Report - ATRIUM 3D Summer School Brno

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During the second week of September (15th–19th), I had the privilege to attend the ATRIUM 3D Summer School in Brno, hosted by the Institute of Archaeology of the Czech Academy of Sciences. The primary focus of the summer school was to deepen participants' expertise in advanced technologies, particularly photogrammetry and laser scanning, which are essential for modern archaeological documentation and heritage preservation.

DAY 1 – 15th of September

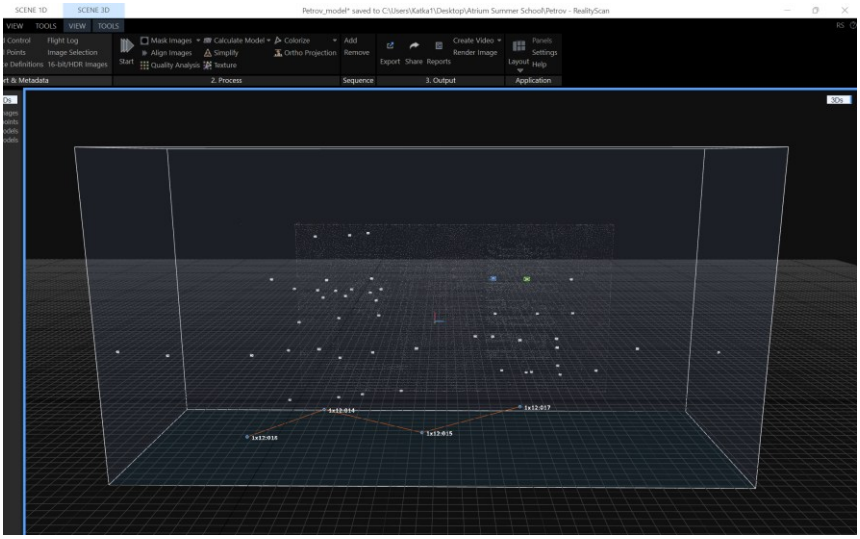
The programme began with a lecture "Understanding 3D: From Space to Artefacts" by V. Nosek, introducing the fundamentals of 3D documentation in archaeology The lecture provided a solid foundation on the use of 3D technologies for archaeology and heritage preservation. In the afternoon, T. Chlup took over with a lecture and practical workshop called "Focus, Dial and (try to) Stay Sane," which explored photography techniques beyond the camera's AUTO mode. We learned how to unlock our cameras' full potential to better document archaeological sites and artefacts. This combination of theory and hands-on practice prepared us for the next day's focus on photography of historic momunemts. The day concluded with a keynote lecture by Dr. L. Starková titled "Scanning the Past," which showcased how photogrammetry, LiDAR, and HBIM technologies are applied in archaeology and heritage care through case study from Iraqi Kurdistan.

DAY 2 – 16th of September

The morning of the second day unfolded outside, right in front of the Petrov Cathedral in Brno. We enhanced our photogrammetry skills by learning how to properly set up a site for precise 3D image capture. This included placing control points and photo shoot to make sure the pictures can be used to create an accurate 3D models. This hands-on session was crucial for understanding the essential groundwork behind photogrammetric documentation.

Participants of 3D Summer School Brno (credits: Paulina)

In the afternoon we processed our photos in Reality capture 2.0.1. to create models with help of tutor of the day D. Spáčil. After lunchbreak we returned to the Institute and we worked through the entire process from importing images and aligning them to create point cloud, to setting measurement references, generating detailed 3D meshes, and finally adding textures to complete the digital models.



Processing in Reality Scan 2.0.1

DAY 3 – 17th of September,

The third day began with two focused lectures. V. Nosek presented lecture *3D Scanning and Photogrammetry in Archaeology: Theory and Practice*," where he covered laser scanning techniques from large-scale landscape documentation to detailed architectural and artefact scanning. The following lecture *Photogrammetry Practical* focused on documenting archaeological artefacts. This was followed by a practical photogrammetry session focused on documenting archaeological artefacts, where we engaged in hands-on exercises. We practiced the complete workflow, starting with photographing selected artefacts and finishing with data processing in Reality Capture.

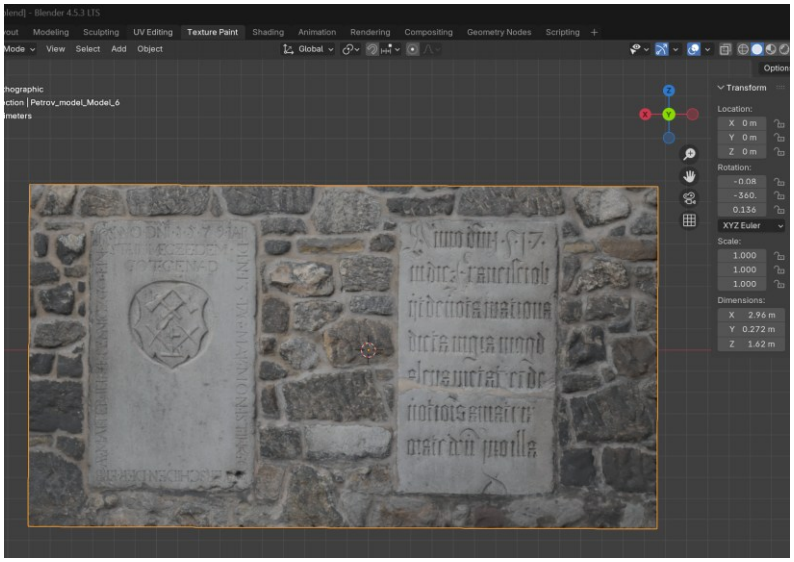
Photographing of small artefacts (credits: Kanyingi John)

DAY 4 – 18th of September

The fourth day featured a series of lectures focused on virtual archaeology. J. Unger from the Institute of Archaeology in Prague introduced the field of virtual archaeology, discussing both general concepts and practical case studies. He also addressed the important topic of uncertainty levels in virtual reconstructions. Following this, M. Koštál from Masaryk University presented the lecture "From 3D Scan to Virtual Reconstruction," guiding us through the Blender environment and showcasing his case studies related to transforming 3D scans into virtual models. In an online lecture Simon Radchenko shared an inspiring project from Ukraine that supports local museums by providing them with digital equipment, training, and expertise to preserve archaeological heritage through 3D digitization. This initiative is especially vital due to the ongoing conflict, which has severely threatened Ukrainian cultural sites and artifacts. The project emphasizes the critical role of regional museums in safeguarding cultural history and promoting digital preservation skills to ensure Ukrainian heritage remains accessible and protected despite the challenges of war.

DAY 5 – 19th of September

On Friday, we put our acquired skills into practice in a prepared environment. We began by learning how to prepare a photo shoot specifically for Reflectance Transformation Imaging (RTI). We practiced positioning the light source at different angles around the objects to capture how light interacts with their surfaces, a critical step for RTI processing. Afterwards, we worked in groups to capture the photographs needed for creating our future 3D models. Mastering the precise arrangement of lighting to highlight the surface details of artefacts was really challenging. These practical exercises helped us to understand the fine details and the specific challenges involved in accurately processing smaller objects.



Blender postprocessing

I am very grateful for the opportunity to participate in the 3D Summer School in Brno at the Institute of Archaeology. My thanks go to the ATRIUM project team and especially to the dedicated organizers and lecturers, namely Zuzana Kopáčová, David Spáčil, Vojtěch Nosek, Tomáš Chlup, Martin Koštál, and Jiří Unger—including all the online speakers. I also want to thank my fellow participants for creating such a welcoming and inspiring atmosphere throughout the program.

In the Archaeological Museum, my colleagues and I plan to apply the knowledge and practical skills acquired to develop detailed 3D documentation of archaeological artifacts, enabling better presentation and increased accessibility for a broader audience.