IMAGING WITH RADIATION
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Morphological studies in forerunners of mammals enhanced by the use of CT-scanning imagery.

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South Africa is world renowned for its rich palaeontological record, which documents in great detail the evolution of mammals. The lineage closest related to mammals is known as non-mammalian cynodonts and first appears in the period known as the Late Permian, at about 255 Millions years ago. Cynosaurus suppostus is a Late Permian species of cynodont, known only from the Karoo Basin of South Africa. Specimens of this species were last scientifically described 48 years ago, and the collection of additional specimens previously not published, makes this taxon due for a formal scientific redescription. The use of X-ray computer assisted tomography (CT-scanning) is becoming fundamental to undertaking detailed morphology studies in fossil animals. We are employing this technique to illustrate the external views of the fossils as the 3D rendering is able to highlight features that is not always clearly depicted in traditional photography of the material, particularly when studying relatively small fossils. An important and unique additional use of this technology, is the possibility to study internal structures that are hidden, without damaging the material, such as dental replacement, as it is possible to recognize new teeth that will replace the functional ones. This technique also allows for the reconstruction of internal cranial cavities, (i.e. brain and nasal cavities). Landmark based study (geometric morphometrics) on the 3D rendering of the ontogenetic series of specimens, allows us to study the ontogenetic trajectory of Cynosaurus suppostus.

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