The ornamented bone and antler artefacts are among the most outstanding pieces of European Middle Stone Age art. In the past, the research into these finds tended to focus on their aesthetic and stylistic values. The technology of their manufacture, ornamentation and use-wear have been addressed in only a very general manner. The main method used in this past research was macroscopic observation of the surface of these objects and of the engraved lines of their ornament. Use was made occasionally also of optical microscopes, at low magnification. The data obtained using these methods were insufficient to reconstruct in greater detail the manufacturing and the ornamentation processes, and traces of wear developed on the artefacts when they were in use.

The objective of studies to be completed within the present project is to reconstruct the social and ritual significance of Mesolithic art objects. According to the existing research one can hypothesize that ornamented artefacts accumulate complex traces of production and use on their surfaces. The objective is to be achieved through a comprehensive study of ornaments and use-wear identified on the surface of these artefacts. The data obtained will be used to reconstruct 'biography' of these objects. Such a biography includes the process of manufacturing the object (choosing its material, technology); making the ornament (the number of its makers, phases, technology), handling (traces of wear, damage and so on), and finally, disposal of the artefact. Episodes which took place within successive phases as the ornamented artefacts continued within a given community will be reconstructed due to cutting edge methods of analysis drawn from several research disciplines. This multidisciplinary approach will contribute to grasping different aspects of the manufacture and the use of these art objects. Interpretation of the identified marks will help to answer the key question of how - from the social and ritual perspective – these objects were made and used.

The focus of this in-depth research are to be Mesolithic ornamented objects stored in different institutions. The research plan adopted within our project takes account of the exceptional culture heritage value of these objects and the need to keep to the minimum the time they are taken out of the museum display. During phase I of the project (6 months) the ornamented artefacts will be taken to Wrocław. Here, their comprehensive drawn and photographic documentation will be made, using state of the art photography methods. Next, 3-D computer models of all the artefacts and their epoxy resin casts will be made. The casting makes it possible to faithfully reproduce their surface to an accuracy of 1 micrometre. Such a high fidelity will assist investigation of the surface, and ornaments executed on the epoxy resin casts. With subsequent experiments made using the epoxy resin casings the original ornamented objects will not become damaged (surface wear), and can be returned to their museums as soon as possible. Moreover, the epoxy resin casts may be manipulated freely for the purpose of microscope examinations. At the end of phase I the original artefacts will be subjected to a palaeozoological analysis, after which samples will be extracted from them for genetic, radiocarbon and chemical testing.

During phase II of the project (12 months) the age of the art objects will be determined (radiocarbon method). Samples of animal bone and antler used in making the artefacts will be used for palaeogenetic studies. The chemical samples will be investigated using the methods of spectrometry and microscopy to identify substances filling the engraved ornament or covering the artefact surface. The techniques used in carving the lines of the ornament and any mechanical traces surviving on the surface of the objects will be investigated by means of a macroscopic analysis of technological traces and use-wear, microscope examinations and analysis of 3D models. Past research shows that only the use of several methods of recording in combination produced good results. Another research task undertaken during this project phase are experimental studies involving making replicas of the ornamented objects from modern bone and antler, and ornamenting them using various techniques and flint tools, as well as putting these replicas to different uses. A comparative study of traces developed on the replicas and on epoxy resin casts will assist interpretation of the traces and use-wear observed on the original artefacts. As a final step, we will try to recognize the settlement context of the Mesolithic art object finds by making archaeological studies near the sites of their discovery.

In phase III of the project (6 months) the results obtained from former analyses will be used to reconstruct the biography of individual artefacts. Different episodes in their life cycle associated with their manufacture, use and disposal will be interpreted from the perspective of the social and ritual life of ancient hunter-gatherers. Within this phase we will carry out comparative studies with other Mesolithic art from Europe.

The research completed within the project is expected to improve our understanding of social and religious mechanisms underlying the manufacture and use of ornamented objects by Mesolithic hunter-gatherers. While the methods of used during our project are known to archaeology, and have been practiced in the past, they have never been used in a combination as the one proposed here for the study of art objects. Consequently, by using this set of techniques we expect to recover and interpret facts hitherto unknown in case of Mesolithic ornamented objects. The canon of methods that will be used has potential to become a standard model, requisite in the study not only of Mesolithic art but also of those dating from other periods.