

Paper Number: 2523

## Beyond the stony veil; reconstructing early trace fossils using Micro-CT analysis, a case study from the Yangtze Gorges area, South China.

Meyer, M. B.<sup>1</sup>, Polys, N.<sup>2</sup>

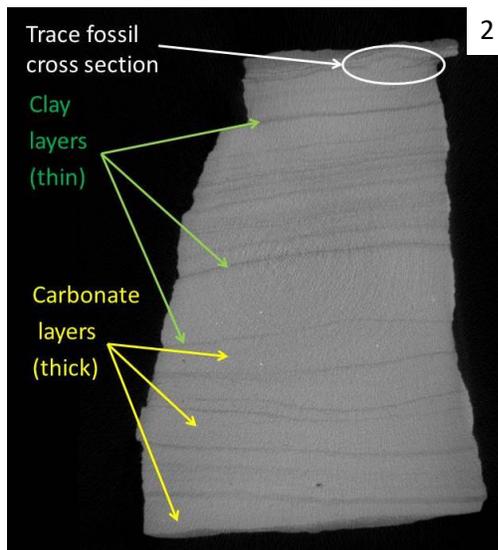
<sup>1</sup>Geophysical Laboratory, Carnegie Institution of Science, Washington, DC, USA

<sup>2</sup>Department of Computer Science, Virginia Tech Information Technology, Blacksburg, VA, USA

Trace fossils are an amazing tool for examining the ancient world because they physically record something which is not (necessarily) physical, an organism's behaviour. However, examining trace fossils can be extremely difficult. Depending on the trace maker, type of trace, amount of traces, and sediment/matrix recording the traces (just to name a few factors), it can be challenging to isolate and examine a single trace. This is especially true for the earliest traces from the Ediacaran Period (635–541 Ma) which are usually small and simple bulldozed trails. Therefore, the discovery of relatively large (~1 cm in diameter) traces from the late Ediacaran Dengying Formation (550–541 mya) age rocks from South China are a great resource to study early bioturbators.



This new ichnogenus and ichnospecies, *Lamonte trevallis*, has been described from the Shibantan Member limestone of the late Ediacaran Dengying Formation (550–541 mya) of the Yangtze Gorges area in South China. It is characterized by relatively large (~1 cm in width) horizontal burrows preserved in full



relief occurring exclusively within clayey and silty, crinkled, and microlaminated layers that are interpreted as the remnants of amalgamated microbial mats. The high bedding-plane bioturbation densities and close association of *L. trevallis* burrows with microbial mats, implies that the burrowers were actively moving through the mats; possibly mining the mats to exploit oxygen or nutrient resources. The exact purpose of the burrows has been difficult to pinpoint as the traces are often obscured by the surrounding matrix or leave the plane of preservation or exposed surface. Here we describe the results of the first computed tomography (CT) X-ray imaging scans of Ediacaran trace fossils and their three dimensional reconstruction. These preliminary reconstructions show that *L. trevallis* trace fossils can be seen in CT scans. While more scan data is needed, there is also evidence of multiple trace making behaviours. By utilizing the unique

preservation of the *L. trevallis* fossils, this investigation can open the doors to analyse many other traces (of any era) in new and exciting ways.

Figure 1: Closer view of *Lamonte trevallis* fossils. Scale bar = 1 cm

*Figure 1: MicroCT scan slice of Shibantan Member limestone. Burrow in cross section circled (white arrow and circle). Thin clay layers (green arrows) can be seen as dark lines, while the thicker carbonate layers (yellow arrows) can be seen as lighter, thicker, layers. Scale bar = 1 mm.*

