

# ***SpaceDust* – A micrometeorite project at the conjunction between art, science and public outreach**

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The topic of urban micrometeorites became highly popular after the first release of Jon Larsens book (2016), eventually initiating numerous citizen science and profound scientific projects worldwide on the collection and research on these cosmic spherules. Recent scientific approaches on urban cosmic dust particles, complementary to the well-established collection of Antarctic micrometeorites, led to the refinement in collecting techniques in particular (Jonker et al., 2023). With this growing number of available cosmic dust material, collected in urban areas, more precise constraints on their source region(s) in space can be retrieved. Moreover, initiated public outreach and citizen science projects on this subject enables to generate a better understanding in general and helps transferring scientific knowledge on the influx of cosmic particles on Earth to the public.

Starting back in 2022 the *SpaceDust* project, initiated by the Viennese artist Sonia Leimer, instantly gained interest from the first author and eventually resulted in this collaborative, interdisciplinary project connecting art, fundamental space science and public outreach. The overall aim of this ministry-funded project is to renew the so-called Leopold Wing located at the city center between Heldenplatz and Vienna Hofburg, Austria, which is also seat of the Austrian Federal President. Central part of the *SpaceDust* project is the collection of material from surrounding rooftops with cosmic particles in particular. From this material a total number of 18 bronze figures will be produced and installed on site (Fig.1). The bronze figures of collected micrometeorites will be about 80 cm in diameter each with an individual patina, accompanied by concrete bollards ensuring safety aspects but may be utilized by the public for seating. A display will provide information to the public, providing some scientific background on the relevance of micrometeorites and influx of cosmic material in general.

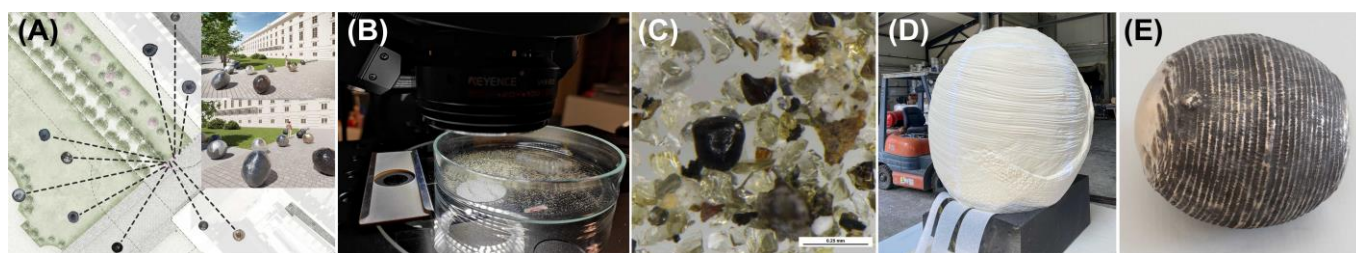


Figure 1. (A) Excerpt of the *SpaceDust* installation concept at the Leopold Wing, Vienna, (B) optical microscopy and (C) documentation of urban micrometeorites, (D) 3D-printed model and (E) smaller bronze sculpture of an selected micrometeorite for installation.

Procedure and documentation strategy was as follows: Material was collected from selected rooftops of the Viennese Hofburg, including the dome of St. Michael's Wing, NHM Vienna, the monumental Burgtor, Austrian National Library, and finally the office of the Austrian Federal President using plastic boxes and bags of several sizes, gloves, scoops, a brush and a hand magnet. Preferentially, material traps such as drains or smaller depressions on the respective roofs were sampled. Subsequently, material was separated using a water flotation and sieve tower method with four different mesh sizes, followed by immediate drying in a furnace at temperatures lower than 50°C to prevent any further reactions, and subsequent careful Nd hand magnet separation of material fractions of interest. The latter were in the range of 63-250 µm and 250-500 µm, respectively. Magnetic fractions of separated materials were then investigated using a Keyence VHX-7000 digital microscope at the NHM Vienna. Spherules of interest were hand-picked. A JEOL JSM-6610LV scanning electron microprobe at the NHM Vienna, was used for further micrometeorite identification and detailed surface documentation. Selected spherules are 3D-animated as a basis for construction of the bronze figures to be placed at the Leopold Wing, Vienna. Further investigations on the micrometeorites using the JEOL HyperProbe JXA-8530F electron microprobe are planned. Selected material may be available for future isotope analysis to gain further insights on the spherule proveniences. Collaborative scientific work and public outreach strategies on the subject of urban cosmic dust in comparison to Antarctic materials are open for discussion.

## **References**

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