Report from ATRIUM 3D Summer School

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During the week of September 15 – 19, I had the opportunity to attend the ATRIUM 3D Summer School, hosted by the Institute of Archaeology of the Czech Academy of Sciences in Brno. The program brought together participants from fields such as archaeology, archival studies, and heritage care, who were mostly interested in gaining or deepening their knowledge of digital documentation and visualization methods. I took part in this workshop as someone who primarily works as a conservator of archaeological artefacts at the Slovak National Museum – Archaeological Museum, motivated by the desire to broaden my knowledge in 3D documentation of artefacts and to explore how these technologies can be applied in conservation and heritage preservation. Throughout the week, the instructors guided us through the topics using a combination of lectures and practical workshops, allowing us to understand the theoretical principles and apply them in real documentation exercises.

Day 1

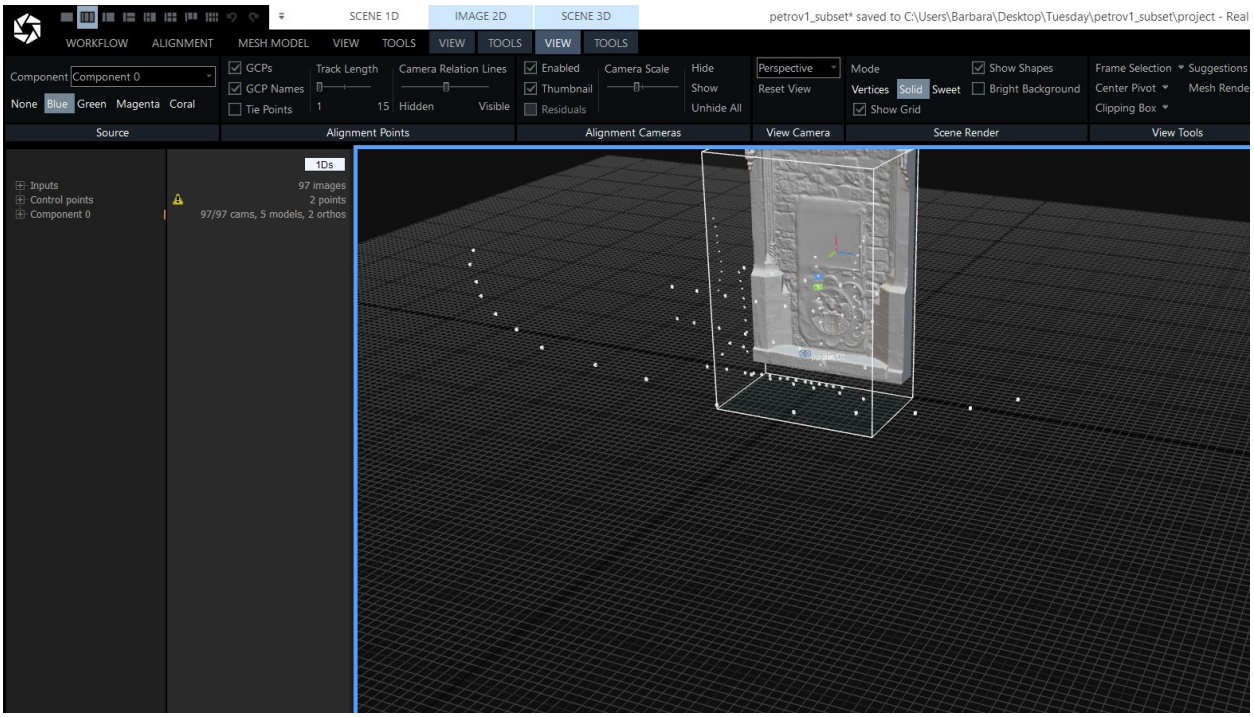
The first day laid the foundation for the entire week. The morning began with an introductory lecture on 3D documentation in archaeology presented by V. Nosek, which outlined the fundamental principles of photogrammetry and its broad range of applications in heritage care. This session gave us an overview of how 3D models can serve not only as research tools but also as long-term documentation and preservation strategies.

In the afternoon, we attended a lecture on Photography in Archaeology led by T. Chlup, followed by a practical workshop. We learned to adjust aperture, shutter speed, and ISO to capture high-quality images for photogrammetry. This was quite challenging, as it showed how much image quality affects the accuracy of 3D models.

The evening concluded with a keynote lecture by L. Starková, focusing on the use of photogrammetry, LiDAR, and HBIM in archaeology and heritage care. Participants were introduced to the possibilities of combining different technologies—LiDAR tablets, mobile and static scanners, aerial and terrestrial photogrammetry—and how these datasets can be integrated into HBIM for heritage management. The case studies, particularly from the Middle East, provided inspiring examples of how technology can reshape archaeological practice.

Day 2

The second day brought us into the field, directly in front of Brno's Cathedral of St. Peter and Paul. Under the guidance of our instructors (D. Spáčil, V. Nosek, T. Chlup), we worked in small groups to document sections of the monument. This involved careful planning of camera positions, setting up control points, and photographing the structure systematically. It was a valuable exercise in understanding the practical challenges of outdoor documentation, from lighting conditions to perspective alignment. In the afternoon, we returned to the Institute to process our collected data using RealityCapture. With the help of our instructors, we went step by step: importing images, aligning them into point clouds, scaling the models with references, generating 3D meshes, and applying textures, while watching the cathedral dataset gradually transform into a digital model.



Day 3

Day three started with a lecture on 3D scanning and photogrammetry in archaeology, which focused mainly on laser scanning techniques ranging from large-scale landscape documentation to detailed scanning of architectural structures and artefacts. Later in the morning, we moved on to the practical session of photographing artefacts, where precision and controlled lighting were essential. Working with smaller objects proved surprisingly challenging, as even slight reflections or shadows could affect the quality of the results.

In the afternoon, we processed these photographs into 3D models. This gave us the chance to compare workflows and explore different software, including RealityCapture and Metashape. The exercise made me appreciate how digital documentation can preserve archaeological objects in ways that make them accessible for both research and public engagement.

The day ended with a friendly evening organized by the hosts, who had prepared a dinner for all participants. The atmosphere quickly became relaxed and lively, with plenty of opportunities to chat, share experiences, and enjoy local food and drinks. It was a great moment for meeting people from different backgrounds, exchanging ideas, and strengthening the sense of community.

Day 4

On the fourth day, the focus shifted to theoretical lectures. J. Unger presented the idea of Virtual Archaeology, demonstrating how digital scans can be transformed into interactive models that bring archaeological research to life for both scholars and the public.

Later, M. Košťál shared practical guidance on turning 3D scans into virtual reconstructions. He introduced useful software tools for organizing references, enhancing textures, and creating realistic visualizations, while emphasizing that effective results can often be achieved without costly equipment.

Later in the day, we attended online lectures about projects from Ukraine and Ireland that focused on photogrammetry and 3D modeling. These lectures, especially the one about the project in Ukraine, highlighted how digital documentation can help preserve cultural heritage even in difficult circumstances and provided inspiring examples of practical applications in different regions.

Day 5

On the final day, we had dedicated time for individual practice. We split into small groups and had the opportunity to try different techniques, such as Reflectance Transformation Imaging (RTI), revisit photographing archaeological objects, and process the collected data to create 3D models. We also practiced working with software tools like Blender and CloudCompare to refine and visualize our models.

Conclusions

The whole week was an extremely valuable learning experience. The combination of lectures and practical exercises made 3D scanning, photogrammetry, and related techniques very approachable and engaging. I now feel well-prepared to further develop these skills and apply them in my work as a conservator of archaeological artefacts. Beyond gaining technical knowledge, I also enjoyed connecting with colleagues from around the world, exchange ideas, and be inspired by their perspectives. A special thanks goes to the organizers and instructors, especially David Spáčil, Vojtěch Nosek, and Tomáš Chlup, for their patience, guidance, and willingness to answer our many questions. They were incredibly supportive throughout the week. Overall, the ATRIUM 3D Summer School was well organized, had a lot of useful content, and the atmosphere was friendly and supportive.