



1. Research activity

The main aim of this project is the valorisation of the “hidden heritage” of the collections stored in the MUST (Museo Universitario di Scienze della Terra della Sapienza), finally granting public access to the whole archive and materials.

This will be achieved by the draft of a specific preservation protocol for the fossils, rock and minerals specimen, the compilation of a digital and interactive inventory of the museum’s contents, extending and updating the existing database of fossils, minerals and rocks, and the planning of data sharing and dissemination to different levels of knowledge (e.g., scientific, high school, middle school and general audience).

The MUST (University Museum of Earth Sciences) arises from the merger of the three historical museums of Geology, Mineralogy and Palaeontology of Sapienza University of Rome, which preserve over 34,000 mineralogical, 6,000 geological and 500,000 palaeontological estimated samples or specimens [1]; the assets of the Museum also consist of books, maps and tools of historical and scientific significance.

The initial research work will be devoted to analysing the Museum collections in order to plan an adequate preservation and storing protocol. During this period an intensive literature analysis about preservation, storing and valorisation will be carried out; at the same time, a network with specialists in the sector of other museums, universities and agencies will be established.

The focus then will be on the compilation of an inventory of the scientifically most relevant invertebrate fossils, such as the holotypes, syntypes, topotypic specimens, and some historical collections. This part of the Ph.D. is aimed at fulfilling the first mission of a scientific museum, that is type specimen curation and scientific dissemination, thus contributing to the prestige of the Museum.

The update and management of the database will be performed in collaboration with the Polo Museale Sapienza, which already has developed a specific database.

During the first year of the Ph.D., the work carried out both for scientific and dissemination purposes will be documented through the Internet page of the Museum and other channels (e.g. using social networks to keep the community updated on the work done and the organisation of events), showing also the behind-the-scenes work. In the meantime, 3D models of the best-preserved and most significant specimens will be performed (at least 20 specimens). 3D data acquisition will be carried out by means of close-range photogrammetry.

The candidate will also attend workshops and congresses of museology and fossil preparation to improve his knowledge (e.g., the 68th Symposium of Vertebrate Palaeontology and Comparative Anatomy that includes a Palaeontological Preparation and Conservation session, in 2020). The candidate, taking the chance to be already in the U.K. for the symposium, will visit the Natural History Museum (London) and the Dynamic Earth (Edinburgh). Those visits will improve his knowledge about the dissemination issues and methods of conservation and valorisation of the collections.

Moreover, the completion of storing and inventorying of the vertebrate fossil collection will be achieved following the same approach used for invertebrate fossils; 3D models of the most significant specimens will be made (at least 15 specimens).

The project then will focus on a census of type mineral specimens [4], historical collections (e.g., the Dactylotheca, donated by Pope Leo XII in 1824) and igneous and metamorphic rocks, most relevant meteorites, sedimentary rocks and uncategorized samples preserved in the museum (e.g., the Marmi Antichi T. Belli, Dodwell, Spada collections).

The student will also participate in conventions related to mineralogy and cultural heritage. Scientific stays at the Museum für Naturkunde (Berlin) and Naturhistorisches Museum (Vienna) are planned; funding for research abroad will be achieved through specific calls for proposals.

The historical analysis of the oldest collections stored in the Museum will be also carried out during the three years. This aim will be complemented by literature analysis, to better understand the history of the Museum and its collections.

During the whole Ph.D. program, selected events for the community will be periodically scheduled. Those events will make aware the lay public of the role played by the Museum, through scientific dissemination, seminars and practical activities aimed at involving students and community into museum work. Collaboration and coordination with trainees and fellows will be crucial, not only for the individual tasks mentioned above but also for the medium-term planning of targeted activities; professors and researchers of the Earth Science department will be involved in specific decisions relating to their areas of expertise.

With the progressive cataloguing of the material and its reorganization, guides of the museum will be developed, targeted on the different types of visitors from primary schools up to university level. In order to support the use of specialised guides, particularly those

dedicated to primary schools, it is considered useful to design kits for geological practicals to be supplied to the teachers.

In addition, tours will be designed and provided within the museum, with the adoption of the most modern technologies such as augmented reality (e.g., applications for smart devices with multiple levels of information on interactive objects).

REFERENCES

- [1] Manni, R. (1993). Il Museo di Paleontologia. I Musei dell'Università "La Sapienza", 46-56.
[2] Dunn, P. J., & Mandarino, J. A. (1987). Formal definitions of type mineral specimens. *American Mineralogist*, 72(11-12), 1269-1270.

2. Research products

a) Abstracts

Sacco E., Antonelli M., Bernardi E., Conti J., Tomasoni R., Pignatti J. & Petti F.M (2019) - The use of aerial- and close-range photogrammetry for the mapping of the Lavini di Marco tracksite (Hettangian, Southern Alps, NE Italy). Session 2. Congresso SPI: "Paleodays 2019, XIX edizione delle giornate di paleontologia". Benevento (Italy), 2019.

Antonelli M., **Sacco E.**, Bernardi E., Conti J., Tomasoni R., Pignatti J. & Petti F.M. (2019) - Tridactyl tracks from the Lavini di Marco dinosaur ichnosite (Hettangian, Southern Alps, NE Italy): ichnotaxonomical review and palaeobiogeography. Session 1. Congresso SPI: "Paleodays 2019, XIX edizione delle giornate di paleontologia". Benevento (Italy), 2019.

Petti F. M., Petruzzelli M., Conti J., Spalluto L., Wagensommer A., Bernardi M., Tomasoni R., Antonelli M., **Sacco E.**, Pignatti J., Sabato L. & Tropeano M. (2018) - The use of aerial and close-range photogrammetry to study dinosaur tracksites both at the meso- and macro-scale: the cases of the Lavini di Marco (Lower Jurassic, Hettangian - Trentino-Alto Adige) and Molfetta (Lower Cretaceous, Aptian-Albian - Apulia) tracksites. Session S37 Congresso SGI-SIMP: "Geosciences for the environment, natural hazard and cultural heritage", Catania (Italia), 2018.