA VETTORE

# TECHNICAL AND IT SERVICES



PAOLA SARACINO  
Head of the Technical  
and IT staff



LAURA BUSATO



BRUNO CIERVO



ALBERTO DE LORENZI



MARIA ORNELLA ROSSIN



NICOLA PRATICELLI



ANTONELLA RASSU \*  
\* Photo not published on request of the employee

# LABORATORIES AND SPECIALIZED SERVICES



LEONARDO TAURO  
Service coordinator



CARLOTTA BETTO



SANDRA BOESSO



STEFANO CASTELLI



SILVIA CATTO'



MARCO FAVERO



GIAMPAOLO GIRARDI



NICOLA MICHELON



DARIA PASQUAL



ROBERTOMARIA ROSSI



LISA SANTELLO



**Full Professors**



### **GILBERTO ARTIOLI**

My research interests are: the materials science of alternative and green building materials; Reuse and recycle of industrial materials for circular economy; solidification and stabilization of contaminated soils; the materials science of cultural heritage.



### **ALESSANDRO CAPORALI**

My research interests are: Solid Earth Physics, Seismology; Seismic sources; Interpretation of space geodetic data for the measurement of surface deformation; Reference frames; Precision positioning; GNSS technology.



### **ALBERTO CARTON**

Geomorphological investigations with particular attention to geomorphological surveying and mapping glacial and periglacial morphogenesis applications of geomorphology to slope stability investigations and hazard and risk processes in high-mountain.



### **GIORGIO CASSIANI**

My research interests are: Geophysical methods for environmental applications; Seismological micro-scale zoning and other soil dynamics uses of exploration geophysics; Integration of hydrological modeling with geophysical methods; Geomechanics for environmental applications.



### **FILIPPO CATANI**

My research interests are: landslide hazard, machine learning applied to geohazards, surface processes monitoring and modelling, applications of remote sensing to landslide studies, oil & gas environmental impact and risk, surface monitoring in open-pit mines, scaling processes.



### **BERNARDO CESARE**

I work on metamorphic petrology, with special interest for: High-grade metamorphism and partial melting of pelitic rocks; Origin of Granites; Fluid and melt inclusions; Petrologic mineralogy.





**FRANCESCA DA PORTO**

My research interests are: Seismic vulnerability; Analysis, intervention and monitoring of historic and modern masonry buildings, RC structures and bridges; Development of procedures for large scale assessment of seismic risk.



**ANDREA D'ALPAOS**

I am a hydraulic engineer who studies the biomorphodynamic evolution of coastal and fluvial landscapes in response to climate change and human pressure, through field observations, laboratory experiments, and mathematical modeling.



**GIULIO DI TORO**

I investigate earthquake physics and faulting by integrating: Field studies of seismogenic fault zones; Rock deformation experiments; Microstructural/geochemical investigations of natural and experimental fault zone products.



**SILVANA MARTIN**

My research interests are: Structural setting of the Alps; Geodynamics of subduction zones; Paleoseismogenic faults and material, Monitoring and dating alpine rock avalanches and landslides



**FABRIZIO NESTOLA**

My research interests are: Mineralogy under extreme conditions of pressure and temperature; Geothermobarometry of diamond-inclusion systems; Carbon phases in meteorites.



**GIORGIO PENNACCHIONI**

My research interests are: Exhumed paleoseismic (pseudotachylite-bearing faults); Nucleation and localization in ductile shear zones; Microstructures in mylonitic zones; Fluid-rock interaction in the ductile field.



**CRISTINA STEFANI**

My research interests are composition and provenance of terrigenous sediments (sand composition and transparent heavy mineral associations) in different geological contexts for paleogeographic and paleoclimatic reconstructions.



**NICOLA SURIAN**

My research interests are: Geomorphic response to extreme flood events and assessment of flood hazard; Sediment dynamics and estimate of bedload transport in large gravel-bed rivers; Channel adjustments and their evolutionary trajectory and prediction of future scenarios



**MASSIMILIANO ZATTIN**

My research interests are: Applications of thermochronology to tectonic evolution of orogenic chains, basin analysis, provenance studies and paleogeographic reconstructions; Feedbacks between tectonics, erosion, sedimentation and climatic variations.





Associate Professors



**CLAUDIA AGNINI**

My research field is micropaleontology and I particularly focus on the study of calcareous nannofossils both as biostratigraphic and paleoceanographic tools.



**JACOPO BOAGA**

I'm an applied geophysicist. My research interests concern mainly engineering and environmental geophysics such as geophysics for natural hazard scenarios, electrical and electro-mag.



**LAURO BOSCHI**

I study how waves propagate in complex media, and apply this knowledge to a number of different fields of research, within the general domains of acoustics and seismology. I am interested in wave-based imaging in geology; sound localization in acoustics; acoustic display.



**ANNA BREDA**

Facies analysis and sequence stratigraphy of clastic and mixed sedimentary successions of continental to shallow-marine environments in terms of depositional processes and stratigraphic architecture.



**LUCA CAPRARO**

My research focuses on reconstructing the stratigraphy and climatic evolution of the Central Mediterranean during the Pliocene and Pleistocene based on the study of onland marine sediments from Southern Italy.



**MARIA CHIARA DALCONI**

My research activity focuses on mineralogy applied to the study of industrial materials and their impact on the environment. I mainly use powder diffraction technique to characterize raw materials, industrial materials and their by-products and wastes.



### **PAOLO FABBRI**

My research field includes: Geostatistics in hydrogeology; Hydrogeology of geothermal areas; Hydrogeological parameterization of aquifers.



### **MANUELE FACCENDA**

I am a solid earth geophysicist working on numerical simulations of plate tectonics and mantle convection processes. I aim at improving our understanding of the Earth's dynamics by reproducing the complex interplay of different geological processes.



### **MARIO FLORIS**

My research field includes: Probabilistic and deterministic modeling of rainfall-induced landslides; GIS-based landslide hazard analysis; Remote sensing techniques in landslide identification and characterization; A-DInSAR techniques for subsidence and landslide analyses.



### **ALESSANDRO FONTANA**

I am a geomorphologist and Quaternary geologist with interest in the evolution of the alluvial and coastal environments and in the geoarchaeological aspects.



### **ELIANA FORNACIARI**

My research interests are upper Cretaceous-Cenozoic calcareous nanofossil biostratigraphy, biochronology and paleoecology with special reference to tempo and mode of the extinction/recovery pattern of nanofossils during environmental perturbations.



### **ANTONIO GALGARIO**

My research interests are: Geothermics; Artificial Intelligence; Machine learning; Landslides risk, early warning and monitoring.



**MASSIMILIANO GHINASSI**  
I am a clastic sedimentologist working mainly on alluvial and coastal deposits. I aim at improving models to interpret the sedimentary record by linking sedimentary products with modern processes and experiments.



**LUCA GIUBERTI**  
I study foraminifera as tools for investigating the climatic variability in the Cretaceous and Paleogene. Secondly, I am currently working on several aspects of Italian Cretaceous and Paleogene Fossil-Lagerstätte.



**LARA MARITAN**  
I work on minero-petrographic application to cultural heritage materials and sites, archaeometry, new mix design for sustainable brick production.



**ANDREA MARZOLI**  
My research interests are: Igneous petrology; Large igneous provinces; Alkaline magmatism; Mass extinctions.



**MATTEO MASSIRONI**  
My research interests are: Exploration and geology of planetary surfaces and small bodies of the Solar System; Geological mapping including Remote Sensing, GIS and 3D modelling; Fault architectures and regional tectonics.



**CLAUDIO MAZZOLI**  
Petrography applied to archeological materials, and stone deterioration. New building materials using industrial waste. Petrography and geochemistry of carbonates in paleoclimate studies. Radon risk. Metamorphic petrology and monazite geochronology.



### **STEFANO MONARI**

I focus on all aspects of paleontology of Mesozoic bivalves and gastropods, including systematics, phylogenetic analysis, stratigraphical significance, paleoecology and paleobiogeography.



### **PAOLO MOZZI**

My research fields are: Geomorphology; Quaternary geology; geoarchaeology; palaeopedology; alluvial, glacial and lagoon landforms and deposits; geomorphological mapping; mapping of Quaternary deposits.



### **PAOLO NIMIS**

My research fields are: Thermobarometry and geochemistry of mantle rocks and diamonds; Mafic-ultramafic-hosted seafloor massive sulfide deposits; Alpine copper metallogeny and provenancing.



### **LEONARDO PICCININI**

My research focuses on applied geology and hydrogeology.



### **MANUEL RIGO**

My cross-disciplinary research aims to decipher the evolution of the Earth, evaluating the role of the oceanic processes in the global climate and environmental changes on modern and geological timescales.



### **NEREO PRETO**

My research fields are: Stratigraphy, sedimentology and cyclostratigraphy of carbonate platforms; isotopic geochemistry; petrology and diagenesis of carbonates aimed at paleoclimatic reconstructions and modelling the depositional architecture of carbonate platforms.



**RAFFAELE SASSI**

My research fields are:  
Petrology, tectono-  
metamorphic evolution of  
crystalline basements; crystal  
chemistry of micas;  
Geothermics; Cultural Heritage  
materials.



**GABRIELLA SALVIULO**

Application of iron oxide  
nanoparticles for waters and  
soils remediation from heavy  
metals and the role of soils  
mineralogical composition in  
the pollutants release.  
Relationships between  
mineralogy, sustainability  
human rights.



**PAOLO SCOTTON**

My research focuses on: Debris  
Flows; Snow avalanches;  
Geothermal heat exchange.



**LUCIANO SECCO**

As a structural crystallographer, I  
study the relationships between  
structure and chemical  
composition of crystals at various  
PT conditions. I study the crystal-  
chemistry of silicates, oxides and  
phosphates of alpine pegmatites  
and carbonates related to  
Triassic hydrothermal events.



**ALBERTA SILVESTRI**

My research activity focuses on  
archaeometric studies of  
ancient glass (vessels, mosaic  
tesserae, stained glass and  
glazes), aiming at identifying  
raw materials, production  
technologies and alteration  
processes.



**RICHARD SPIESS**

Understanding the significance  
of microstructures within  
terrestrial and extraterrestrial  
rocks. Study of microstructures  
within experimentally formed  
and deformed rock analogues.  
Metamorphic petrology.  
Geodynamics. Microstructures  
in all materials.





### **DARIO ZAMPIERI**

brittle tectonics (kinematic analysis of faults, transfer zones, natural fracture systems, active tectonics, geological structure of geothermal fields, rockslide hazard), geological mapping, geodynamics of the Adria plate, humans as geomorphic agents.



### **ANNALISA ZAJA**

Applied geophysicist with a primary interest in characterizing the shallow underground. I mainly employ electromagnetic investigations, both active and passive, with a particular emphasis on magneto-telluric methods, for geo-environmental and archeologic studies.





Assistant Professors



**ROBERTO GATTO**

All aspects of paleontology of Mesozoic and Cenozoic benthic molluscs, especially gastropods, including systematics, paleoecology, paleobiogeography and evolution.



**CHRISTINE MEYZEN \***

Tectonic, magmatic, and hydrothermal processes at mid-ocean ridges. Composition, evolution and dynamic of the earth's mantle. Formation of the oceanic lithosphere and crustal evolution at ridges.

\* Photo not published on request of the employee





**RTDa**



### **LUCA CARTURAN**

I am a specialist of the alpine cryosphere. My research activity is devoted to the monitoring, understanding and modelling of the climate-related changes of the Alpine cryosphere and their effects on mountain hydrology.



### **NICOLA CENNI**

I am a geophysicist working mainly in multi-techniques geodetic monitoring to study processes as subsidence, the present tectonic pattern in the Mediterranean area, and landslide movements. The time series analysis methods are arguments for my research.



### **ELOISA DI SIPIO**

My main research interests are geothermal energy resources, geophysics application to geothermal studies, petrophysical characterization of lithological materials and hydro-geological characterization (e.g. saltwater intrusion, isotope geochemistry).



**RTDb**



### **OMAR BARTOLI**

My research interests are: High temperature metamorphism; Crustal melting and granite formation; Melt inclusions in magmatic and metamorphic rocks; P-T-t evolution of high-grade metamorphic terranes; Volatiles in crustal magmas.



### **SIMONE BIZZI**

Fluvial Geomorphology in particular: the use of emerging remote sensing technology to develop model of sediment transport, sediment connectivity and fluvial processes in general. The use of this knowledge to support river management.



### **DAVIDE NOVELLA**

I am interested in global geochemical cycles and magmatic processes occurring in the Earth's interior, with particular attention to the behavior of volatiles, trace elements and non-traditional stable isotopes.



### **VALERIO OLIVETTI**

My main research interests are tectonics, orogenic processes, quantification of erosion, thermochronology.



### **TELEMACO TESEI**

My research interests are: Structural geology of faults and shear zones; Experimental rock mechanics and earthquake mechanics; Microtectonics.



### **LUCA VALENTINI**

I work on design, characterization and modelling of sustainable building materials based on clay and industrial waste.



Post-Doc





**JACOPO AMALFITANO**

My research interests comprise the evolution of fossil ichthyofaunas, in particular of northeastern Italy, during the Cretaceous climatic hyperthermal events.



**ELENA BACHINI**

Development of a numerical model for the solution of strongly anisotropic flow and transport equations in porous media (two- and three-dimensional domains)..



**RICCARDO BIONDI**

I use remote sensing to investigate extreme atmospheric events such as severe convection and volcanic clouds.



**BRUNA BORGES-CARVALHO**

My research interests are: Anatexis at high to ultra-high temperature and ultra-high pressure conditions; Melt and fluid inclusions in peritectic garnet; Volatile contents of granitic magmas; Fluid regime of the deep crust.



**ANDREA BRENNA**

I am a fluvial geomorphologist. My research interests focus on sediment dynamics in gravel-bed rivers, and responses of mountain streams to high-magnitude hydrological events.



**CARLOTTA CAPPELLI**

My research interests are: Calcareous nannoplakton evolution and biostratigraphy, with focus on early Eocene global warming and following transition to the middle Eocene global cooling; Determining relationship between paleoclimatic / paleoceanographic changes and evolution.



### **CATERINA CANOVARO**

My research is focused on the study of ancient copper and bronze artefacts. The main goal is to establish the geological origin of the metal employed, by investigating each sample from a mineralogical, metallurgical, chemical and isotopic point of view.



### **ALBERTO CARRERA**

My research interests concern geophysical methods for environmental and engineer applications and shallow geothermal energy modeling.



### **CHIARA COLETTI**

My main research interests are: Cultural Heritage decay and climate change; Green solutions for new mix design recycling waste; Radon occurrence in soils, rocks, and construction materials.



### **LUCA COLLANEGA**

My main research interest is tectonics, with a special focus on the use of 3D seismic data to image complex fault patterns.



### **MARTA COSMA**

My main research interest is sedimentology, with a particular focus on fluvial and tidal channel deposits. I am investigating their morphodynamic evolution and stratal architecture through a multidisciplinary approach.



### **ALBERT DE MONTSERRAT NAVARRO**

My major research interest is in computational geodynamics.



### **GIORGIA DALLA SANTA**

My main research interests are: Shallow geothermal systems for building conditioning, mechanical and permeability effects induced by freezing-thawing processes in sediments, sediments and rocks thermal properties; FEM modelling of fluid and heat transfer processes in porous media.



### **BARBARA DE TOFFOLI**

My research interests are: Fluid circulation in the Martian crust and terrestrial analogue sites; Analysis of percolating fracture systems; Sedimentary volcanism; Water resurgences and degassing centers identification in a search for life perspective.



### **HASSAN EZ-ZAKI**

My research interests are focused on the use of natural resources and by-products such as calcium carbonate, slag, calcined clays, etc. in cementitious materials to study their effect on the fresh and hardened states.



### **MICHELE FONDRIEST**

I am a structural geologist. I focus my research on fault and rock mechanics with extensive field work approach and some laboratory experiments.



### **ENRICO GARBIN**

My research interests are: Cement, lime and alkali activated binders. Mechanics of construction materials; Mechanics and structural retrofitting of modern and historic structures; Special applications: neutron shielding mortars and geothermal grouts and slurries.



### **LUIGI GERMINARIO**

My research field is heritage science, e.g., stone decay and durability in historical buildings, caves, and geoheritage; impact of air pollution, climate change, microclimate, and water; provenance of archaeological stone.



**OMAR GIANOLA**

My research interests are: Origin and evolution of oceanic and continental crust; Geochemical differentiation of mantle-derived magma; Origin of anatectic crustal melts; Transport of melts through mantle and crust; Formation of crust-mantle transition zones.



**RODRIGO ALFONSO GOMILA OLMOS DE AGUILERA**

I am a Structural Geologist. My area of interest and research is the dynamic interaction between hydrothermal fluids and fault-zones in the crust at seismogenic structural levels.



**VERONIKA IVÁN**

My research interests are: Hydrogeophysics; Plant-soil-water interactions; Sustainable groundwater management and Karst aquifers.



**ELŻBIETA LASOTA**

I study severe weather monitoring using Radio occultation and ground-based GNSS observations, geovisualisation, machine learning.



**BENJAMIN MARY**

I study soil-plant interactions for water using geophysics.



**SIMONE MOLINARI**

Application of iron nanoparticles for industrial wastewater remediation. Use of an innovative system (HPSS) for stabilizing and recycling of highly polluted soils.



### **JACOPO NAVA**

I study spectroscopic properties and mineralogical composition of geological, planetary and stone materials.



### **MARTHA GIOVANNA PAMATO**

I study unique samples forming in the deep Earth, such as inclusions in diamond. I also conduct experiments to determine the properties of mantle minerals. My research goal is to understand the structure, composition and evolution of the Earth.



### **SIMONE PAPA**

My research focuses on the microstructural record associated with earthquakes, both in natural (pseudotachylite-bearing) and experimental faults, as a tool for understanding the rheology of the lower crust.



### **LUCA PENASA**

My research interests are: Planetary geology; Small bodies; 3D geological modelling; Data science applications to geology; Python programming for geosciences; Dynamical modelling of brittle deformation.



### **ELENA MERCEDES PEREZ-MONSERRAT**

My research interests are: Ancient bricks technologies; Built heritage resilience; Interdisciplinary studies; Multianalytical approaches; Archaeometry; Traditional and eco-friendly building materials.



### **RICCARDO POZZOBON**

My research focuses on planetary geology and structural geology. The main topics are 3D geo-modeling of planetary surface/subsurface, structures related to diapirism, mud volcanism and lava tubes and planetary analogues.



### **GIULIA RICCI**

I am an archaeological scientist working on the diagnostic of Cultural Heritage encouraging interdisciplinary connections. My current research is the characterization and radiocarbon dating of historical mortars aiming at contributing to the cultural valorization of the built heritage.



### **MICHELA REATO**

My research interests cover the study of industrial materials, cementitious materials and hydraulic binders.



### **LIVIO RONCHI**

I am mostly interested in the evolution of alluvial plains linked to the last marine transgression.



### **HONAMI SATO**

My research interests are: Geochemistry and stratigraphy of Mesozoic successions to understand environmental changes through Earth history and its trigger (e.g. extraterrestrial impact and volcanic events).



### **SANDRO ROSSATO**

I am a geomorphologist interested in the evolution of Alpine valleys and alluvial plains in the late Quaternary. I mainly work in geological mapping, DEM analyses and geochronological investigations.



### **ELISA SALER**

My research field focuses on seismic vulnerability assessment at large scale of masonry and r.c. school buildings, for the evaluation of seismic risk and damage scenarios.



**ALESSANDRO SGARABOTTO**  
I work on numerical modelling of meandering fluvial channels to predict spatial distribution of sedimentary facies.



**PIERRE-YVES TOURNIGAND**  
I use Radio Occultation technique to detect volcanic ash clouds.



**BRANDON VANDERBEEK**  
My research focuses on improving seismic imaging strategies to better constrain the anisotropic structure of Earth's interior.



**JIANFENG YANG**  
I am a geodynamicist working on the numerical modeling of subduction zone dynamics and intraplate volcanism. I apply the petrological-thermo-mechanical models to study the complex dynamics in the Mediterranean region.



PhD students





**ELEONORA BENÀ**

*R. Sassi, G. Ciotoli, E. Spagnuolo*

Tectonic control on enhanced geogenic radon as a first order factor in radon hazard assessment



**LINDSAY CAPITO**

*S. Bizzi, N. Surian*

Geomorphic responses to sediment connectivity at the river network scale



**MARIA ELENA GASTALDELLO**

*C. Agnini, A. Alegret*

The latest Miocene-early Pliocene biogenic bloom: duration, causes and paleoceanographic implications



**MASSIMO DOMENICO NOVELLINO**

*A. Fontana, C. Ravazzi*

Landscape evolution in northern Adriatic regions in the late Pleistocene



**MIRKO PAVONI**

*J. Boaga*

Electrical and electromagnetic geophysical surveys in rock glacier environments



**SILVIA PULIERO**

*M. Floris, F. Catani*

Detection and monitoring of slope instabilities through satellite SAR data in areas affected by extreme climate events



**LUKAS RETTIG**

*P. Mozzi, G. Monegato, M. Spagnolo*  
The equilibrium line altitude (ELA) in the southern fringe of the Alps during the Last Glacial Maximum



**MICHELA SIMONATO**

*E. Fornaciari, I. Gardin, L. Giusberti*  
Calcareous nannofossil evolution during upper Cretaceous paleoenvironmental stress. Testing the impact of oceanic anoxic event (OAE2) and the Late Turonian Events on the synchronism of biohorizons



**XIAODUAN WANG**

*N. Preto, G. Dalla Porta*  
An ocean-wide mineralogical and geochemical study of ooids at the transition from an aragonite to a calcite sea: the Triassic and Jurassic of the Southern Alps (Italy) and Sichuan Basin (China)





**ANDREA BOSCAINI**

*A. Marzoli, N. Preto, J. Davis*  
Age, duration, and origin of the Wrangellia large igneous province and implications for the Carnian Pluvial Event.



**GIANLUCA CADELANO**

*A. Galgaro, A. Bernardi, G. Dalla Santa*  
Innovative solutions for ground heat exchangers.



**PIETRO CARPANESE**

*F. da Porto*  
Seismic risk assessment on a territorial scale based on bayesian approaches and machine learning



**OLIVER CHRIST**

*F. Nestola, F.E. Brenker*  
Extraterrestrial diamonds in ureilites and meteorites



**WEI FENG**

*G. Di Toro*  
Investigation of seismic slip in experimental faults under hydrothermal conditions.



**AMINOUS ISSOUFOU**

*G. Cassiani*  
Subsoil characterization using seismic reflection: advanced techniques.



**YIKAI LIU**

*G. Artioli, L. Valentini, M. Dalconi*  
Studies on the ionic transports in soil-binder systems.



**LUDOVICO MASCARIN**

*L. Valentini*  
Sustainable binders for emerging countries: numerical and experimental analysis of alkali-activated calcined clays.



**SIMONE MASOCH**

*G. Di Toro, J. Cembrano, G. Pennacchioni*

Structure, evolution and deformation mechanisms of large displacement seismogenic faults in the continental crust.



**ALICE PUPPIN**

*A. D'Alpaos, M. Marani*

Marsh biomorphodynamics under natural and anthropogenic changes through field observations and their modelling interpretation.



**APSARA SHARMA DHAKAL**

*L. Boschi*

Constraining the source of earthquake using time reversal seismic data.



**PAWEL MICHAL SLUPSKI**

*B. Cesare, O. Bartoli, J. Majka*

Former melt inclusions from (U)HP gneisses of the Scandinavian Caledonides.



**TOFFOL GIOVANNI**

*G. Pennacchioni, L. Menegon*

Interaction between coseismic brittle deformation and ductile flow in the lithosphere.



**ILARIA TOMASI**

*M. Massironi, C. Meyzen, F. Sauro*

Formation processes and evolution of large size lava tubes.



**ALBERTO ZONTA**

*F. da Porto*

Development of seismic isolation systems for industrial racks.



**ELENA BELLIZIA**

*M. Ghinassi, A. D'Alpaos*

Sedimentary facies variability along fluvial and tidal meanders: examples from the Holocene Venetian Plain.



**VALERIA CASCONO**

*J. Boaga, L. Boschi*

Ground motion seismic monitoring by the use of distributed low cost sensors



**XUE CHEN**

*M. Floris*

Testing multi-temporal InSAR techniques for geohazards analysis and assessment in different geological and geomorphological environments.



**LUCA DEL RIO**

*G. Di Toro, M. Moro, M. Fondriest*

Mechanism of formation of slip surfaces in carbonate-built rocks: seismic faulting vs. deep seated gravitational slope deformation.



**ROSALIA LO BUE**

*M. Faccenda*

Inverse geodynamic modelling with the adjoint method.



**SOFIA LORENZON**

*F. Nestola, P. Nimis*

Peering into the deep Earth through diamonds.



**LEONARDO PASQUALETTO**

*P. Nimis, F. Nestola*

Genesis and thermobarometry of inclusions in diamonds from Voorspoed kimberlite (South Africa).



**FRANCESCO RAPPISI**

*M. Faccenda*

Micro and macro scale geodynamic and seismological modelling of convergent margins.



**CINZIA SCAGGION**

*G. Artioli, N. Carrara, C. Scheib*  
Advanced analytical diagnostics  
applied to human osteological  
remains.



**ALLYSON VIGANO'**

*C. Agnini*  
Are calcareous phytoplankton affected  
by the onset of the Antarctica Ice-Sheet  
at the Eocene – Oligocene transition?



**YANG ZHICHENG**

*A. D'Alpaos, M. Marani, S. Silvestri*  
Analysis of the eco-  
geomorphodynamic evolution of  
the Venice Lagoon through  
remote sensing observations and  
ancillary field surveys.



# XXXIII series (defense on February 2021)



**ILARIA BARONE**

*G. Cassiani, J. Boaga, C. Strobbia*  
Seismic surface analysis and inversion:  
development and testing of  
tomographic algorithms.



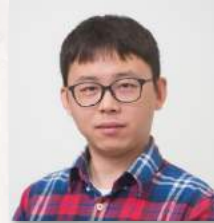
**MANFREDO CAPRIOLO**

*A. Marzoli, R.J. Newton*  
Carbon in the Central Atlantic Magmatic  
Province and its implications for the  
end-Triassic mass extinction



**SILVIA CONESSI**

*M. Dalconi, G. Artioli*  
Mineralogy and geochemistry of  
solidified metal-contaminated soil: case  
studies and leaching behavior.



**YIXING DU**

*M. Rigo*  
Integrated studies on Upper Triassic  
conodonts: biostratigraphy, evolution,  
and extinction.



**MARIE GENGE**

*M. Zattin, B. Vendeville, C. Witt*  
Tectonic evolution of the North-Central  
Patagonia: a thermochronological  
approach.



**ARIANNA MARCOLLA**

*P. Mozzi, C. Stefani, A. Miola*  
Late Quaternary paleoenvironmental  
reconstruction of the Venetian Plain  
from multi-proxy analysis.



**RODOLFO PEREGO**

*A. Galgaro, S. Pera*  
Shallow geothermal systems  
sustainability through a holistic  
approach: the Canton Ticino (CH) test  
site.



**TORRESAN FILIPPO**

*L. Piccinini*  
Sustainability assessment of geothermal  
exploitation by numerical modeling.

# In 2020, the following PhD candidates defended their thesis:

Candidate	Thesis	Supervisors
<b>Jacopo Amalfitano</b>	The Cenomanian-Turonian ichthyofaunas from the Scaglia-type succession of northeastern Italy	Giusberti Carnevale Fornaciari
<b>Marta Cosma</b>	Stratal patterns and sedimentary facies in tidal point bar	Ghinassi D'Alpaos
<b>Marco Crivellaro</b>	Deciphering the polymetamorphic history of Jubrique sequence (Betic Cordillera, Spain)	Cesare Bartoli Acosta Vigil
<b>Nico Dalla Libera</b>	The Natural Background Level (NBL) problem: a hydrogeochemical study on the natural occurrence of arsenic located in the Veneto region (NE, Italy)	Fabbri Tateo
<b>Simone Molinari</b>	Chromium and arsenic removal from contaminated waters and soils: environmental application of maghemite nanoparticles (SAMNS)	Salviulo Vianello Carbone
<b>Jacopo Nava</b>	Mineralogical composition and geological characters of minor bodies of the Solar System (4 Vesta and 1 Ceres) inferred from NASA-Dawn space mission data	Massironi Fosco Palomba
<b>Simone Papa</b>	The pseudotachylite-mylonite association: an insight into the mechanism of deep earthquakes	Pennacchioni
<b>Xia Li</b>	From bedrock to sediments: insights on Ross Sea ice-flow dynamics inferred from detrital data	Zattin





**Our commitment  
beyond the Department**

## MEMBERSHIPS AND APPOINTMENTS

Accademia delle Scienze di Torino	Member	F. Nestola
Accademia Nazionale delle Scienze detta dei XL	Member	F. Nestola
American Geophysical Union	Member of the Tectonophysics Nominations (or Canvassing) Committee	G. Di Toro
ANVUR	Member of the panel for National Scientific Qualification	M. Zattin
ANVUR	Member of the evaluation panel of PON projects	M. Zattin
Arqus European University Alliance Action line 2.13 Task force: Common charters on Gender Equality, Inclusion and Sustainable Development Goals	Unipd Coordinator	G. Salviulo
Associazione Italiana di Cristallografia	Membro del Consiglio di Presidenza	G. Artioli
Associazione Italiana di Geografia Fisica e Geomorfologia	Member of the Executive Committee	N. Surian
Associazione Italiana di Geologia Applicata (AIGA)	Member of the Executive Committee	P. Fabbri
Board of the coordinators of the PhD courses, University of Padua	Member	C. Agnini
Carleton University, Canada	Referee for professorship Promotion	B. Cesare
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Centro Ateneo Musei, Department of Geosciences (University of Padua)	Scientific Director of the Museum of Geology and Paleontology of the University of Padua	L. Giusberti
Centro di Protezione Civile dell'Università di Firenze	Scientific Panel Member	F. Catani
Centro Interdipartimentale CIRCe, UNIPD	Director	G. Artioli
Commissione Italiana di Stratigrafia	Member (since september)	L. Giusberti
Consiglio Nazionale delle Ricerche	Member - DPCNR 26/2019 - Committee for studying and drafting technical standards for constructions	F. Da Porto
Corso Diritti Umani e inclusione, Università di Padova	Member of the board	G. Salviulo
Council of the coordinators of the PhD courses, University of Padua	Member	C. Agnini
Council of the School of Science, University of Padua	Member	C. Agnini
Department representative "disability and inclusion" committee, Unipd	Member, delegate of the Department of Geosciences	G. Salviulo
Department representative "SAFI committee"	Member, delegate of the Department of Geosciences	G. Salviulo
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EUREF – International Association for Geodesy- Commission on European Reference Frame	Honorary Member	A. Caporali
European Association for Earthquake Engineering	Member - EAEE-WG10 "Seismic aspects of monuments preservation"	F. Da Porto
European Research Council	Panel member of the PE-10 (Earth Sciences)	G. Di Toro
European Research Council	Panel member of the Earth System Science (PE10)	F. Nestola
European Space Agency	Member of the Solar System Exploration Working Group	M. Massironi
Human Rights Centre "Antonio Papisca" Unipd	Head	G. Salviulo

INQUA – International Union for Quaternary Research	Member of the advisory board	A. Fontana
INQUA Commission on Stratigraphy and Geochronology (SACCOM)	Member	L. Capraro
International Subcommittee on Paleogene Stratigraphy	Secretary	C. Agnini
ISIS-RAL	Member of FAP-7, panel for neutron beamtime allocation	G. Artioli
Istituto Nazionale di Geofisica e Vulcanologia	Member of the Scientific Council of the Istituto Nazionale di Geofisica e Vulcanologia	G. Di Toro
Italian chapter of International Association of Hydrogeologists (IAH)	Member of the Executive Committee	P. Fabbri
IUCr International Union of Crystallography	Chair of the Commission on Crystallography in Art and Cultural Heritage	G. Artioli
Marie Curie Alumni Association Italy Chapter	Chair	R. Biondi
Metamorphic Studies Group (UK)	Member of the Barrow Award judging panel	B. Cesare
Mineralogical Society of America	Member of MSA Award Committee	B. Cesare
Ministère de la Culture, Direction générale des patrimoines - Service du patrimoine, France	Comité scientifique pour l'étude et la restauration de la vaisselle de bronze de Lavau	G. Artioli
National Science Center (Poland)	Member of the International Panel of Expert	M. Zattin
PEW Pew Research Center	External adviser for the report "The place of Science in Societies around the world".	G. Di Toro
Scuola Galileiana di Studi Superiori, University of Padua	Member of Executive Board	F. Nestola
Sub-Commission 4.3: Atmosphere Remote Sensing under the IAG Commission 4 "Positioning and applications" (2019 - 2023)	Member	R. Biondi
UNESCO Chair on Prevention and Sustainable Management of Geo-hydrological Hazards, Florence	Chair Associate	F. Catani
UNESCO site candidature: Val d'Alpone	Member of Scientific Committee	E. Fornaciari
UNI - Ente Italiano di Normazione	Member - UNI/CT 021/GL 08 (U730006) Structural Engineering Committee/Working Group 6 "Monitoring of structures"	F. Da Porto
UNI - Ente Italiano di Normazione; CEN - European Committee for Standardization	Vice-president. UNI/CT 021/SC6 (U7306) Structural Engineering Committee/Subcommittee 6 - Italian Delegate - CEN/TC 250/SC 6 "Masonry Structures"	F. Da Porto
Unione Geofisica Italiana	President	A. Caporali
Unipd sport activities	Advisor of the Rector	M. Zattin
University of Padua	Vice- Rector for Buildings and Safety	F. Da Porto
University of Padua	Member of the Rectoral Committee for regulation of PhD activities	M. Zattin
University of Padua	Member of the Academic Senate	F. Nestola
University of Padua	Member of the Executive Board of Heads of Departments	F. Nestola
University of Tübingen	Evaluation of "Competence Center Archaeometry - Baden-Wuerttemberg (CCA-BW)	L. Maritan
Veneto Region	Member of the technical-scientific committee on PFAS	P. Fabbri
Working Group on the Early/Middle Pleistocene Boundary (SEQS)	Member	L. Capraro

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American Mineralogist	F. Nestola
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Tectonophysics	Di Toro
Vadose Zone Journal	B. Mary
Water	N. Surian
Water Resources Research	S. Bizzi



Projects and funding



## PROJECTS AND FUNDING

*by N. Surian*

What kind of research projects are going on in the Department? Which funding schemes support these projects? Addressing these points helps better understand the scientific research that is carried out by the staff of the Department. Seventy-one projects are going on this year. The projects cover a very wide range of research topics, from curiosity-driven science to applied science. Good examples of curiosity-driven research are the following: 'SINDIA - Sulphide INclusions in DIAMonds: A Window into the Earth's Interior Through Time' (EU – H2020 MSCA) and 'A New Global Volcanic-driven Carbon Cycle Perturbation at the Norian/Rhaetian Boundary, Late Triassic' (MUR-PRIN). Examples of applied science are 'GROWING - Geophysical Roots Observation for Water SAVING in Arboriculture, Viticulture and Agronomy' (EU – H2020 MSCA), 'GEO4CIVHIC - Most Easy, Efficient and Low Cost Geothermal Systems for Retrofitting Civil and Historical Buildings' (EU H2020) and 'Understanding of Admixture Control on Rheology, Hydration, and Development of Mechanical Resistance in Cement and Concrete' (funded by MAPEI). Overall, the ongoing research projects highlight two aspects. First, new research areas have been established over the past few years (e.g., planetary geoscience). Second, applied research is receiving progressively more attention. The present research strategy of the Department is described by the 'Project for the Development of the Department' (2018–2022), a project that places great emphasis on the role of geosciences in the Anthropocene and on the link between science and society.

A wide range of funding schemes supports our research. Funds come from the European Commission, the Italian Ministry of University and Research (MUR), the University of Padova, public institutions and agencies, private foundations and companies. In addition, the staff is involved in some international projects (e.g., IODP - International Ocean Discovery Programme; ECZ Dry, Italy-Israel Scientific and Technological Cooperation Programme). Sixteen projects are funded by the EU Commission: two European Research Council (ERC) projects (one Consolidator Grant and one Starting Grant); 10 collaborative projects (H2020); and four Marie Skłodowska-Curie Individual Fellowships. Ten projects are funded by MUR: four PRIN projects; five projects dealing with Antarctica; and one Rita Levi Montalcini Programme. Nine projects are supported and carried out in collaboration with public institutions, such as the National Civil Protection, the Basin Authority of the Eastern Alps and the Veneto Region. Seven projects are funded or supported by private companies (e.g., MAPEI) and foundations (Cariparo and Cariplo). Overall, these funding schemes show that the Department is successful and attractive (as a host institution) for very competitive projects (specifically ERC grants and MSCA fellowships), has established solid research networks at the national and international levels (the PRIN and H2020 projects, respectively) and has good and increasing interactions with public and private sectors. Finally, where is this research being carried out? Is the research focused on specific areas of the Earth? As expected, several study sites are in North-eastern Italy (e.g., Dolomites, Venetian and Friulian Plain, Venice Lagoon), but we have studies going on in many other regions (Africa, Asia, North and South America, Australia and Antarctica) and...on other planets (Mars and Mercury).



Title	Handler	Funding body
Source and impact of greenhouse gasses in Antarctica (SENECA)	R. Sassi	MUR – PNRA
3D reconstruction of the shape of solid inclusions in garnet	B. Cesare	University of Padova
A new global volcanic-driven carbon cycle perturbation at the Norian/Rhaetian Boundary, Late Triassic	M. Rigo	MUR - PRIN
airport-sCAle severe weather nowcastinG project (CARGO)	R. Biondi	EU - H2020 SESAR
Application of structural health monitoring techniques and methodologies for the assessment of cultural heritage buildings and sites	F. da Porto	CIPAR
Bioconstructional organisms from the Ross Sea under Climate Change: ecosystems and 'oasis' of biodiversity to monitor and protect (BIOROSS)	C. Mazzoli	MUR - PNRA
Bricks manufacturing technologies to increase built heritage resilience and to raise common identities of peoples (CLAYONRISK)	E. M. Perez Monserra	EU – H2020 MSCA
Caratterizzazione chimico-fisica di olivine carbonatate per valutazione di possibili utilizzi	G. Artioli	ENI Spa
Carbon minerals in Frontier Mountain ureilites of the Museo nazionale dell'Antartide, Siena, Italy (COMMANDER)	F. Nestola	MUR - PNRA
Collaboration agreement with the Gemological Institute of America	F. Nestola	Gemological Institute of America
Controllo delle prestazioni e della reologia nelle moderne formulazioni dei leganti per l'edilizia	G. Artioli	MAPEI Spa
Cretaceous Hotspots: Exploring Fish Biodiversity At The Rise Of A Greenhouse Regime	L. Giusberti	University of Padova
Crustal anatexis up to ultra-high temperature conditions in Antarctica	B. Borges Carvalho	MUR - PNRA
Dal mondo greenhouse al mondo icehouse: la transizione Eocene-Oligocene in Zelandia	C. Agnini	University of Padova
Dating of the tectonic activity along the Transantarctic Mountains Front	V. Olivetti	MUR - PNRA
Development of a Decision Support System for Improved Resilience and Sustainable Reconstruction of historic areas to cope with Climate Change and Extreme Events based on Novel Sensors and Advanced Modelling Tools (HYPERION)	C. Mazzoli	EU – H2020
Dynamics of transitional settings from Cretaceous to Eocene in the Southcentral Pyrenees	M. Ghinassi	MCIU, Spanish Government
ECZ-Dry: New technologies to monitor the Earth Critical Zone in water-limited ecosystems	G. Cassiani	Italy-Israel Scientific and Technological Cooperation Programme (Scientific Track 2018)
Europlanet 2024 (EPN2024)	M. Massironi	EU - H2020-INFRAIA
EXTEND: Estendere la conoscenza del terremoto dalla profondità alla superficie	G. Di Toro	Dipartimento Protezione Civile



Title	Handler	Funding body
Fluid-fluxed crustal melting: looking for the evidence	O. Bartoli	University of Padova
Fluid-Rock InteraCTION at hydrothermal conditions during the seismic cycle (FRICTION)	R. Gomila Olmos De Aguilera	EU – H2020 MSCA
Fluvial and tidal meanders of the Venetian-Po plain: from hydrodynamics to stratigraphy	M. Ghinassi	CARIPARO Foundation
From sediment connectivity to fluvial processes	S. Bizzi	University of Padova
Most Easy, Efficient and Low Cost Geothermal Systems for Retrofitting Civil and Historical Buildings (GEO4CIVHIC)	A. Galgaro	EU – H2020
Geological-hydraulic modeling and identification of risk scenarios of the landslide phenomenon of the Busa del Cristo, Perarolo di Cadore, Belluno	A. Galgaro	Veneto Region
Geophysics in permafrost environments	J. Boaga	Swiss Federal Research Institute WSL
GEOPLANEXT	M. Massironi	EU- ERASMUS + Strategic Partnership
Giscad OV	A. Caporali	EU – H2020
Managing the effects of multiple stressors on aquatic ecosystems under water scarcity (GLOBAQUA)	G. Cassiani	EU
Ground motion seismic monitoring by the use of distributed low-cost sensors	J. Boaga	University of Padova
Geophysical Roots Observation for Water savING in arboriculture, viticulture and agronomy (GROWING)	B. Mary	EU – H2020 MSCA
Historic and prehistoric landslides in the Alps. Implications for new hazard maps in mountainous areas. Focus on Lake Garda–Brenta Dolomites sector (NE Italy)	S. Martin	University of Padova
Hydrothermal fluid circulation and cryogenic activity on primitive icy bodies of the Solar System.	R. Spiess	University of Padova
PalaeoHydrological, -PEDological and -AEolian processes shaping Quaternary landscapes (HYPEDA)	A. Fontana	INQUA - International Union for Quaternary Sciences
Innovative technologies to mitigate the effects of dynamic actions on racks/shelves systems	F. da Porto	POR FSE
Integrated river management of mountain streams	N. Surian	Basin Authority of the Eastern Alps
Intraplate deformation, magmatism and topographic evolution of a diffuse collisional belt: Insights into the geodynamics of the Arabia-Eurasia collisional zones	M. Zattin	MUR - PRIN
Knowledge based approach for the conservation, restoration and mitigation of seismic risk of Cultural Heritage buildings stricken by the Central Italy earthquake (2016)	F. da Porto	CIPAR
Lombardy-based Advanced Meteorological Predictions and Observations (LAMPO)	R. Biondi	CARIPLO Foundation

Title	Handler	Funding body
MapFly	P. Mozzi	University of Padova
Mechanism of seismic rupture propagation in the Longmen Shan fault belt, China	G. Di Toro	Natural National Science Foundation of China
MineHeritage	G. Artioli	EIT Raw Materials
Mineral reactivity, a key to understand large-scale processes: from rock forming environments to solid waste recovering/lithification	G. Artioli	MUR – PRIN
multi-hazard monitoring and early warning system (ALARM)	R. Biondi	EU - H2020 SESAR
New outlook on seismic faults: from earthquake nucleation to arrest	G. Di Toro	EU - ERC
New Window into Earth's interior (NEWTON)	M. Faccenda	EU - ERC
Petrophysics (Physical Properties/Downhole Measurements)	J. Boaga	IODP
PLANetary MAPping project (PLANMAP)	M. Massironi	EU - H2020- COMPET
Progetto Esecutivo 2019-2021 DPC-ReLuis	F. da Porto	National Civil Protection
Proprietà reologiche di argille calcinate	L. Valentini	University of Padova
Raccolta, catalogazione ed armonizzazione dei dati di interesse prodotti dopo vaia. analisi di immagini telerilevate (RAPID)	M. Floris	Veneto Region
Rapporti tettonica/sedimentazione nella successione syn-rift dell'Horda Platform (Mare del Nord settentrionale)	A. Breda	University of Padova
Satellite-borne and in-situ Observations to Predict The Initiation of Convection for ATM (SINOPTICA)	R. Biondi	EU - H2020 SESAR
Scientific support to the design and execution phases of seismic risk prevention interventions on historical churches	F. da Porto	Superintendence of Verona, Rovigo, Vicenza
SEA-LEAPS: rapidi innalzamenti del livello marino durante la trasgressione marina olocenica	A. Fontana	University of Padova
Single-grain multi-technique dating of sediments: a new approach to the study the uplift and exhumation of the north-eastern Tibetan Plateau	M. Zattin	High-Talent Program, Shaanxi Province (China)
Structural health monitoring and condition assessment of: Arena di Verona; Roman Theatre; Castelvecchio; Lamberti Tower; Cansignorio Tomb; Ponte Nuovo del Popolo	F. da Porto	Municipality of Verona
Studio di analisi e consulenza sul processo di produzione di rivestimenti ceramici	G. Artioli	Gruppo Piazzetta Spa

Title	Handler	Funding body
Studio idrogeologico della frana di Lamosano in Comune di Chies d'Alpago (BL)	L. Piccinini	Genio Civile di Belluno, Regione Veneto
Sulphide Inclusions in Diamonds: A Window into The Earth's Interior Through Time (SINDIA)	M. Pamato	EU – H2020 MSCA
The COmplexity of the MICrostructural record associated with an earthQuakE (COMICHE)	G. Pennacchioni	University of Padova
The deep Earth Oxygen Cycle: Tracing stable isotopes of iron in the mantle	D. Novella	MUR – Rita Levi Montalcini Programme
The Dynamic Mass Transfer from Slabs to Arcs (DYNASTARS)	B. Cesare	MUR - PRIN
The Pliocene-Quaternary succession of the Venetian-Friulian area: new insights of the landscape evolution from the Zanclean transgression to the Present	C. Stefani	University of Padova
Tracking the Greenland ice sheet dynamics during Eocene and Oligocene: a multi-proxy approach	V. Olivetti	University of Padova
Trasporto solido in eventi alluvionali estremi	N. Surian	University of Padova
Underground temperature records for climate change and subsurface geothermal Assessment (ULTRA)	E. Di Sipio	University of Padova
Venet-ONE	J. Boaga	Veneto Region
Venezia 2021: Programma di ricerca scientifica per una laguna regolata	A. D'Alpaos	Provveditorato Interregionale per le Opere Pubbliche per il Veneto, Trentino Alto Adige e Friuli Venezia Giulia
Volcanic clouds dEtection and monitoring for Studying the eRuption impact on climate and aVlatiOn (VESUVIO)	R. Biondi	University of Padova



# Laboratories



## **LABORATORY FACILITIES** *by M.C. Dalconi*

Year 2020 has been challenge because of the pandemic, which significantly impacted every sector, with lab-based research in the earth sciences being no exception.

The containment of the SARS-CoV-2 virus imposed restrictions that inevitably limited access to laboratory facilities both for students and technical staff. This has led to a reduction in the total number of sample preparations and analyses compared with 2019. Nonetheless, the operational activity has not been halted completely thanks to a prompt reorganisation of work and the resilience of the technical staff.

Despite the difficulties related to lockdown periods, it has been possible for the development plan of the departmental laboratories to continue with the completion of administrative procedures for acquiring two state-of-the-art instruments: a dual-beam FIB/FEG-SEM and confocal Raman microscope.

The dual-beam FIB/FEG-SEM was delivered to the Department in December 2020, and it is going to be fully operational in 2021.

In 2020, a total of 24 departmental laboratories were active in supporting internal and collaborative research projects, delivering an average volume of approximately 3,000 sample preparations, 3,700 analyses and 715 hours of SEM working time.

The highest volumes of analysis were confirmed to be delivered by the X-ray powder diffraction lab (nearly 1,500 analyses), scanning electron microscopy lab and isotope ratio mass spectrometry lab.

Laboratories equipped with advanced instrumentations executed highly specialised analyses unique to their features, for example, single crystal X-ray diffraction measurements of mineral inclusions in diamonds or seismic-slip simulations with rotary shear apparatus. The newly established hyperspectral analysis lab reached full operational status, and the laboratory temporary staff delivered courses to train users in data collection and analysis. Departmental drones were extensively used for drone-based surveys to support both research activities and online education through virtual field laboratories. The thin section preparation laboratory and the laboratories for palaeontological preparations were the most active in supporting internal research projects and teaching activities. A total of nearly 2,000 sample preparations were delivered by palaeontological laboratories, followed by the 1,000 sample preparations executed in the thin section preparation lab. The photography lab deserves special credit for the large amount of work that has gone into realising the digital collection of rocks and minerals, which has been fundamental in supporting online teaching. The thin section preparation laboratory and the laboratories for palaeontological preparations were the most active in supporting internal research projects and teaching activities. A total of nearly 2,000 sample preparations were delivered by palaeontological laboratories, followed by the 1,000 sample preparations executed in the thin section preparation lab.



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In 2020, the Department has welcomed Silvia Cattò as a technician in the sedimentology and thin section labs and Roberto Rossi as a technician expert in GIS applications, along with thanking and wishing all the best to Sandra Boesso on her retirement. By the end of 2020, the technical staff of the Department was composed of 10 technicians operating in 18 laboratories. Operational activities in the other six laboratories were supported by researchers and temporary staff.

#### Equipment acquired in 2020:

- **Ultra-high-resolution FIB/FEG-SEM, Tescan Solaris**
- **Lapping and polishing system, Logitech LP70**
- **High-capacity cut-off machine, Struers Labotom-15**
- **Low-speed cut-off machine for small samples, Struers Minitom**
- **Fluid pressurising system for rotary shear apparatus, ROSA**

#### LIST OF LABORATORIES AT THE DEPARTMENT OF GEOSCIENCES

Applied Mineralogy	A
Applied Petrography	A
Cathodoluminescence	A
Fluid and Melt inclusion microthermometry	A
Confocal Optical Microscope (maintenance phase in 2020)	A
Fitoplancton	S
Geophysics	A
Hydrogeology	A
Hyperspectral analysis	A
Macropaleontology	S
Mass Spectrometry - IRMS	A, S
Micropaleontology	S
Micro-Tomography	A
Mineral Resources	S
Mineral separation	S
Palinology	S
Rock mechanics and petrology	A, S
Scanning Electron Microscopy	A
Sedimentology	S
Thermocronology	A
Thin section preparation	S
X-ray Fluorescence Spectroscopy (maintenance phase in 2020)	A
X-Ray Powder Diffraction	A, S
X-Ray Single Crystal Diffraction	A
Graphics and photography	A

S: sample preparation; A: analysis



**Museums**





## MUSEUMS

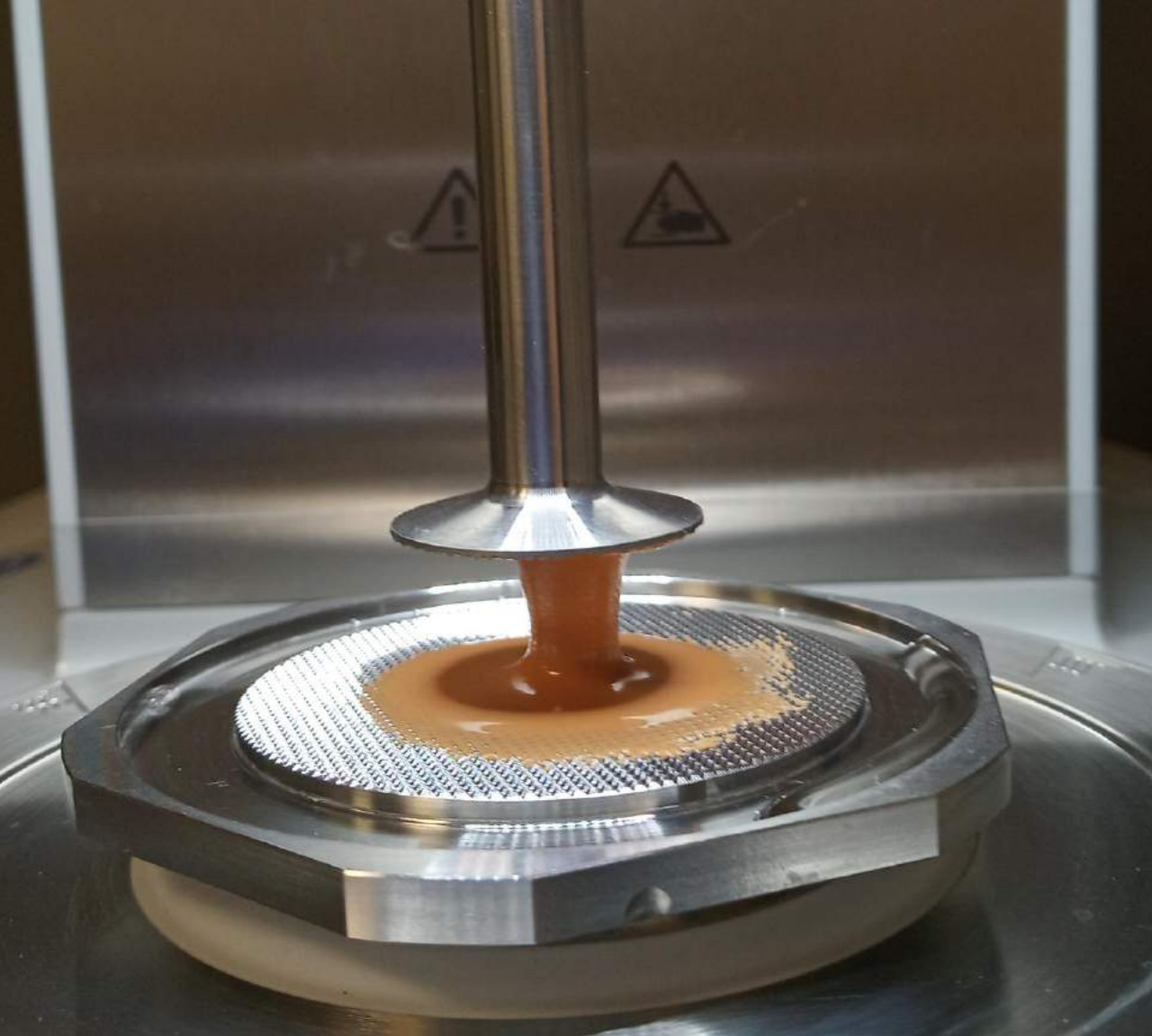
*by L. Giusberti*

The Department owns extensive collections of Italian and foreign rocks, fossils and minerals housed at 'Palazzo Cavalli' in the Museum of Geology and Palaeontology and in the Museum of Mineralogy. Such huge scientific and cultural heritage has its roots in the old collections of the Natural History Museum of the University of Padua, which was founded in 1733 thanks to a donation by Antonio Vallisneri Jr.

Besides the scientific activities carried out by Italian and foreign researchers from all over the world, the museum's staff, coordinated by CAM (Centro Ateneo Musei), carries out intense public engagement activities with the fruitful support of the Department's researchers.

In 2020, all the museums' activities were strongly affected because of the COVID-19 pandemic. Nevertheless, the realisation of the 'Museum of Nature and Humankind', which will include the former Department's collections along with the university's collections of zoology and anthropology, is currently underway at Palazzo Cavalli.

Since 2017, several of the Department's researchers have been strongly involved in this ambitious project which hopefully will represent the main legacy of the celebrations in 2022 to mark 800 years of University of Padua.



**CIRCe**

# CIRCe – Centre for the Investigation of cement materials

by G. Artioli

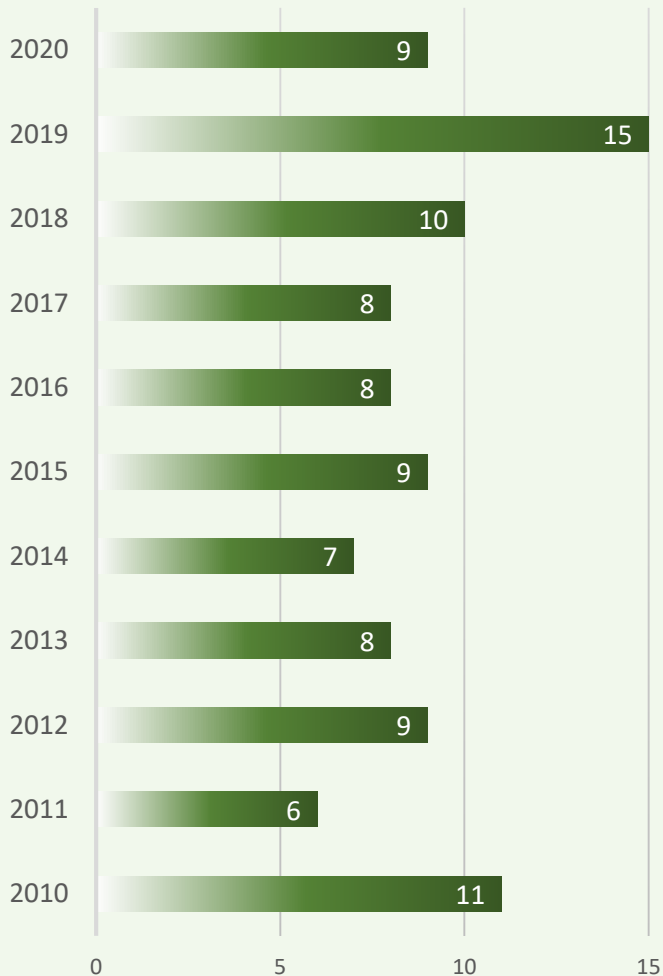
CIRCe Centre is the only centre devoted to the fundamental investigation of cement materials and the formulation of construction binders in Italy. The centre activity includes fundamental research, applied research and consulting. The centre started as a collaboration in the field of construction materials between the Department of Geosciences and the Department of Civil, Construction and Environmental Engineering (ICEA). Recently the Department of Cultural Heritage (DBC) and the Department of Industrial Engineering (DII) also joined. The Centre acts as research support and partner for a number of Institutions and Companies at the international level. Despite the complicated global sanitary situation, CIRCe Centre continues its mission concerning the scientific investigation and development of materials mainly devoted to buildings and constructions. The activity encompasses the following: (1) the archaeometric investigations of ancient building materials in collaboration with archaeologists, art historians and restorers; (2) the established collaborations with important companies such as MAPEI Spa, which involves the optimisation and development of innovative binders and admixtures; (3) the training of students and support of African researchers in the development of sustainable binders complying with the concepts of circular economy; and (4) the consultancy for small companies wishing to move towards UNESCO's Sustainable Development Goals.





PhD programme

**Fig. 1 - PhD (2010-2020)**

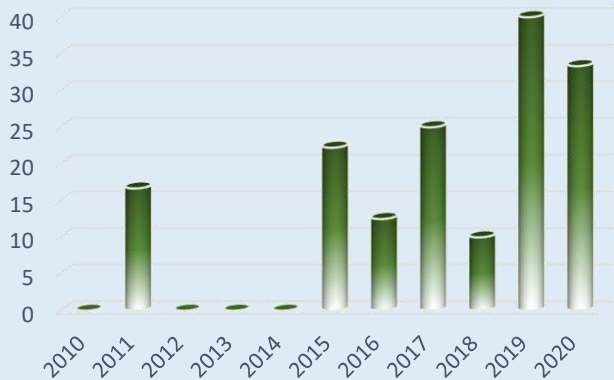


## **PhD PROGRAMME** *by C. Agnini*

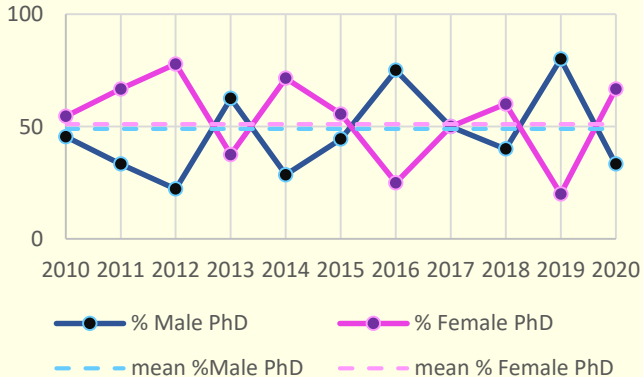
In 2020, the doctoral course in geosciences of the University of Padua (XXXIV series) passed ANVUR's evaluation with a special recognition for internationality and interdisciplinarity. The members of PhD board have increased and is composed of 48 people, who include 35 members of the University of Padua faculty staff, 12 high-reputation foreign researchers and one Italian external member (INGV – Rome) (<https://www.geoscienze.unipd.it/corsi/phd-course/phd-board>).

The active series were XXXIII, XXXIV, XXV and XXXVI, with XXXIII series finishing on September 30th and XXXVI series starting from October 1st. The total number of PhD candidates was 42 (Figure 1). The research projects cover all the disciplines of the geosciences (i.e., palaeontology, stratigraphy, sedimentology, structural geology, geomorphology, applied geology, mineralogy, petrography and geochemistry, applied mineralogy, cultural heritage conservation, geophysics and applied geophysics), and in most, if not all, cases, the research projects have a multidisciplinary integrated approach. Although the publication of papers is not a mandatory requirement to finish the PhD programme, the outcomes of the PhD research are usually published in ISI-Scopus Q1 journals. Details on the research project of each PhD candidate are available in the people chapter.

**Fig. 2 - % foreign PhD (2010-2020)**



**Fig. 3 - Scissor graph Female vs Male (2010-2020)**



Among the nine scholarships available for 2020, six are funded by the university, two are supported by the CARIPARO foundation and one comes from the UNIPD-CSC joint programme. The PhD board has decided to reserve two scholarships for foreign students, one from the university and one from the CARIPARO foundation. This strategy has allowed a substantial increase of foreign students (mean ca. 25%) over the last five to six years (Figure 2). The increase of foreign PhD students for different countries (e.g., USA, Germany, Poland, China and France) has created a more stimulating and cutting-edge environment where Italian and foreign students can interact in a positive mode that always respects each other's cultural background and identity. Geosciences is one of the STEM (science, technology, engineering and mathematics) disciplines for which a gender gap is usually observed. The scissor graph on the male/female percentage per year (Figure 3) displays a high variance because of the relatively low number of the PhD positions but substantial equality if the mean percentage is calculated in a longer time window (51% female and 49% male). Nevertheless, we are aware that this gender balance dramatically changes in favour of males as one's career advances. Last but not least, 2020 will be remembered for the COVID-19 pandemic that has forced all of us to face new challenges in developing research. Our PhD candidates have suffered and still suffer, but they have been able to find new ways to reach their aims, even in such difficult conditions. We are very proud of you guys!



Collaborations

## COLLABORATIONS

by A. Fontana

The exchange of ideas and comparison with colleagues of other Italian and foreign institutions is one of the characteristics that has marked the Department since its origin. Unfortunately, as expected, after almost one year of travel and working restrictions, several activities related to many collaborations were strongly limited and largely postponed to next year.

The list below reports only the formalised collaborations that were active in 2020, even though a significant number of informal relations exists, in particular with other national and European institutions and local territorial agencies. Also, the multiple and important relations with other departments of the University of Padua are omitted.

In 2020, the Department aimed at strengthening its partnership with institutions devoted to territorial administration and management, in particular several research agreements and contracts with the agencies of Regione del Veneto, Provincia Autonoma di Trento and Regione Autonoma Friuli Venezia Giulia. In this framework, specific projects help monitor, study, plan and manage river channels, mountain slopes and geological mapping, collaborating, for example, with Veneto Regional Agency for Environmental Protection (ARPAV), ARPA of Region Emilia-Romagna, Basin Authority for Eastern Alps, Soprintendenza Archeologia and Belle Arti e Paesaggio of Friuli Venezia Giulia. The Department is involved in a network of collaborations with many other Italian universities within the framework of the research projects funded by the MUR and other national administrative institutions (e.g., PRIN, PNRA). However, many other collaborations with colleagues exist, originating from interpersonal relations.



*Official agreements and relationships with other institutions in 2020*



Several connections and projects are carried out in collaboration with the Italian National Research Council (CNR) and its different departments and institutes, not only with the CNR-IGG (Institute of Geosciences and Georesources), which has its local unit hosted in the Department. At a European level, several academic institutions have relations with the Department, mainly for the development of research projects that, partly, have been funded in the framework of the ERC, H2020 and INTERREG programmes. As described in the chapter about the didactic aspects, several partnerships are also linked to the co-tutoring of PhD students for their theses and in the framework of the exchange programme ERASMUS+. From a global perspective, in 2020, the Department maintained relationships with extra-European countries, and a significant part of these collaborations has been active with universities and research institutions in China, Australia, USA and Canada. Some of the agreements with Chinese universities aim at strengthening cooperation for master and PhD courses.



# ITALY

University of Milan, Department of Earth Sciences

University of Camerino, Sezione di Geologia

University of Perugia, Department of Physics and Earth Sciences

University of Bologna, Department of Cultural Heritage

University of Bologna, Department of Chemistry "Giacomo Ciamician"

University of Torino, Department of Earth Sciences

University of Udine, Department of Humanities and Cultural Heritage

University of Sannio, Dipartimento di Scienze e Tecnologie

University of Bari, Department of Earth and Geo-environmental Sciences

University of Roma Tre, Department of Sciences

University of Parma, Department of Chemistry, Life Sciences and Environmental Sustainability

University of Siena, Department of Physical sciences, Earth and environment

Polytechnic of Milan, Department of Electronics, Information and Bioengineering (DEIB)

Polytechnic of Milan, GEOLab Geomatics and Earth Observation Laboratory

University of Roma La Sapienza Department of Earth Sciences

University of Modena and Reggio Emilia, Department of Chemical and Geological Sciences

CNR-ICMATE, Institute of Condensed Matter Chemistry and Technologies for Energy, Padova

CNR-IGAG, Institute of Environmental Geology and Geo-Engineering, Milan

CNR-IGAG, Institute of Environmental Geology and Geo-Engineering, Rome

CNR-IGG, Institute of Geosciences and Georesources, Firenze

CNR-IGG, Institute of Geosciences and Georesources, Padova

CNR-IGG, Institute of Geosciences and Georesources, Pisa

CNR-IRPI, Institute for Geo-Hydrological Protection, Padova

CNR-IRSA, Institute of Research on Water, Bari

CNR-ISAC, Institute of Atmospheric Sciences and Climate, Bologna

CNR-ITC, Construction technologies institute, Milan

ENEA - Technical Unit for the Development of Applications of Radiations, Frascati

ENEA – SSPT – Department for Sustainability – La Spezia, Italy

INGV - National Institute of Geophysics and Volcanology, Rome

INGV - National Institute of Geophysics and Volcanology, Bologna

OGS – National Institute Experimental Geophysical observatory, Trieste

CIRCE - Centre for Isotopic Research on Cultural and Environmental Heritage, INNOVA SCaRL

Ministero dell'Interno  
Soprintendenza dei Beni culturali ed ambientali di Palermo (Italy)  
Soprintendenza Archeologia, Belle Arti e Paesaggio of Friuli Venezia Giulia  
Museo Regionale della Sicilia, Galleria di Palazzo Abatellis, Palermo  
ISMEO Italian Archaeological Mission  
Centro Studi Sudanese e Sub-Sahariani, Treviso

Arpae Emilia-Romagna, Bologna  
Autorità di bacino distrettuale delle Alpi Orientali  
Regione del Veneto, Dipartimento Difesa del Suolo, Venezia  
Servizio geologico di della Provincia di Trento  
Servizio Geologico, Regione Autonoma Friuli Venezia Giulia, Direzione Centrale Difesa dell'Ambiente,  
energia e sviluppo sostenibile, Trieste  
Superintendence of Verona, Rovigo, Vicenza  
Municipality of Verona

Eni SpA, Research & Technological Innovation Department  
MAPEI Spa, Milan  
SOGEL spa Società Generale di Informatica, Rome  
Geomatics Research & Development (GReD) srl, Italia  
CIMA Research Foundation, Savona

## **EUROPE**

Belgium, Vrije Universiteit Brussel, Department of Electrochemical and Surface Engineering

Denmark, University of Copenhagen

Estonia, University of Tartu, Estonian Biocentre, Institute of Genomics

France, IsTerre, Institute of Earth Sciences, Grenoble-Alpes University, Grenoble

France, Université Aix-Marseille, CEREGE, Aix-en-Provence

France, University of Lille, Department of Earth Sciences

France, University of Paris-Saclay Geops, Paris

France, Institut de Physique du Globe, Paris  
France, University Sorbonne, IStEP - Institute of Earth Sciences of Paris, Paris  
France, CNES, National Centre of Space Studies (CNES, France)  
France, CNRS, Laboratory of Paleontology and Geodynamics, Nantes

Germany, Jacobs University Bremen, Department of Physics and Earth Sciences  
Germany, University Bremen, MARUM  
Germany, University of Frankfurt  
Germany, Westfaelische Wilhelms-Universitaet Muenster, Institut für Planetologie  
Germany, GeoZentrum, Friedrich Alexander University Erlangen Nuernberg (FAU)  
Germany, Department Physical Geography - University of Göttingen  
Germany, UFZ - Helmholtz Centre for Environmental Research, Leipzig  
Germany, Ludwig Maximilians Universität München, Department of Earth and Environmental Sciences  
Greece, School of Rural & Surveying Engineering, National Technical University of Athens (NTUA), Athens

Ireland, Trinity College Dublin, Department of Geology, Dublin

Norway, Oslo Metropolitan University, Department of Civil Engineering and Energy Technology

Portugal, University of Aveiro, Department of Materials and Ceramic Engineering

Romania, Babeş - Bolyai University, Department of Geology, Cluj - Napoca

Poland, Centrum Badań Kosmicznych Polskiej Akademii Nauk - Space Research Centre

Spain, University of Granada, Instituto Andaluz de Ciencias de la Tierra, CSIC  
Spain, Universitat Autònoma de Barcelona, Departament of Geology  
Spain, University of Granada, Department of Mechanics, Structures and Hydraulics  
Spain, Universidad Carlos III de Madrid, Aerospace Department  
Spain, Tecnalia Research & Innovation  
Spain, University of Zaragoza, Departamento de Ciencias de la Tierra & IUCA

Sweden, Uppsala University, Department of Earth Sciences

Switzerland, WSL Institute for Snow and Avalanche Research SLF, Davos Dorf  
Switzerland, Paul Scherrer Institut, X-ray Tomography Group, Losanne

Switzerland, SUPSI, Department of Environment Constructions and Design, Locarno  
Switzerland, Ion beam physics of ETHZ, Zurich

UK, University of Newcastle upon Tyne, School of History Classics and Archaeology

UK, University of Edinburgh, School of Geosciences

UK, University of Durham, Earth Sciences Department

UK, University of Leeds, School of Earth and Environment

UK, University of Liverpool, Department of Earth, Ocean and Ecological Sciences

UK, University College of London UCL, Institute of Archaeology

UK, University College of London UCL, Earth Sciences

UK, Open University, Fac. of Science, Technology, Engineering & Mathematics, Sch. of Physical Sciences

UK, ZEISS Research Microscopy Solutions, Cambridge

## **EXTRA-EUROPE AND GLOBAL**

Australia, University of Adelaide, Department of Earth Sciences

Australia, Macquarie University, Department of Earth and Environmental Sciences, Sidney

Australia, Monash University, School of Earth Atmosphere and Environment, Melbourne

Australia, University of Western Australia, School of Earth Sciences & UWA Oceans Institute, Perth

Australia, Australian National University, Research School of Earth Sciences, Canberra

Australia, Curtin University, School of Earth and Planetary Science, Perth

Cameroon, University of Yaoundé, Department of Inorganic Chemistry

Canada, Laurentian University, Harquail School of Earth Sciences, Sudbury

Canada, McGill University, Department Earth and Planetary Sciences, Montreal

Canada, University of Alberta, Department of Earth and Atmospheric Sciences, Edmonton

Canada, University of Quebec, Department of Earth and Atmospheric Sciences, Montreal

Canada, University of British Columbia

Chile, Pontificia Universidad Católica, Department of Structural and Geotechnical Engineering Santiago

China, China University of Geosciences, Beijing

China, Guangzhou University, Earthquake Engineering Research and Testing Center

China, Guangzhou University, Institute of Geochemistry, State Key Laboratory of Isotope Geochemistry

China, China University of Geoscience Wuhan

China, Northwest University Xi'an, Department of Geology

China, Chengdu University of Technology, Institute of Sedimentary Geology  
China, State Key Lab. of Earthquake Dynamics, Inst. of Geology, China Earthquake Administration, Beijing  
China, University of Science and Technology of China, School of Earth and Space Sciences Hefei

India, Indian Institute of Technology, Kanpur

Israel, Geological Survey of Israel, Jerusalem  
Israel, Israel Antiquity Authority, Jerusalem  
Israel, Sami Shamoon College of engineering, Beer Sheva

Japan, Kyushu University, Dynamics Structure and Evolution of Earth and Planets  
Japan, Kyoto University, Graduate School of Science  
Japan, Niigata University, Faculty of Science  
Japan, National Institute of Polar Research, Geoscience Group, Tokyo

Kenya, Meru University of Science and Technology

New Zealand, Victoria University, School of Geography Environmental and Earth Science, Wellington

South Korea, Korean Institute of Geoscience and Mineral Resources, Daejeon  
South Korea, Sejong University, Seoul

Sudan, Section Francoise de la direction des Antiquites, Khartoum

Turkey, Istanbul Technical University, Department Geophysical Engineering

USA, Lawrence Berkeley National Laboratory, Berkeley, California  
USA, Colorado State University, Fort Collins  
USA, Rutgers University, Dept of Earth and Planetary Sciences, New York  
USA, University of California Berkeley, Department of Landscape Architecture & Environmental Planning  
USA, University of Minnesota, Earth and Environmental Sciences  
USA, University of Oregon, Department of Earth Sciences  
USA, Stanford University, Woods Institute for the Environment and the Department of Biology  
USA, Getty Conservation Institute, Los Angeles  
USA, University of Chicago Marine Biological Laboratory, Woods Hole  
USA, Gemological Institute of America  
USA, Carnegie Institution for Science

# VISITING SCIENTISTS

The pandemic situation almost completely blocked people from travelling to temporarily join other institutions. Thus, the movement of visiting scientists, both as incoming and outgoing researchers, has been almost null. In particular, only the few exchanges carried out before mid of March 2020 occurred.

## OUTGOING

<b>Claudio Mazzoli</b>	ENEA (PNRA) – Antarctica, 2 months
<b>Elena Perez Monserrat</b>	UNIVERSIDAD DE GRANADA, 2 months
<b>Pietro Carpanese</b>	Bauhaus Universität Weimar, 1 year
<b>Ludovico Mascarin</b>	Université Claude Bernard Lyon I, 2 months
<b>Simone Masoch</b>	Dep. de Ingeniería Estructural y Geotécnica, Pontificia Universidad Católica de Chile - 2.5 months

## INCOMING

<b>Pietro Poli</b>	Université Grenoble Alpes ISTERre-Grenoble, France (1/9-15/10/2020); L. Boschi/G. Di Toro
<b>Maltoni Sarah</b>	University of Lausanne, Switzerland (16/9/2020 – 31/8/2021); A. Silvestri
<b>Joaquin Zurutuza</b>	University of Caen and Aranzadi Scientific Society, Spain (1/2/2019 – 1/2/2020); A. Caporali
<b>Ondráčková Lenka</b>	Masaryk University (20/1 – 6/3/2020); N. Surian
<b>Wang Yu (PhD student)</b>	China University of Geosciences, Wuhan (1/11/2019 – 1/5/2021); M. Zattin



# International Degree programme



# INTERNATIONAL DEGREE PROGRAMME

*by M. Zattin*

Over the past few years, the University of Padua has spent a lot of effort on the internalisation of its research and didactic activities. In the wake of this process, in 2020, the Department launched a couple of new projects that should be able to significantly increase the number of incoming foreign students, especially regarding the master's degree courses.

A very innovative agreement (named the '3+1+1 Programme') was signed with the University of Lanzhou and the Northwestern University of Xi'an. The above-mentioned programme will offer the opportunity for 10 students who have completed the first three-years curriculum of undergraduate level courses to spend up to one academic year at the University of Padua as exchange students, attending course units within the Geology and Technical Geology second cycle degree course.

At the end of the first year as exchange students, selected students may apply to pursue their studies as degree-seeking students within the Geology and Technical Geology degree course, following an evaluation by the academic board responsible for the regular admission. Notwithstanding the COVID-19 restrictions, the first five students from the University of Lanzhou registered for the academic year 2020–2021 and are currently attending the courses as regular students. During the second semester, they will work on their thesis projects in Padua and finally obtain a Chinese BSc degree.

A further agreement has been signed with Goethe University of Frankfurt with the specific aim to implement a two-year International Master Programme in Geosciences. The proposed programme (named 'Earth Dynamics') will consist of a first year at the home university, the third semester spent at the host university and a jointly supervised master's project in the fourth semester. Upon successful completion of the International Master Programme, students shall be awarded a degree by their respective home university, but we are working to reach an agreement for a joint degree in the next few years. The main objective is to train students in the field of geosciences with a multidisciplinary approach and focus on active and fossil orogenesis and coupling processes from mantle to atmosphere.

Moreover, it aims to endow students with the ability to tackle advanced problems using state-of-the-art theoretical and analytical tools. Students enrolled for the academic year 2020–2021 will be eligible for the programme, and their selection will start in January 2021. They will benefit from a specific grant given by the Department that will supplement the ERASMUS+ mobility programme.



Seminars

## **SEMINARS** *by A. Fontana*

In February 2020, the word 'webinar' was known only by a limited number of researchers and students, but in the span of a few weeks, it became one of the most widespread and diffused terms—sometimes even abused—for describing the possibility to meet colleagues, students and, more in general, people. A 'webinar', formed from the contraction between 'web' and 'seminar', describes a presentation given by someone and who is available online, both as a 'live' and/or 'podcast' modality. If, on the one hand, the COVID-19 emergency has suppressed the possibility to travel and meet people personally, on the other hand, it has incredibly multiplied the availability of online seminars, lectures and conferences. Probably, the diffusion of webinars will be one of the few positive legacies of the pandemic situation that we have been facing.

Generally, the Department is used to organising seminars almost every week for master's and PhD students. During 2020, only two seminars have been given as a conference in person in February, whereas between March and October, other similar activities that were planned had to be cancelled. Thanks to the efforts of the PhD School in Earth Sciences, between November and December, seven webinars were organised for showing the students some of the cutting-edge international research topics and new methodologies.



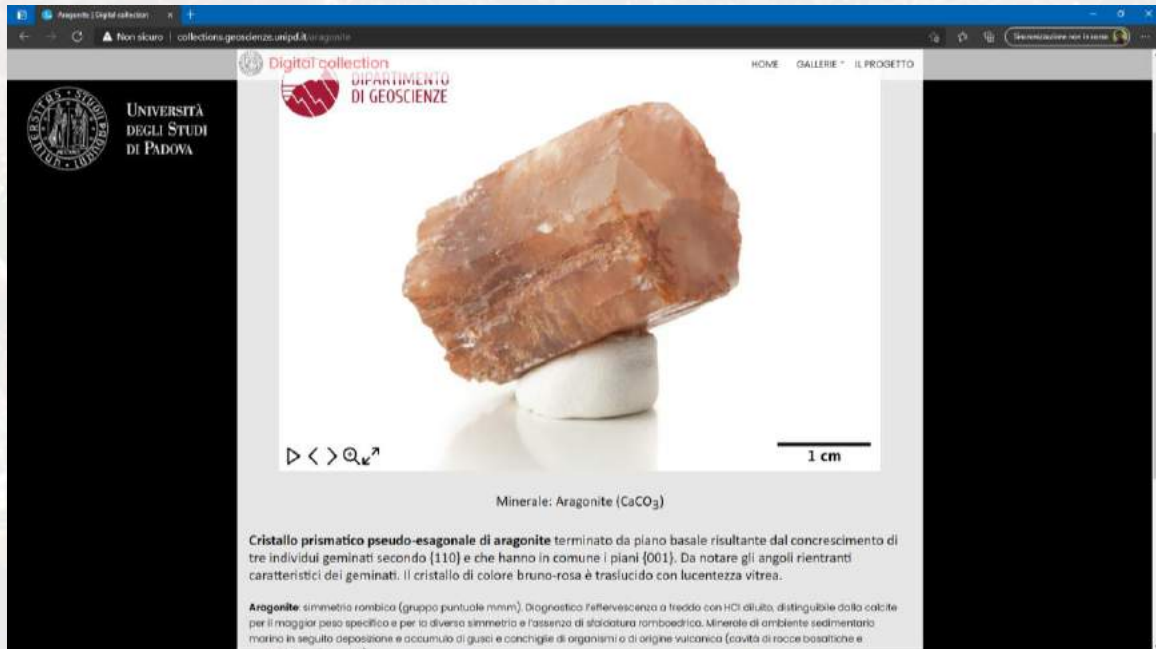
Date	Speaker	Affiliation	Title	Type
13/02/2020	Robert Dinnebier	Max Planck Institute for Solid State Research Stuttgart	Linking Powder Diffraction to Art and Conservation: A synergy story	Seminar
26/02/2020	Xing Yu	Key Lab of Submarine Geosciences, Second Institute of Oceanography, MNR, Hangzhou (China)	Plate-Driven Micro-hotspots: Cases from Southwest Indian ridge	Seminar
26/11/2020	Thomas Westerhold	MARUM University of Bremen	How to capture 66 million of years of natural climatic variability	Webinar
27/11/2020	Benedetto De Vivo	Università Telematica Pegaso	Geochemical monitoring of soils	Webinar
03/12/2020	Mariachiara Zaffani	Veneta Engineering Srl, Verona	Investire le proprie competenze nel settore delle pietre ornamentali: il ruolo del geologo in un laboratorio prove su materiali lapidei	Webinar
04/12/2020	Lucia Mancini	Elettra - Sincrotrone Trieste S.C.p.A. (Trieste), LINXS – Lund Institute for Neutron and X-ray Science, Lund, Sweden	3D and 4D X-ray imaging techniques for comprehensive microstructural analysis of materials: from geological applications to natural and cultural heritage studies	Webinar
10/12/2020	Emily Brodsky	University of California Santa Cruz, Dept. of Earth and Planetary Sciences	The mechanics of large earthquakes	Webinar
17/12/2020	Ian Kane	University of Manchester - Department of Earth and Environmental Sciences	Microplastics in deep-marine sedimentary environments	Webinar
18/12/2020	Morelia Urlaub	GEOMAR - Helmholtz Centre for Ocean Research, Kiel (Germany)	A fresh view on submarine volcano-tectonic deformation	Webinar



# Teaching

## TEACHING DURING COVID by M. Ghinassi

Teaching was strongly penalized by the COVID emergency, but Earth Science disciplines tightly linked with practical activities were certainly the most impacted ones and since March to June 2020, our students in Geology could not perform the indoor class lab (interpretation of geological maps, production of geological cross sections, etc.) and outdoor field geology (production of geological maps) activities. A number of ventures were carried out at the Department in order to provide a qualified teaching standard and keep high the enthusiasm among students. The Digital Collection Project, sponsored by the University of Padova, luckily started just before the pandemic emerged as crucial tool to guarantee online teaching. In the frame of this project, a total of 250 samples, including minerals specimens, fossils and rocks were acquired as 3D photogrammetric models and made available for teaching. All the models were acquired at high-resolution, allowing the fines details fully visible in a 3D space, and make available for teachers and students.



UNIVERSITÀ DEGLI STUDI DI PADOVA

Digital collection  
DIPARTIMENTO DI GEOSCIENZE

HOME GALLERIE IL PROGETTO

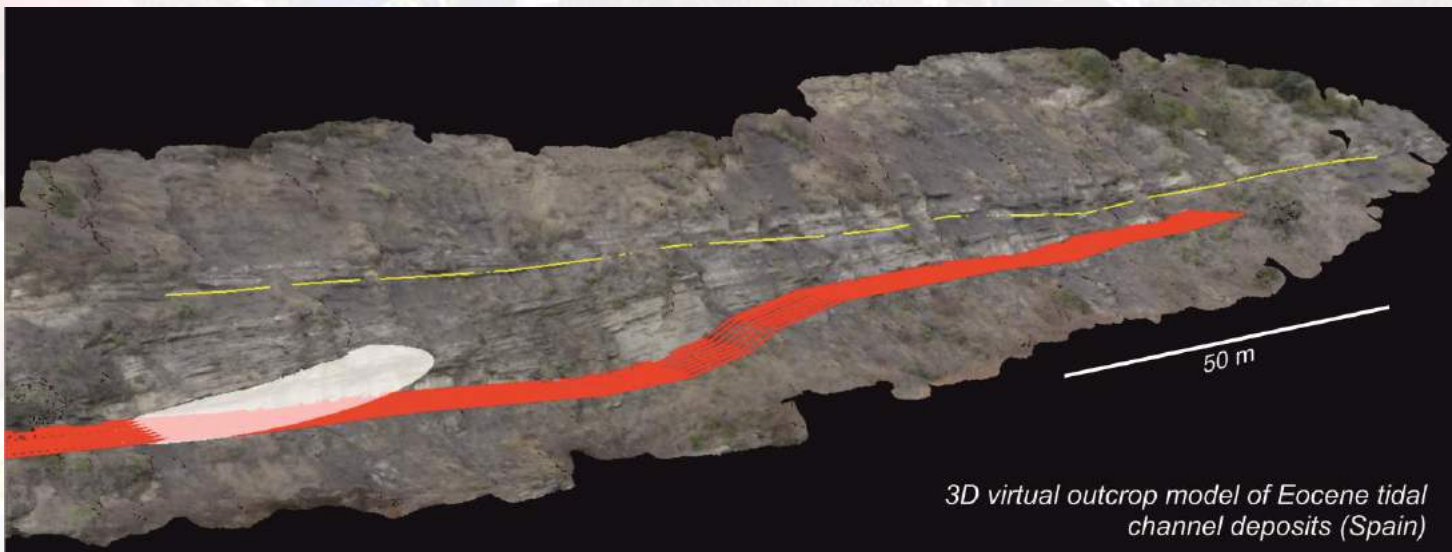
1 cm

Minerale: Aragonite ( $\text{CaCO}_3$ )

**Cristallo prismatico pseudo-esagonale di aragonite** terminato da piano basale risultante dal concrescimento di tre individuali geminati secondo {110} e che hanno in comune i piani {001}. Da notare gli angoli rientranti caratteristici dei geminati. Il cristallo di colore bruno-rosa è traslucido con lucentezza vitrea.

**Aragonite:** simmetria rombica (gruppo puntuale  $m\bar{3}m$ ). Diagnostico l'effervescenza a freddo con HCl diluito, distinguibile dalla calcite per il maggior peso specifico e per la diversa simmetria e l'assenza di sfaccatura romboidale. Minerale di ambiente sedimentario marino in angulo deposizione e accumulo di gusci e conchiglie di organismi o di origine vulcanica (cavità di rocce basaltiche e

The Digital Collection Project included also 135 digital scans of thin sections from magmatic, metamorphic and sedimentary rocks, but also rock samples suitable for micropaleontological observations. Section were scanned both at parallel and crossed nicols. Within specific thin sections, key areas were also identified and covered through a dynamic scanning in order to make them visible through a 360° rotation and highlight optical features of different minerals. Field activities and observation of geological outcrops are a further crucial formative experience that was denied to our students by the pandemic. High-resolution 3D models of outcrop cliffs were used to compensate this lack. These models, which were previously acquired for research purposes or obtained as freely-distributed from web sources, were adjusted to specific courses and used to carry out virtual fieldtrips. Although the lack of a field activities is a critical educational gap for students, introduction of virtual geology offered them the opportunity of exploring a new perspective about field geology, and made them close to the most innovative approaches used nowadays to investigate geological outcrop. The two field mapping courses, which are yearly organized at the end of second and third year of the first-cycle degrees in Earth Sciences were not carried out. Nevertheless, during summer 2020, when the imposed lockdown guidelines were relaxed by the government, students were organized in groups and conducted field geology activities in the Southern Alps.



# BACHELOR AND MASTER DEGREES IN EARTH SCIENCES

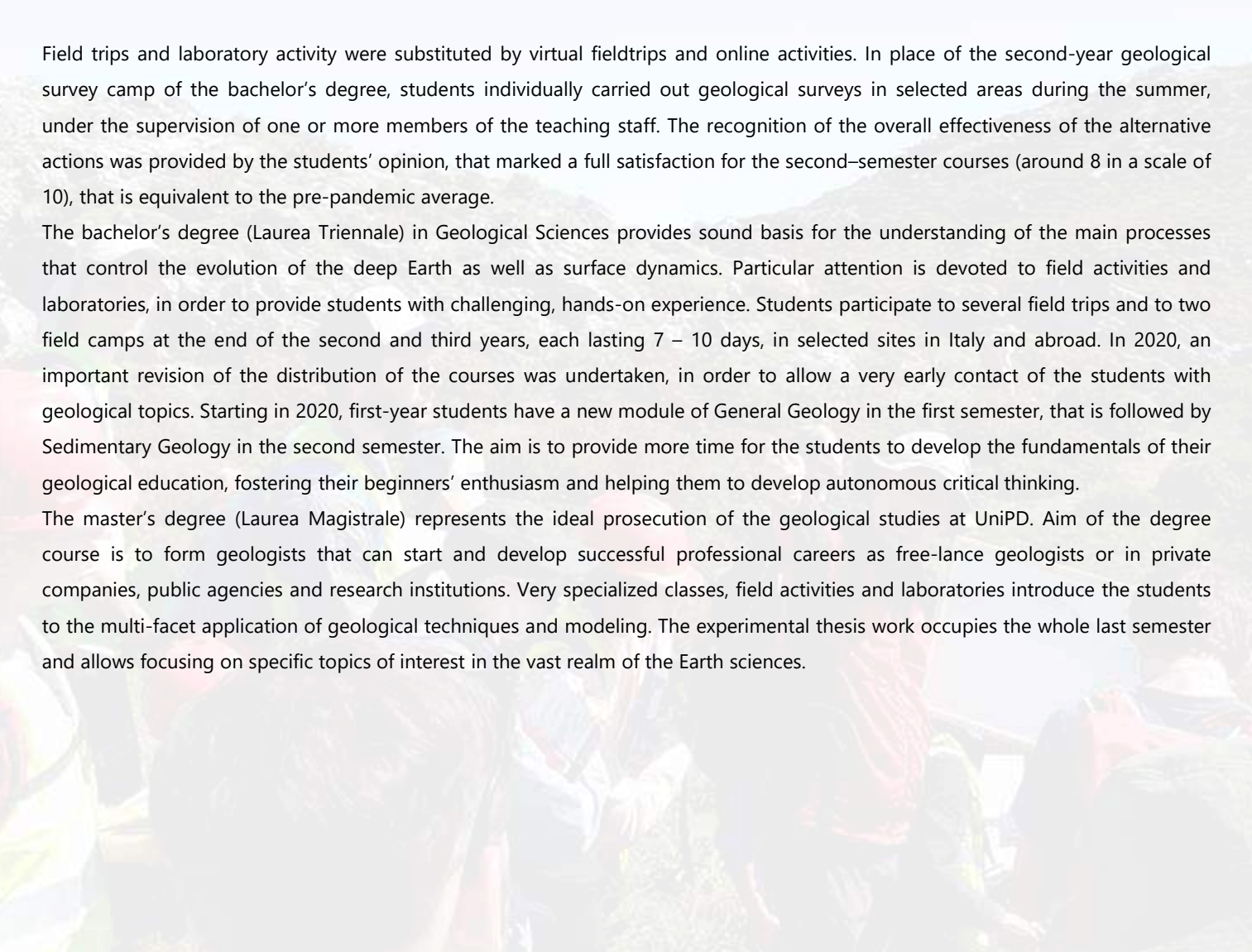
by P. Mozzi

The professorial and research faculty of the Department of Geosciences covers the wide array of topics of the Earth Sciences, spanning from paleontology and stratigraphy to sedimentology, structural geology, geomorphology, technical geology, mineralogy, petrology, geochemistry, georesources, planetary geology and geophysics of the solid Earth and the atmosphere. All faculty members are active scientists in their field of expertise and their effort is to continuously transfer groundbreaking scientific and professional knowledge and skills to their students. This allows the Department to offer a thorough, high-standard education cycle in the geosciences, entirely hosted in a modern and comfortable building where classrooms are adjacent to laboratories and research facilities.

The COVID-19 pandemic heavily hit all teaching activities in the second semester 2020. All courses continued online but there was no possibility of running the normal laboratory and field activities. Nevertheless, the effort and dedication of our faculty, combined with the resilience and enthusiasms of our students, allowed to minimize the damages of such situation.







Field trips and laboratory activity were substituted by virtual fieldtrips and online activities. In place of the second-year geological survey camp of the bachelor's degree, students individually carried out geological surveys in selected areas during the summer, under the supervision of one or more members of the teaching staff. The recognition of the overall effectiveness of the alternative actions was provided by the students' opinion, that marked a full satisfaction for the second-semester courses (around 8 in a scale of 10), that is equivalent to the pre-pandemic average.

The bachelor's degree (Laurea Triennale) in Geological Sciences provides sound basis for the understanding of the main processes that control the evolution of the deep Earth as well as surface dynamics. Particular attention is devoted to field activities and laboratories, in order to provide students with challenging, hands-on experience. Students participate to several field trips and to two field camps at the end of the second and third years, each lasting 7 – 10 days, in selected sites in Italy and abroad. In 2020, an important revision of the distribution of the courses was undertaken, in order to allow a very early contact of the students with geological topics. Starting in 2020, first-year students have a new module of General Geology in the first semester, that is followed by Sedimentary Geology in the second semester. The aim is to provide more time for the students to develop the fundamentals of their geological education, fostering their beginners' enthusiasm and helping them to develop autonomous critical thinking.

The master's degree (Laurea Magistrale) represents the ideal prosecution of the geological studies at UniPD. Aim of the degree course is to form geologists that can start and develop successful professional careers as free-lance geologists or in private companies, public agencies and research institutions. Very specialized classes, field activities and laboratories introduce the students to the multi-facet application of geological techniques and modeling. The experimental thesis work occupies the whole last semester and allows focusing on specific topics of interest in the vast realm of the Earth sciences.

The year 2020 was a period of fervent discussion and programming of the new master's degree in Environmental Geology and Earth Dynamics to be operative in the next academic year 2021-2022. The project, that is now under approval by the Italian Ministry of University and Research, foresees two curricula within the master's degree. The curriculum in Earth Dynamics is entirely in English and combines solid fundamental knowledge on the Earth's processes and history with the application of cutting-edge geological techniques and data processing. Through applied research-oriented teaching, field activities and laboratories, the program offers advanced education and training in the geosciences, with a focus on diverse issues that are crucial for future society such as the prevention and mitigation of geohazards, land planning and environmental management, Climate Change, the prospection and sustainable exploitation of georesources, geomaterials, cultural heritage protection, planetary exploration. An agreement has been signed with the University of Frankfurt that allows a selection of the most meritorious students to spend 6 months abroad.





Other agreements with European universities are under definition, exploring the possibility of establishing double-degrees.

The curriculum in Geologia Applicata alla Difesa del Suolo e dell'Ambiente firmly keeps the focus on the formation of professional geologists dedicated to technical and engineering geology and hydrogeology. This is a strategic need for the Italian society, given the fragility of the national territory in terms of geohazards and environmental protection. The courses of this program are being deeply remodeled with the aim of keeping the pace with the more advanced techniques in data acquisition and processing, as well as to meet the needs of evolving environmental regulations in Italy and the European Union. Teaching on the crucial issues of landslide monitoring and remediation is being greatly strengthened thanks to new acquisitions of the faculty staff.

In order to consolidate the international experience of our students and enhance their opportunities in the European and worldwide professional and research market, the Department of Geosciences is enthusiastically committed in the ERASMUS+ Programme and SEMP - Swiss European Mobility Programme. Up to 20 grants have been available in 2020 for our best students to spend a semester in a choice of fourteen European Universities in Norway, Finland, Denmark, France, Germany, Hungary, Spain and Switzerland.

# MASTER'S COURSE IN GEOPHYSICS FOR NATURAL RISKS AND RESOURCES

by *G. Cassiani*

In October 2020, the Department has activated for the first time the Master's course in Geophysics for Natural Risks and Resources. The Master has the main goal of educating professionals and researchers capable of approaching in a multi-disciplinary manner the theory and applications of physical methodologies for the exploration and characterization of the subsoil. This exploration can take place at different spatial scales, from meters to tens and hundreds of kilometers, with aims spanning a large number of application and theoretical areas where the knowledge of soil and subsoil is crucial, such as:

- Search for mining and energy resources;
- Subsoil characterization for renewable energies such as geothermal energy;
- Non-invasive techniques for civil and environmental engineering, including geotechnical applications:
- Engineering geology characterization with specific attention to hillslope stability and hydrological risks in general;
- Characterization for seismic risk both at global (fault presence and nature) and local (amplification mechanisms) scales;
- Application to built structures, with specific reference to the historical buildings, foundations and soil-structure interactions.
- Applied Geodesy to study Earth's dynamics.





The offer of courses has been constructed with two goals in mind: (i) educating professionals in the geophysical sector with a wide and solid quantitative background, thus capable of accessing a number of careers in industry and research; (ii) attracting students from different backgrounds and produce graduates with a fluid interaction with the international geophysical community. In order to satisfy the requirements of the job environment, two majors are foreseen: (a) a computational specialization, tentatively directed towards large scale geophysical applications (e.g. 3D and 4D seismics) with a predominant role in mining and energy subsoil exploration, but also for satellite applications, and (b) a field specialization, with applications directed towards the management of natural resources and environmental and engineering disciplines, with the aim of educating independent professionals. The MSc course has had a good success already in its first year of activation, with 25 pre-registered students, and, in spite of the obvious difficulties due to the COVID pandemics, a vast majority of international students coming from more than 10 different countries.



Graduates

# BACHELOR

Candidate	Title	Supervisor	Course
Aghemo A.	Analysis of temperatures and conductivity in the Scorzè area in the medium Venetian plain	P. Fabbri	Envir. Sciences and Technology (STAm)
Bagalini M.	The Complex Architecture of a Major fault Zone: an example from the Umbria-Marche Apennines	T. Tesei	Geological Science
Bardini L.	Reassessment of a fossil fish collection housed in the Museo Civico di Crocetta del Montello (Treviso, Italy)	E. Fornaciari	Natural Science
Bedon S.	Geological analysis of pit and cones in Derain quadrangles (Mercury)	M. Massironi	Geological Science
Bellacicco L.	Carbon isotope investigations on organic matter of the stratigraphic sequences at the Rhaetian/Hettangian limit (Triassic/Jurassic)	M. Rigo	Geological Science
Bregolin M.	An assessment of landslide susceptibility in the municipalities of Colle Santa Lucia and Selva di Cadore (BL)	M. Floris	Geological Science
Byloos C.	Environmental proxies through geochemical analyses around the Norian/Rhaetian (Upper Triassic) limit	M. Rigo	Natural Science
Cangiamila A.	Geochemical and paleoenvironmental analyses around the Norico-Rhaetian (Upper Triassic) limit: possible evidence of anoxia	M. Rigo	Natural Science
Carlassare M.	Conodont biostratigraphic study of the stratigraphic successions of Timor Leste	M. Rigo	Geological Science
Carradore E.	Shock temperature recorded by graphite from Almahata Sitta ureilites	F. Nestola	Geological Science
Cervelli M.	Analysis of the thermal anomaly during the intrusion of a magma body: an example from the Southern Andes	M. Zattin	Geological Science
Chiesurin A.	Mineral composition of fault rocks from the Koyna deep drilling project (India)	G. Di Toro	Geological Science
Chini M.	Geological study of the Mattarello-Trento transect for the preliminary design of the Trento tunnel (Fortezza-Verona line -South Access of the Brenner Tunnel)	M. Massironi	Geological Science
Chiocchetti F.	Chemostratigraphic correlations (d13Corg) of Tethyan sequences at the Triassic/Jurassic boundary	M. Rigo	Geological Science
Cicalini N.	Carbon isotope analysis on organic matter around the Noric/Rhaetian boundary of the Western Tethys	M. Rigo	Geological Science
Cogliati A.	Landslide susceptibility evaluation in Val di Zoldo municipality	M. Floris	Geological Science

Costa M.	Comparison between the Norian/Rhaetian limit and the Warepia /Otapirian limit (New Zealand) through the isotope curve of organic carbon	M. Rigo	Geological Science
de Cristofaro L.	Using clays as a building material: past, present and future	G. Artioli	Materials Science
De Giovanni F.	Analysis of the planar configuration of unvegetated meandering rivers	A. D'Alpaos	Geological Science
Elgashti M. A. A.	Analysis of Historical Weather Data of Andraz Station (BL)	L. Piccinini	Geological Science
Gastaldello G.	Environmental characterization of fuel storage site in Albignasego (PD)	L. Piccinini	Geological Science
Gastaldi G.	Analysis of the morphological variations of the Cordevole river and some of its tributaries following the Vaia event (October 2018)	N. Surian	Geological Science
Gatti A.	Structural analysis of the Ganymede grooves at margins of the main geological units (dark and light terrains)	M. Massironi	Geological Science
Giordano A.	Analysis of the morphological variations of the Sesia river in the period 2016-2019 using Sentinel-2 images	N. Surian	Natural Science
Groff M.	Evolution of the Lares glacier (TN) from 1973 to 2015	P. Mozzi	Geological Science
Lorenzato I.	Climatic variations on the pluviometric series of the stations of Tonezza (VI), Bovolenta (PD) and Chioggia (VE)	P. Fabbri	Envir. Sciences and Technology (STAm)
Montagner M.	Sustainable cementitious materials and circular economy	G. Artioli	Materials Science
Moranduzzo G.	Contact metamorphism of metapelites in the aureole of the Cima d'Asta pluto	B. Cesare	Geological Science
Nichele G.	Geomorphological effects of an extreme alluvial event in the Albedosa river basin (Piedmont)	N. Surian	Natural Science
Pacchiega L.	An assessment of landslide susceptibility in the municipalities of Vallada Agordina, San Tomaso Agordino and Cencenighe Agordino	M. Floris	Geological Science
Palmieri C.	Identification of microplastics in the sediments of the Venice Lagoon	M. Zattin	Envir. Sciences and Technology (STAm)
Pellegrina M.	Inorganic pigments in the history of art: analysis, degradation and restoration of azurite	G. Artioli	Materials Science
Pisoni C.	Geochemical proxies for paleoenvironmental interpretations of stratigraphic sequences at the Norian/Rhaetian limit (Upper Triassic)	M. Rigo	Geological Science
Rampin S.	Use of the negative shift of organic $\delta^{13}C$ as a possible event for the definition of the Norian / Rhaetian limit	M. Rigo	Geological Science
Ranieri R.	Geological-structural surveys of the Vado di Ferruccio area (Central Apennines, Italy)	G. Di Toro	Geological Science



Rosa F.	Morphological and vegetation variations in an alpine braided river (Tagliamento river)	N. Surian	Natural Science
Sala M.	Hints of evaporitic diapirism and karst in Izamal and Yelapa Craters, Arabia Terra, Mars	M. Massironi	Geological Science
Sarri D.	Hydrogeological study on some springs of Montello	P. Fabbri	Envir. Sciences and Technology (STAm)
Semprebon P.	Reassessment of the Paleogene crustaceans Lophoranina housed in the Museum of Geology and Paleontology of Padova University	L. Giusberti	Natural Science
Tarletti G.	Growth relationships between diamonds and inclusions of iron sulfides: implications on the diamond age	F. Nestola	Geological Science
Tonello A.	Microstructures and composition of primary melt inclusions in crustal xenoliths of the Andean margin (Mercaderes, Colombia)	B. Cesare	Natural Science
Zeba M.	Interaction between structural framework, tertiary intrusive systems and speleogenesis in Eastern Lessinia	M. Massironi	Geological Science



# MASTER

Candidate	Title	Supervisor	Course
Badamo F.	Chemical-petrographic, geomechanical and thermophysical characterization of the halite mine of Petralia Soprana (Pa)	A. Galgaro	Geology and Technical Geology
Benvegnù I.	Thermal evolution of Paleozoic and Triassic reservoir rocks in the Ghadames-Illizi Basin (Algeria)	M. Zattin	Geology and Technical Geology
Bersan E.	Field and microstructural investigation of extensional faults in bituminous dolostones (Fornaca Valley, Central Apennines, Abruzzo)	G. Di Toro	Geology and Technical Geology
Bianco S.	Middle Eocene Calcareous nannofossil study from the Core Possagno A (Possagno, Italy)	E. Fornaciari	Natural Science
Bortolamei E.	Seismic vulnerability evaluation of metallic industrial racks	F. Da Porto	Civil Engineering
Cancel F.	Solid transport processes in mountain watercourses during extreme events: the Vaia storm (27-30 October 2018) in the Tegnias river basin (Dolomites)	N. Surian	Natural Science
Caprino A.	Analysis of the effectiveness of combined interventions at various degrees of invasiveness to reduce the seismic vulnerability of masonry buildings: the former Fabriano's courthouse case	F. Da Porto	Civil Engineering
Carraro E.	Geological characterization and modelling aim to evaluate the Sant'Andrea landslide (Perarolo di Cadore, BL Italy) geo-hydrological risk	A. Galgaro	Geology and Technical Geology
Catelan F. T.	Numerical simulation of PFAS contamination of groundwater in the Western Veneto Region	L. Piccinini	Geology and Technical Geology
Chimento F.	The Eocene / Oligocene boundary in the Lessini Shelf - facies analysis and carbonate stable isotope geochemistry	N. Preto	Geology and Technical Geology
Costa B.	Petrology and melt inclusions study of lower crustal xenoliths from Mercaderes Rio Mayo - Colombia	B. Cesare	Geology and Technical Geology
De Cristofaro A.	Preliminary assessment of tunnel drainage: the case study of Trento Gallery	L. Piccinini	Geology and Technical Geology
Dei Cont C.	Hydrogeological characterization of the Meschio spring in Savassa Alta, Vittorio Veneto (TV)	P. Fabbri	Geology and Technical Geology
Facci M.	Unconventional deep closed-circuit heat exchanger: preliminary numerical feasibility study	A. Galgaro	Geology and Technical Geology

Favaro S.	On the role of vegetation on the morphodynamic evolution of meandering rivers	A. D'Alpaos	Civil Engineering
Feletto L.	Cost-benefit analysis of an energy and structural requalification of a strategic building for the Italian Civil Protection	F. Da Porto	Energy Engineering
Ferrari F.	Organic carbon stable isotopes and palynofacies across the Permian–Triassic boundary in the Adige Valley and Dolomites (Southern Alps, Italy)	N. Preto	Geology and Technical Geology
Garzotto F.	Hydrogeological modelling of the Veneto area affected by contamination by perfluoroalkyl substances (PFAS)	P. Fabbri	Geology and Technical Geology
Gaspari M.	Structural analysis of existing RC buildings including traditional and innovative solutions for strengthening and seismic isolation	F. Da Porto	Civil Engineering
Gasperi L.	Late Quaternary Evolution of the Musone river basin (Veneto)	A. Fontana	Geology and Technical Geology
Gobbi V.	Morphometry and migration rate in high- and low-peak discharge variability meandering rivers	M. Ghinassi	Geology and Technical Geology
Grandi P.	Oceanic lithologies associated with magnetite mineralisation of the Montsalet area (Cogne, Val d'Aosta)	P. Nimis	Geology and Technical Geology
Guzzo F.	Prediction of the reservoir quality of a sandstone through the use of an analogue	M. Zattin	Geology and Technical Geology
Lovati G.	Analysis of Martian north polar ice cap layering with SHARAD data	M. Massironi	Astronomy
Martinello A.	Analysis of the effects of salt-marsh reduction on the hydrodynamics and sediment transport in the Venice Lagoon	A. D'Alpaos	Civil Engineering
Mario L.	Morphometry of Holocene fluvial paleo-meanders of the Venetian Plain between Monselice and Correzzola (Italy)	M. Ghinassi	Geology and Technical Geology
Nardelli L.	Analysis through photointerpretation of the paleohydrography of the south-eastern Friulian Plain (NE Italy)	A. Fontana	Geology and Technical Geology
Nisato E.	An analysis of the causes of subsidence in the lower Veneto-Friuli plain area through satellite interferometry techniques and geotechnical characterization	M. Floris	Geology and Technical Geology
Nechita L. D.	Reuse of CO <sub>2</sub> storage materials in soil stabilization	G. Artioli	Land and Envir. Sci. And Technology (STAmT)
Olivieri O. S.	The Dupal anomaly: an expression of the rifting history of the Indian Ocean?	C. Meyzen	Geology and Technical Geology

Pavoni M.	Surface and borehole ERT for hydrological characterisation of the near surface	J. Boaga	Geology and Technical Geology
Piredda G.	The Pantheon in Rome: the interpretation of structural behaviour through historical-constructive investigations and numerical analysis	F. Da Porto	Civil Engineering
Pivato A.	Morphodynamic evolution of meander cutoffs in coastal landscapes	A. D'Alpaos	Geology and Technical Geology
Pulze E.	Subsoil stratigraphy of the Euganean Thermal Basin (north-eastern Italy)	C. Stefani	Natural Science
Rampado M.	Analysis of masonry quality, virtual reconstruction and evaluation of seismic vulnerability for some structures of Shivta archaeological site in Israel	F. Da Porto	Building Engineering and Architecture
Rosso C.	Multiple polygonal fault systems in the Cretaceous-Cenozoic succession of the Horda Platform (Norwegian North Sea)	A. Breda	Geology and Technical Geology
Salaorni A.	Planform morphologies of submarine meandering channels	A. D'Alpaos	Civil Engineering
Santoro F.	Process of carbonation and durability in alternative binders	L. Valentini	Geology and Technical Geology
Schiavon F.	Morphometry of Holocene fluvial paleo-meanders of the Venetian Plain between Correzzola and the present-day shoreline (Italy)	M. Ghinassi	Geology and Technical Geology
Sirch F.	Electrical and electro-magnetic techniques for the characterization of permafrost: case studies in the eastern Alps	J. Boaga	Geology and Technical Geology
Surian B.	Electrical resistivity tomography for monitoring saline intrusion in a coastal environment	J. Boaga	Geology and Technical Geology
Tonello M.	Morphometries and spatial distribution of mesoforms in fluvial point bars	M. Ghinassi	Geology and Technical Geology
Valerio A.	San Benedetto Basilica in Norcia: identification of construction phases and analysis of the dynamics of collapse of the bell tower	F. Da Porto	Civil Engineering
Veliu M.	Detection of small microplastics (< 10 µm) from environmental samples	G. Artioli	Land and Envir. Sci. And Technology (STAmT)
Vesco Lopez S.	Hydrogeological study on water quality in the provincial areas of Venice and Treviso	P. Fabbri	Geology and Technical Geology
Zampieri A.	A study on the correlation between subsidence phenomena and underground water circulation in the municipality of Portogruaro (VE) (Veneto-Friuli plain)	M. Floris	Geology and Technical Geology



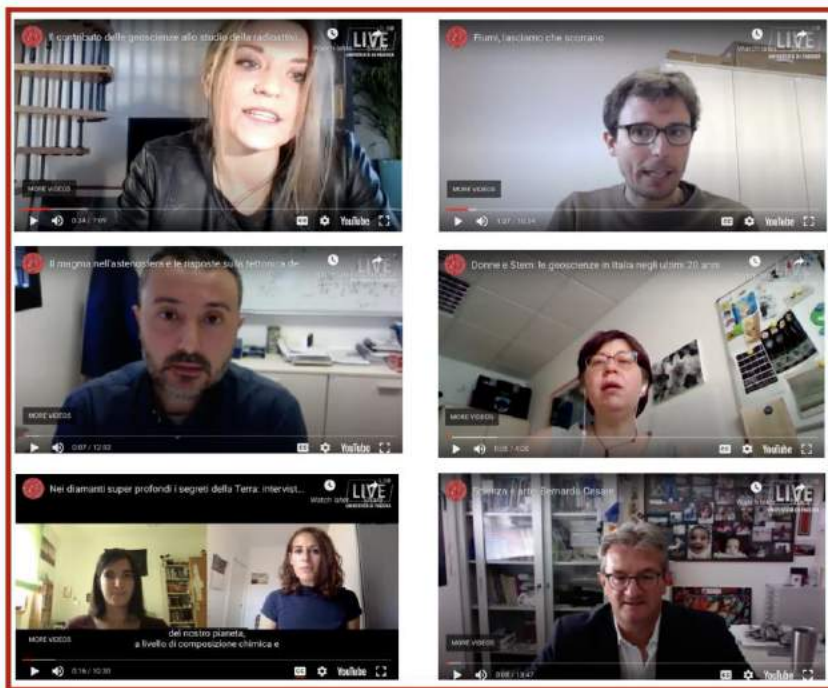
Dissemination  
and outreach

## DISSEMINATION & OUTREACH *by J. Boaga*

The Department is actively committed to promoting and offering the dissemination and divulgation of the scientific knowledge. Nowadays, it is agreed that a pervasive and effective outreach of research is as important as the usual scientific dissemination. Scientific dissemination is mainly achieved via publication of the theoretical and experimental results in specialistic journals and congresses, generally using strict scientific and technical jargon. Thus, only a restricted community will ultimately benefit from this information. Divulgation and general dissemination, on the contrary, are intended to share scientific knowledge with a broader audience that is composed of people with no specific training in the field. Dissemination and communication activities performed by the components of the Department are also aimed at increasing its public visibility and reputation. In this respect, TV coverage, radio broadcasts, printed and online documents, video and digital contents (as interviews and documentaries) on social media are exceptionally efficient. For these reasons, over the past few years, the Department has considerably increased its commitment in social media, public events, exhibitions and educational activities, as well as the distribution of publications specifically addressed to a generic audience. In 2020, the Department promoted several initiatives, even if limited because of the pandemic. Specifically, our researchers were invited to take part in eight radio interviews, ranging from national news broadcasts to local radio stations, to explain their research topics.

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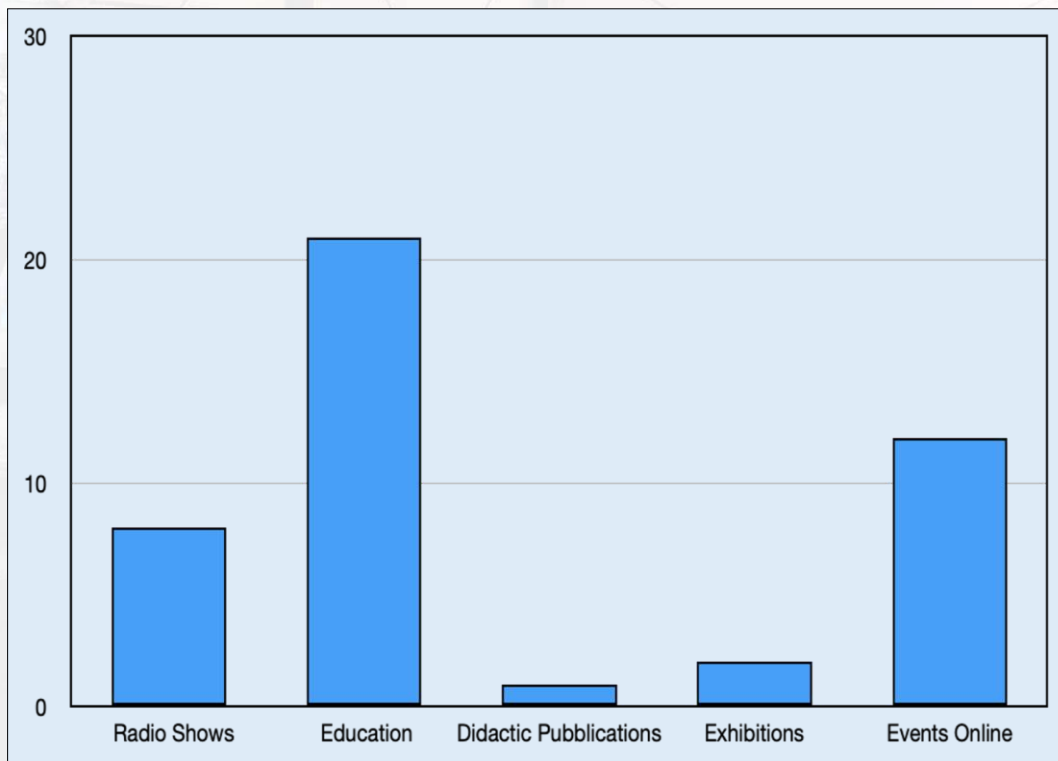
*Department of Geosciences scientists on air in 2020! Did you know your cellar can be a possible radioactivity source? Or that a stone can hide a colourful artwork? Why do the rivers have those shapes? Diamonds at 400 km depth in the Earth's interior? Stay tuned to our MediaSpace channel!*



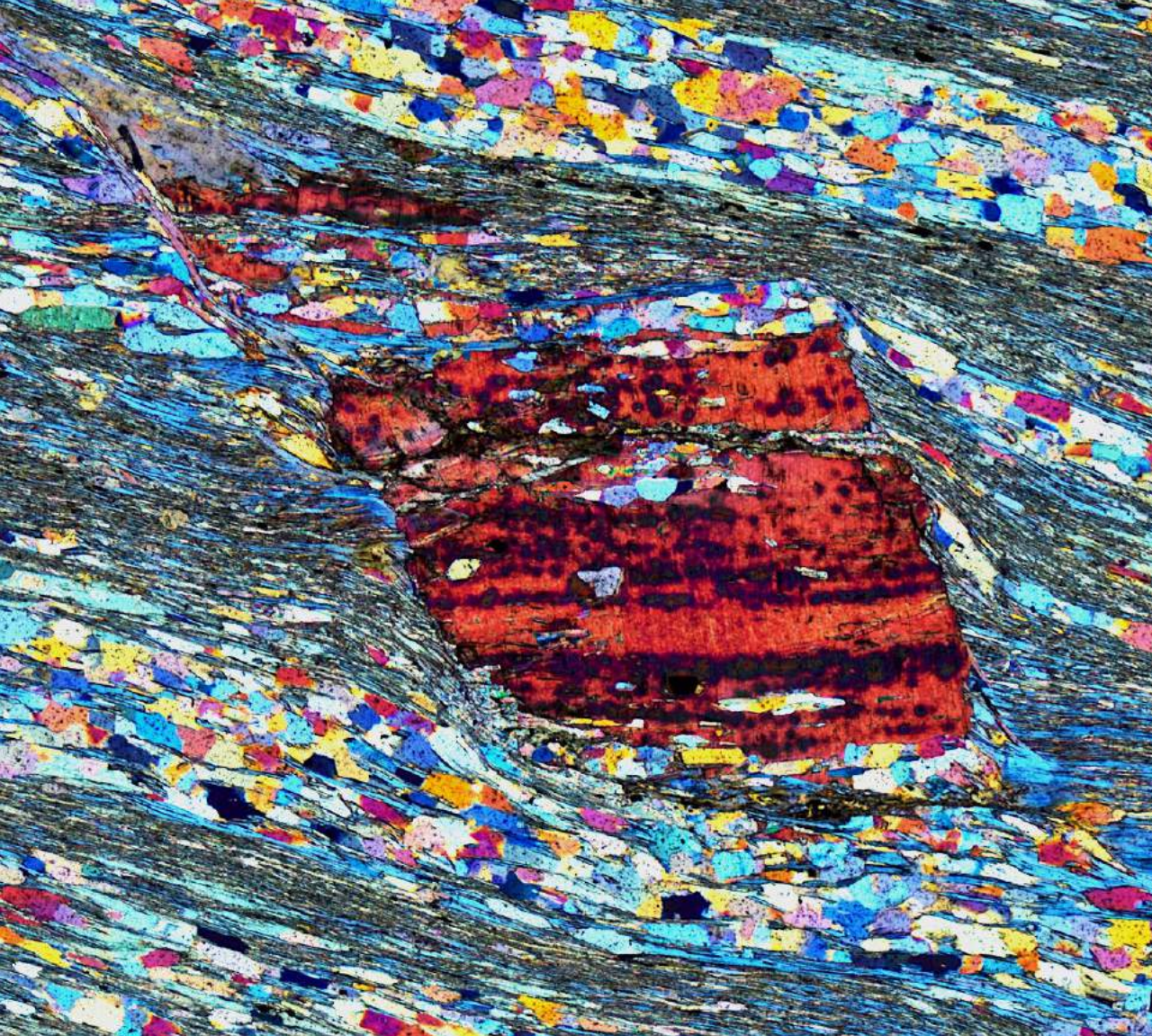
Two exhibits for generic audiences were organised, and six events with schools and educational institutions took place. In total, more than 20 events aimed at promoting and presenting scientific results to the public were organised. In this peculiar pandemic year, most of the activities were online, so we proposed webinars and online experiments for the wider public, from lab experiences dedicated to generic audiences to topic seminars about our activities. Unfortunately, the Department did not host schoolchildren classes as usual this year because of COVID-19 regulations, but we tried to overcome this with technology. In fact, for the first year,



the Department has selected a team specifically dedicated to communication and outreach, which is involved in all the activities related to presenting both research and teaching to the so-called “general public”. New social accounts on the main platforms, such as Instagram, Facebook, Twitter and MediaSpace, were specifically developed to share with large audiences the science we build during our everyday work. We have hundreds of likes and followers of our Facebook and Instagram profiles, with thousands of visualisations of the videos there being promoted. In this framework, the Department website was deeply redesigned, becoming our main external façade, especially during the forced social distance period. News about events, publications, discoveries and activities are constantly updated, so don't miss them! Part of the efforts in 2020 in divulgation also addressed science teachers, who represent the main inspiration and guide in orienting the youngest in society. Based on the feedback received, we strongly believe that teaching earth sciences deserves a more modern and efficient approach to captivate the interest of middle and high school students. In the graph, Department's dissemination and divulgation activities are summarised for the year 2020. Even with the pandemic conditions, the message is still clear: we keep serving science, we keep serving our community, and we do not intend to stop!







GeoContest

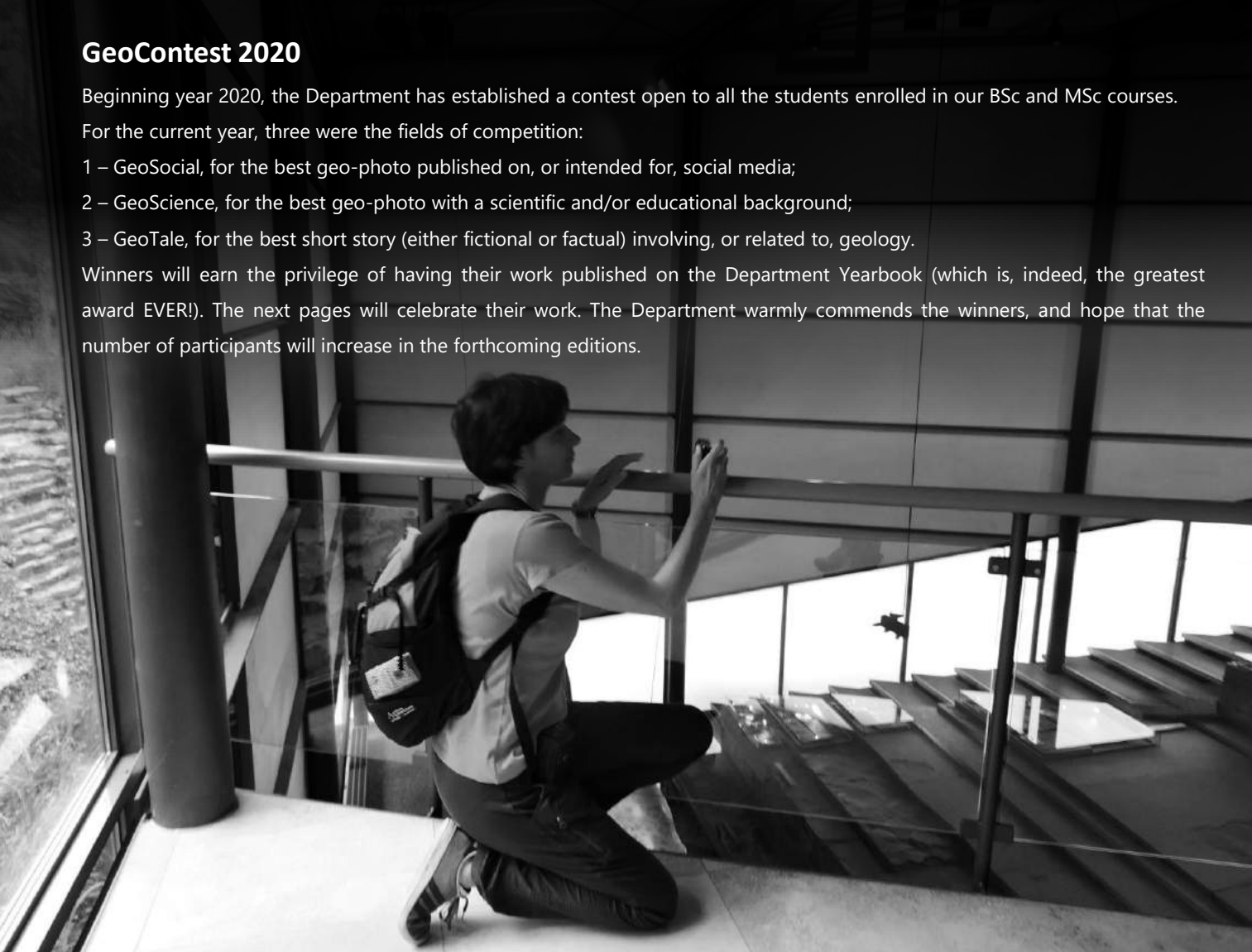
## GeoContest 2020

Beginning year 2020, the Department has established a contest open to all the students enrolled in our BSc and MSc courses.

For the current year, three were the fields of competition:

- 1 – GeoSocial, for the best geo-photo published on, or intended for, social media;
- 2 – GeoScience, for the best geo-photo with a scientific and/or educational background;
- 3 – GeoTale, for the best short story (either fictional or factual) involving, or related to, geology.

Winners will earn the privilege of having their work published on the Department Yearbook (which is, indeed, the greatest award EVER!). The next pages will celebrate their work. The Department warmly commends the winners, and hope that the number of participants will increase in the forthcoming editions.



# WINNER

## GeoSocial photo contest

"When finding an outcrop is harder than studying it"



Enrico  
Zampieri  
*MSc student*





**WINNER**  
**GeoScience**  
**photo contest**

"Abyssal star"

Linda  
Lambertucci  
*BSc student*





Pietro  
Castellini  
*BSc student*

## WINNER GeoTale writing contest

### "Letter to Geology"

*Dear Geology,*

I still remember how it began, in a mid-summer night besieged by a thousand doubts. What will I do when I get big, I wondered. While watching a sad movie I saw the light: "I'll be a geologist" I shouted from the rooftops. I still recall the runs at breakneck speed to take the train. I remember the emotion, but also the fear of the first class, in the huge Arduino room. We set off with chemistry, difficult subject to many. At the time I was alone and did not know anyone. Yet in the air you could already breathe the hunger for rocks.

But to satisfy it we had to wait for the Physical Geography classes and especially the second semester, with fearsome Mineralogy, you remember it, don't you? Many were the sleepless nights spent studying. Then the first friends came, for someone also the first loves. Then, when the first hurdles were overcome, the time came for us to taste the first rocks. I still recall the paragneisses and the orthogneisses (by the way, what was the difference?), then go with Stratigraphy and the countless names to be learned: such as Dolomia dello



Pietro  
Castellini  
*BSc student*

## WINNER GeoTale writing contest

### "Letter to Geology"

Sciliar or Formazione a Bellerophon or the membro di San Lucano, which sounded more like the name of a liquor... it seemed like it was just repeating an endless shopping list. shopping list. Yet it was worth it, now that I know what is around us and its past. You know, Earth's history always fascinated me, I believe that is why I enrolled in you.

And how could I forget the microscopy thin sections? And the endless hours spent on those uncomfortable stools? The back pains I had when I got home, I would not wish them to my worst enemy (no, I would to him). No, come on, I am joking, I am not really a bitter guy, unreliable at most. Yet I got to the third year. With my head spinning more than the inversion of the Earth's magnetic field. And then down, toward so-long-dreamed-of-and-never-come Corsica. Damned Covid, you stole our dreams but did not steel our ideas. You know what, dear Geology, we will come back stronger than before. I know, it sounds like the usual cliché but I promise you it will not be so. We will learn from our mistakes and look to the future, maybe forgetting about our masks. By now we find ourselves looking for a smile



Pietro  
Castellini  
*BSc student*

# WINNER GeoTale writing contest

## "Letter to Geology"

like it was a philosopher's stone and understanding, more and more, the strength of a hug. And I find myself thinking, my sweet Geology, that I made at least one Field Camp. Do you remember the imprecations? The countless grazes, and the flying hammers? I do, I can almost still feel the sweet "calcarous" flavour of the rocks.

Yet, dear Geology, my journey has almost come to the end, and I write to you not to forget. A new chapter of my life is opening, but I wanted to thank you. You made me grow up as a man and know new friends. I also learned unknown terms, and I made experiences that little by little have transformed me in the man I am. Therefore, dear Geology, I just wanted to thank you, for all.

With love,  
your Geologist



**2020**

**A year in a  
nutshell**

at the Department of Geosciences

[https://mediaspace.unipd.it/media/A+Year+in+a+Nutshell/1\\_1erefpsv/87137311](https://mediaspace.unipd.it/media/A+Year+in+a+Nutshell/1_1erefpsv/87137311)



The Department of  
Geosciences welcomes

**Paola Saracino**

---

New Executive Secretary of  
the Department and Head of  
the Administrative staff



**January**

The Department of  
Geosciences welcomes

**Roberto Maria Rossi**

---

New member of the Technical  
and Administrative staff



**February**

# The Covid-19 pandemic spreads all over the world

It disrupted our life and job as we knew them: closed offices, empty classrooms, online lectures and meetings... but it could not stop us!



# March

The Department of  
Geosciences welcomes

**Lisa Santello**

---

New member of the Technical  
and Administrative staff



**March**

# Restoration

begins of the old  
Lab facility  
("Stabulario") built  
next to the  
Department



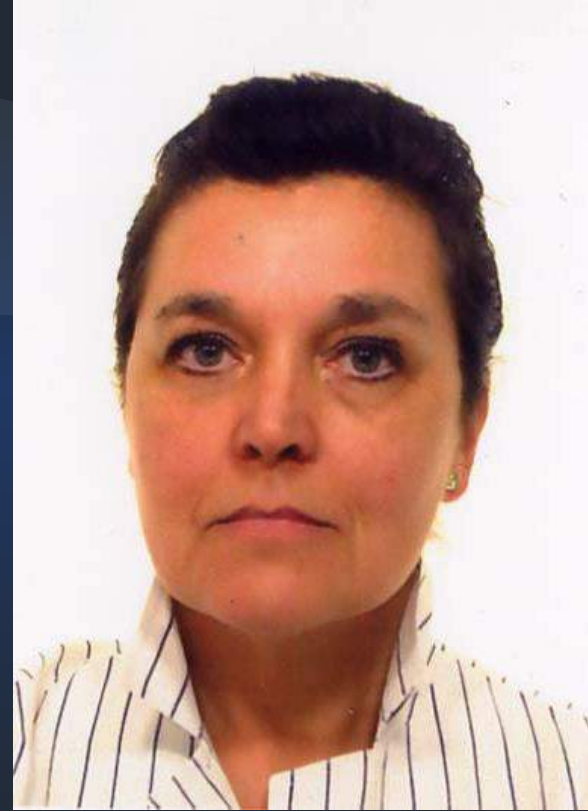
April

# Sandra Boesso

---

Member of the Technical and  
Administrative staff, retired

The Department of  
Geosciences thanks her for her  
precious work in the past years



# August

# Andrea Marzoli

---

former Associate Professor in  
Geochemistry, is now **FULL  
PROFESSOR** at TESAF,  
University of Padova

The whole Department wishes  
him good luck with his new  
position!



# September

The Department of  
Geosciences welcomes

**Cristian Iozzia**

---

New member of the Technical  
and Administrative staff



September



# Award

## Jacopo Boaga

Associate Professor

---

**Bando Leonardo da Vinci 2020**

Conferenza dei Rettori delle Università italiane

*to foster structured relationships as  
visiting academic with centers of  
excellence in higher education and  
research worldwide*



# September

# Award

# Simone Masoch

PhD student

Student Author of the year Award  
for their paper:

Seismic cycle recorded in cockade-bearing  
faults (Col de Teghime, Alpine Corsica)

by *S. Masoch, M. Fondriest, N. Preto, M.  
Secco and G. Di Toro - JSG, 129 (2019)*



# September

# Award

## Manuel Rigo

Associate Professor

---

Premio Marco Beltrando 2019-2020  
Società Geologica Italiana

*given his scientific quality, productivity and the ability to attract resources on competitive projects, which make him a potential future leader of scientific research in the field of Geosciences*



# September

# Alberto Carton

---

Full Professor in  
Geomorphology, retired

The Department of  
Geosciences thanks him for his  
precious work in the past years



# October

# Annalisa Zaja

---

Associate Professor in Applied  
Geophysics, retired

The Department of  
Geosciences thanks her for her  
precious work in the past years



# October

# Luciano Secco

---

Associate Professor in  
Mineralogy, retired

The Department of  
Geosciences thanks him for his  
precious work in the past years



# November

The Department of  
Geosciences welcomes

**Alberto De Lorenzi**

---

New member of the Technical  
and Administrative staff



**November**

The Department of  
Geosciences welcomes

**Silvia Cattò**

---

New member of the Technical  
and Administrative staff



**November**



The Department of  
Geosciences welcomes

**Davide Novella**

---

Researcher in Geochemistry



December

The Department of  
Geosciences welcomes

**Filippo Catani**

---

Full Professor in Engineering  
Geology



December



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Coordination, data collection and integration,  
graphic design, editing and publication by

*Massimiliano Ghinassi*

*Laura Busato*

*Luca Capraro*

*Stefano Castelli*

*Elisa Facciolo*

*Nicola Michelon*

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