

Meteorites inside out

Visualising and analysing the composition of meteorites by combining 3D photogrammetry, micro-CT scans, and thin section analysis.

Department: Earth Sciences

Research groups: Astrobiology / Petrology / Structural Geology and Electron Microscopy

Supervisor: Inge Loes ten Kate,

Collaborators: Roberto Rizzo, Eric Hellebrand, Onno Tijmsma, Garrett Speed, Perro de Jong

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Project description

The Department of Earth Sciences has an extensive meteorite collection that is currently only partly used in teaching activities. Inge Loes ten Kate, the curator for the collection, aims to make the collection better accessible for future teaching activities at UU and other institutions, as well for the public at large. In 2022, we have established the Utrecht Meteorite Lab, the virtual Utrecht meteorite collection (utrechtmeteoritelab.sites.uu.nl). We aim to create a virtually accessible collection containing 3D renderings of the Utrecht meteorite collection, enriched with their respective density and composition data obtained with micro-CT, and microscope images of thin sections.

Aim

The main aim of this project is to do a comprehensive analysis of a set of meteorites from the collection and describe the outcomes in an accessible way for high school and bachelor students.

Methodology (location, supervisor)

- (I) create 3D models of their exterior through Structure-from-Motion photogrammetry, where photographs of the meteorites will be rendered into 3D photorealistic models (ESL, Garrett/ Onno).
- (II) create 3D models of their interior by making micro-CT scans (ESL, Roberto)
- (III) identify mineralogical composition of their thin sections using microscopy (VMA, Eric / Inge Loes)
- (IV) write a comprehensive analysis of the meteorites combining the three data sets (Inge Loes / Robert / Eric)
- (V) add the meteorites and their descriptions to the website in an accessible and attractive way (Perro/Inge Loes)
- (IV) store the obtained data in accessible way using FAIR principles (Garrett)

Expected outcome

A set of well-described meteorites and well-documented data that can be used for teaching purposes and as a starting point for bachelor meteorite research projects.

Job requirements

A responsible and conscious working attitude is required to work with these precious materials. In addition, affinity with photography and meteoritic, mineralogical, and petrological analyses, and the ability to quickly learn new analytical techniques and adopt workflows with a new software are a pre.