Periodically, new techniques arrive and revolutionise the working practices for conservators, researchers and curators. One such technique introduced to the Natural History Museum (NHM) in London in 2008 was the arrival of Micro-Computed Tomography. Assessment of the price of CT scanners and the increase in “affordable” computing power prompted an investment in a dedicated Micro-CT centre based in the Imaging and Analysis Centre. The CT suite at the NHM facilitates over 100 projects and typically 2000 scans per year, resulting in an incredible amount of data being produced. This non-destructive, non-invasive and exceptionally informative technique has become a key tool in the interpretation and analysis of museum specimens. This talk explores how Micro-CT can contribute to projects in a range of scientific areas by showcasing its versatility as a technique, and examines ways to share such a large, information-rich, collection.

High profile projects such as the Tissint Martian meteorite used Micro-CT to locate voids which might contain trapped Martian atmosphere [1] (Fig. 1). Other projects such as imaging the 19th century Blaschka glass models for conservators, can provide a wealth of information on the lost manufacturing techniques used to produce these delicate artworks. This is invaluable data for conservation purposes (Fig. 2), but also provided a virtual record of the condition of the specimens.

Recently, virtual collections have become a much more appealing concept for the museum environment. Micro-CT derived data can aid in producing a library of virtual specimens which can both avoid the need to loan samples, which can reduce damage or contamination to collections (Fig. 3) and be used to enable researchers to collaborate remotely. The data can be shared in various formats; raw data, mesh data, embedded models in pdf documents, numerical data, rendered images or standard 2D projections. The scope to share 3D data opens new avenues for research and takes data sharing into the future of science.

Micro-CT data has also been providing an additional perspective on traditional 2D histology and thus has had an important impact in Taxonomy (Fig. 4) [2]. Researchers have been able to morphometrically analyse data, to process density information and obtain quantitative measurements. The combination of results enables scientists to get a better grasp of the specimen of interest. The acquisition of a Micro-CT system at the NHM also produces readily understandable, visual information that allows the public to easily understand vast range of different research projects carried out here.

Fig. 1: Micro-CT rendered image of a sample from the Tissint meteorite. Colours are used to highlight different density minerals within the meteorite which can then be used to determine the different volumes of those minerals.

Fig. 2: Micro-CT rendered image of a Blaschka glass model of a Radiolarian, which are part of the marine zooplankton. This model was created by the famous artisans Leopold and Rudolf Blaschka in the 19th century. It shows the species called Dorataspis diodon. Colours represent the different types of glass used in the production of these delicate models.

Fig. 3: Micro-CT rendered image of a holotype collection of a lizard. The skin is coloured a transparent white and the bone in a yellow-brown. An example of the building of a virtual collection of holotype material to protect the original holotype.

Fig. 4: Micro-CT rendered image of a Chrysanthemum in cross section. Colours highlight the different densities of tissue type, by examining cross sections of this material in any plane desirable many ‘hidden’ features can be revealed.