Imaging techniques help rebuild ancient fauna

August 12 2014, by Aaron Bryans

A paper summarising a 20-year study into Ordovician-Late Devonian microfauna has revealed new histological data aiding taxonomy and palaeographic reconstructions.

Curtin University expert and co-author Dr Kate Trinajstic and her team looked into the Late Devonian fauna of the Gogo Formation located in the Canning Basin.

They applied micro-computed tomography and synchrotron tomographic advancements in an attempt to reconstruct historical reefs and understand its habitants including rocks and fish.

"You can use fossils to find the relative age of rocks," Dr Trinajstic says.

"It's not an absolute age but you can say that a rock layer is older or younger than another layer.

"We're trying to use these fossils to correlate the different parts of the reef that have been preserved so that we can build up a model of what the original area used to look like."

The study also revealed information on bone growth, muscle attachments, teeth evolution and reproductive structures of the fish from the Gogo Formation thanks to the use of micro-computed tomography and synchrotron tomographic techniques.

Soft anatomy no longer a mystery

Reconstructing the soft anatomy of extinct animals has until recently been difficult with palaeontologists relying on the interpretation of muscle scars to predict muscle placement.

However the advancement of synchrotron technology has enabled scientists to reveal the presence of extrinsic fibres that indicate muscle alignment points.

"We're in the unique position where we were able to do synchrotron scanning and see where the muscles are attached, and then we actually find fossils that had soft tissue in them [helping us] to test the models," she says.

"They basically work like an ordinary medical CT scanner, taking x-ray slices and pictures around a full circle that you can build up and make a 3D reconstruction.

"A synchrotron does the same at a much finer resolution."

The advancements of tomographic techniques have, for the first time, provided a non-destructive histological 'section' of dermal plates.

Other co-authors assisting the study include Curtin University graduate Brett Roelofs, Queensland Museum researchers Dr Carole Burrow and Dr Susan Turner, and Flinders University Professor John Long.

Provided by Science Network WA