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## Visualising Evolution and Extinction through silicified fossil fruits from Queensland.

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A recent successful trial using the Imaging and Medical (IMBL) at the Melbourne Synchrotron has revealed the internal anatomy and morphology of rare, three-dimensionally preserved, 30 million year old silicified fruits from Capella, in Central Queensland. These IMBL scans are the first application of this technique to the study of this kind of material. Previous medical CT scanning did not reveal any internal information. During the permineralisation process silicates have replaced the organic material of the fruit and thus biological information (such as DNA) is impossible to obtain. This in turn makes accurate taxonomic classification extremely difficult. Physical sectioning of these rare fossils for visualisation has many risks as it invariably destroys the specimen and is not guaranteed to produce any additional information. However, the current IMBL scans have provided us with accurate, detailed images of the internal reproductive structures of these enigmatic fruits, enabling, for the first time, a direct physical comparison between internal morphologies of extinct and extant rainforest fruits. This extra vital information effectively enables researchers to establish or confirm classifications to appropriate family, genus and species. Accurate species identification will help to advance knowledge of past environments and climates in Australia. Our collaboration specifically aims at combining art, science and technology to explore various approaches in the visualisation of this material, to drive content not only for scientific publication, but for exhibitions in galleries and museums and thereby attract entirely new audiences to this research.

### Keywords

IMBL fossil fruit Cenozoic silicified extinction evolution visualization Queensland Museum

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