



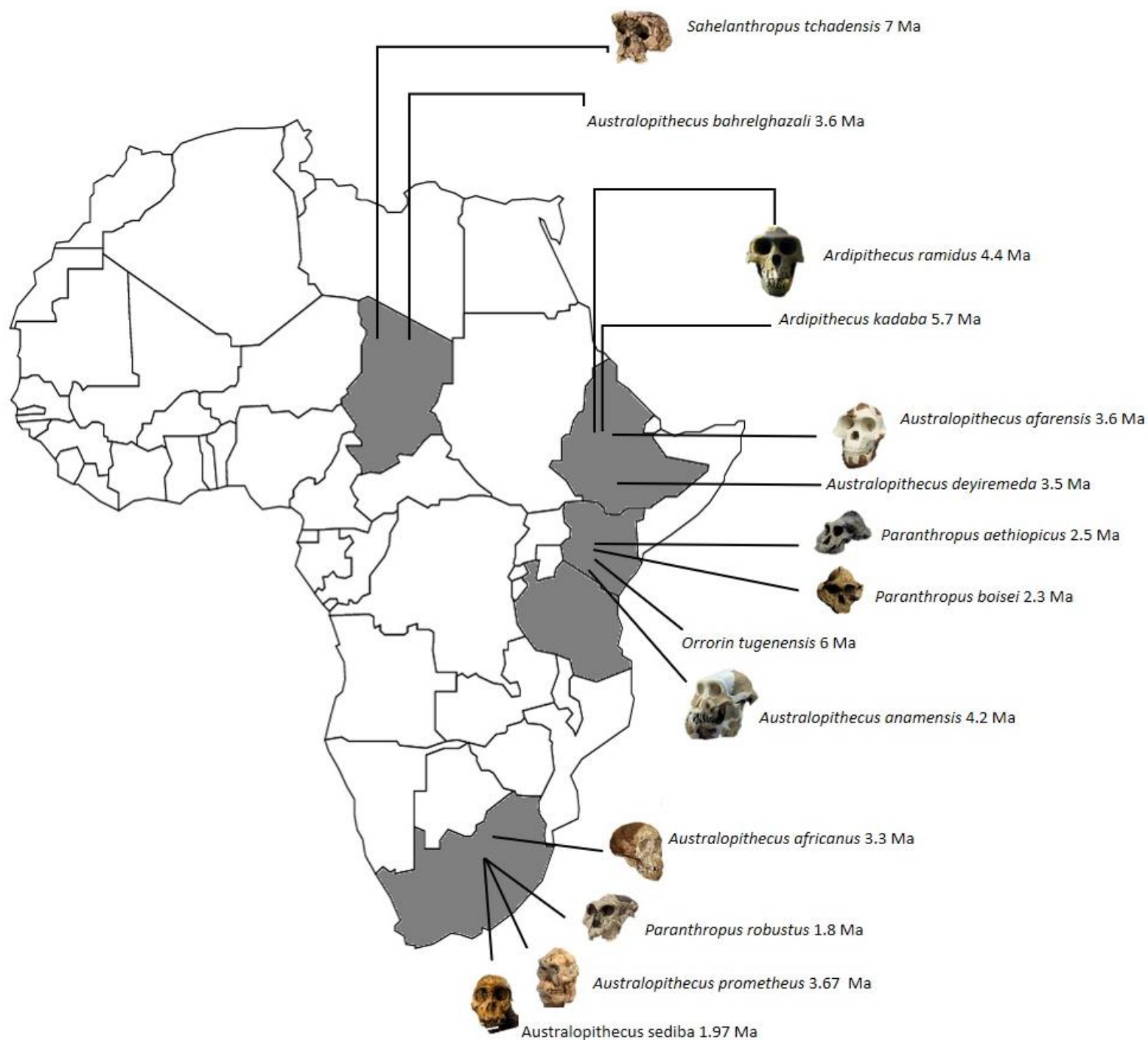
| The European Synchrotron



African fossil studies at synchrotrons

K. Jakata

The European Synchrotron Radiation Facility

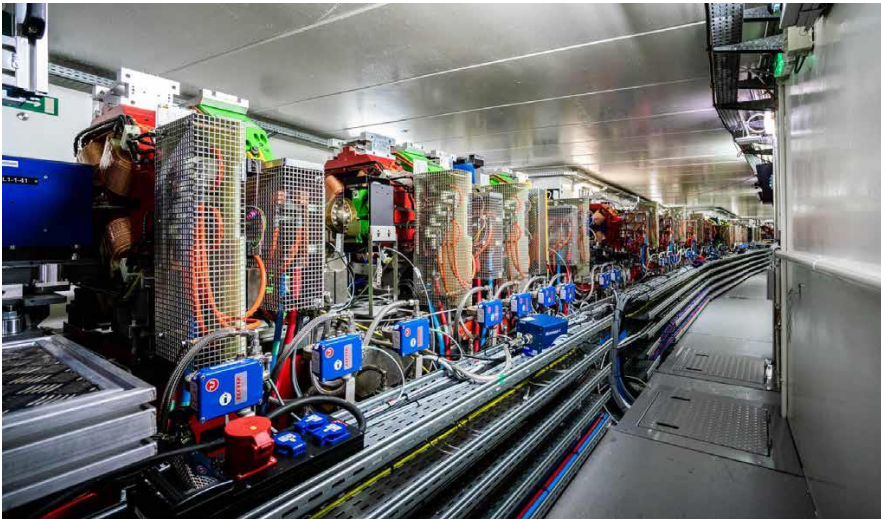






LITTLE FOOT



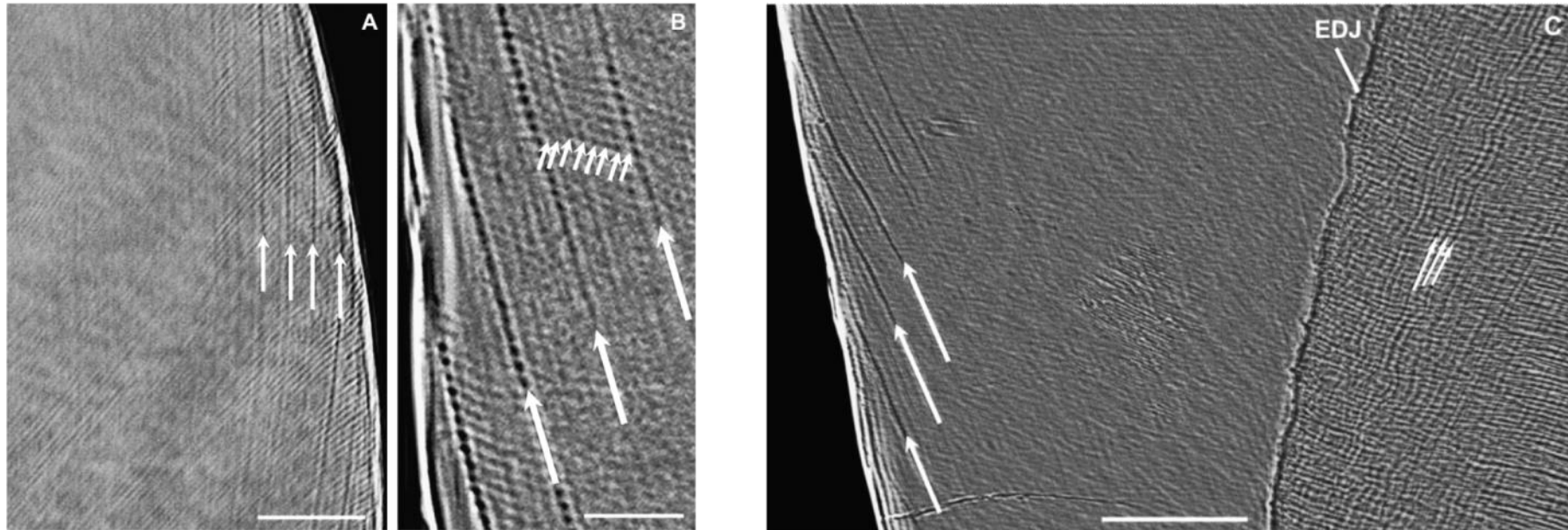


Phase contrast imaging

- Gives much better contrast
- Better sensitivity to sample inhomogeneities

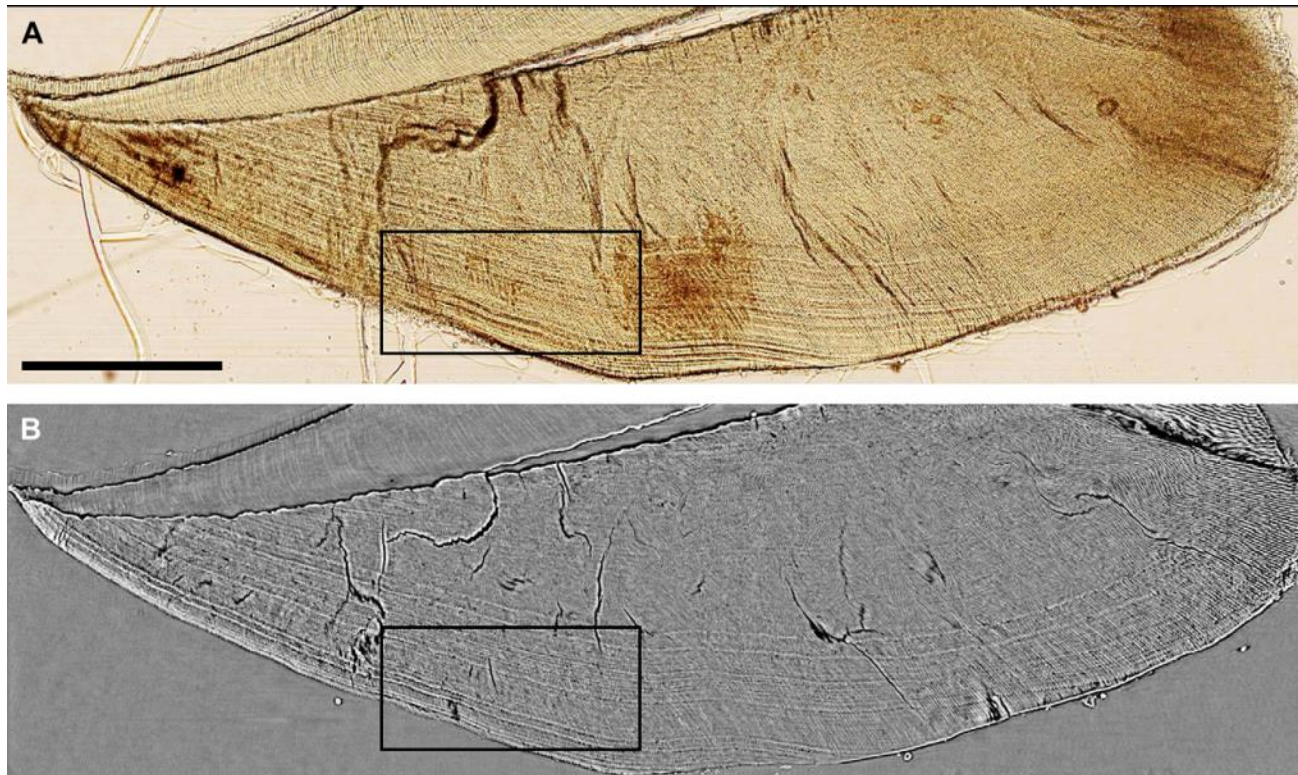
Nondestructive imaging of hominoid dental microstructure using phase contrast X-ray synchrotron microtomography

Paul Tafforeau^{a,b,*}, Tanya M. Smith^c



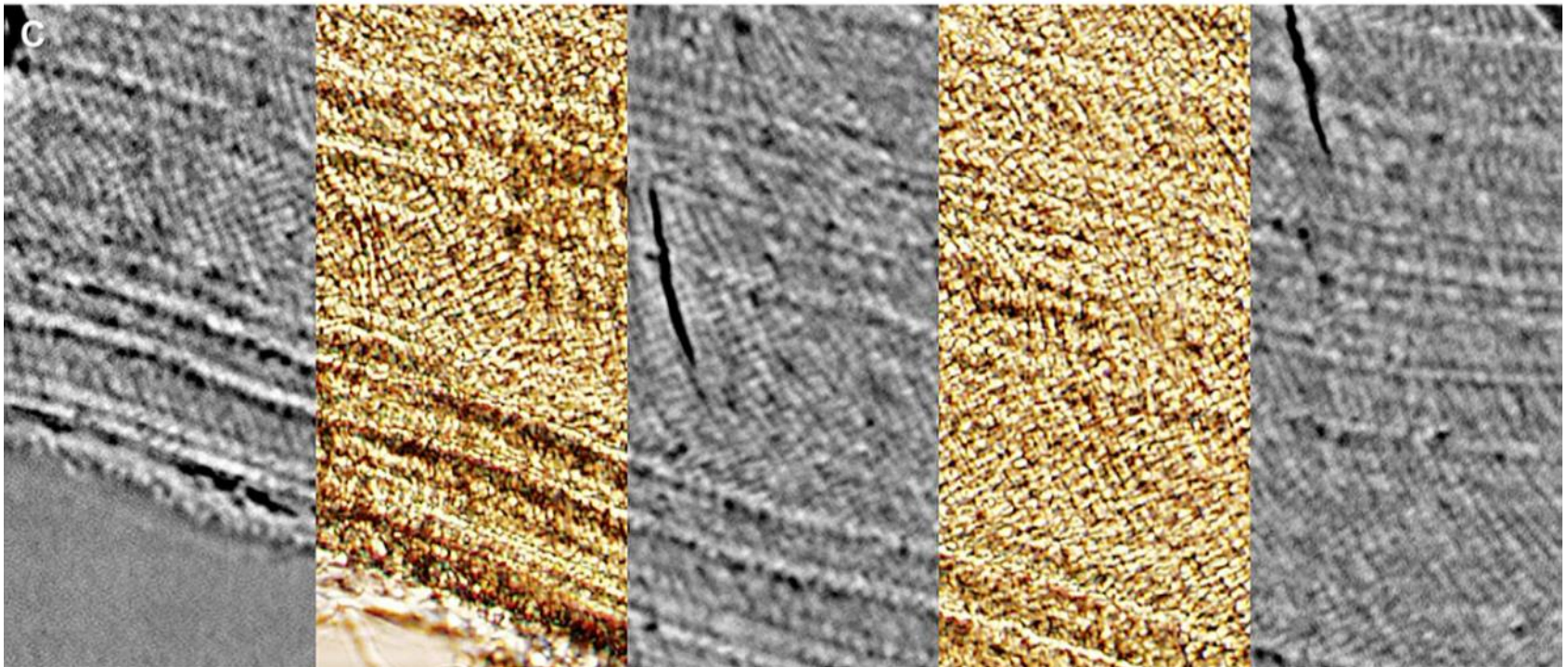
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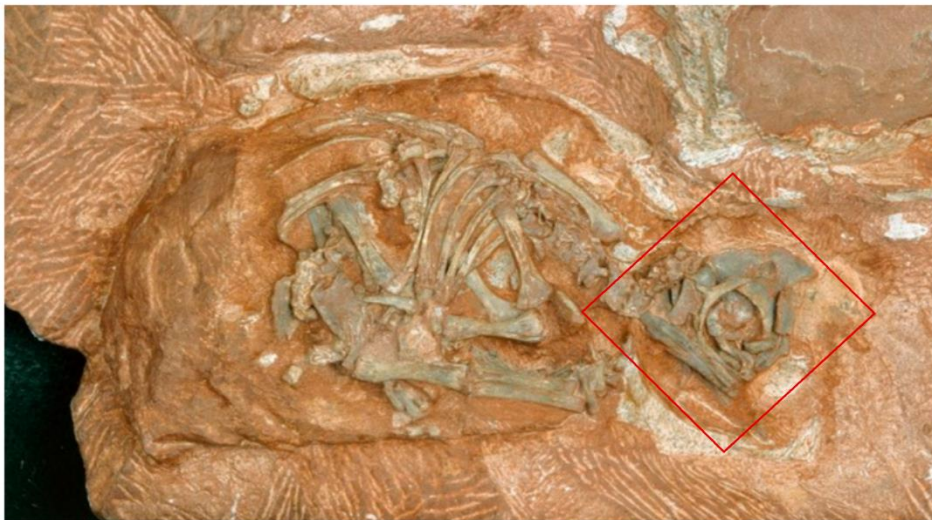
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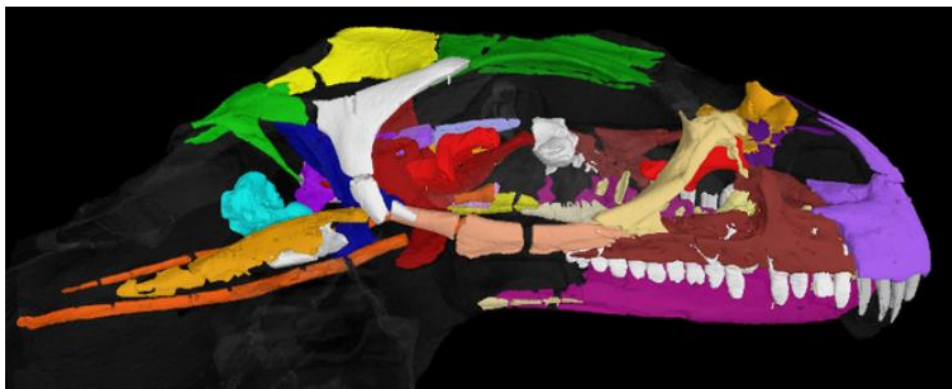


Dinosaur eggs get ready to hatch their secrets – 200 million years later

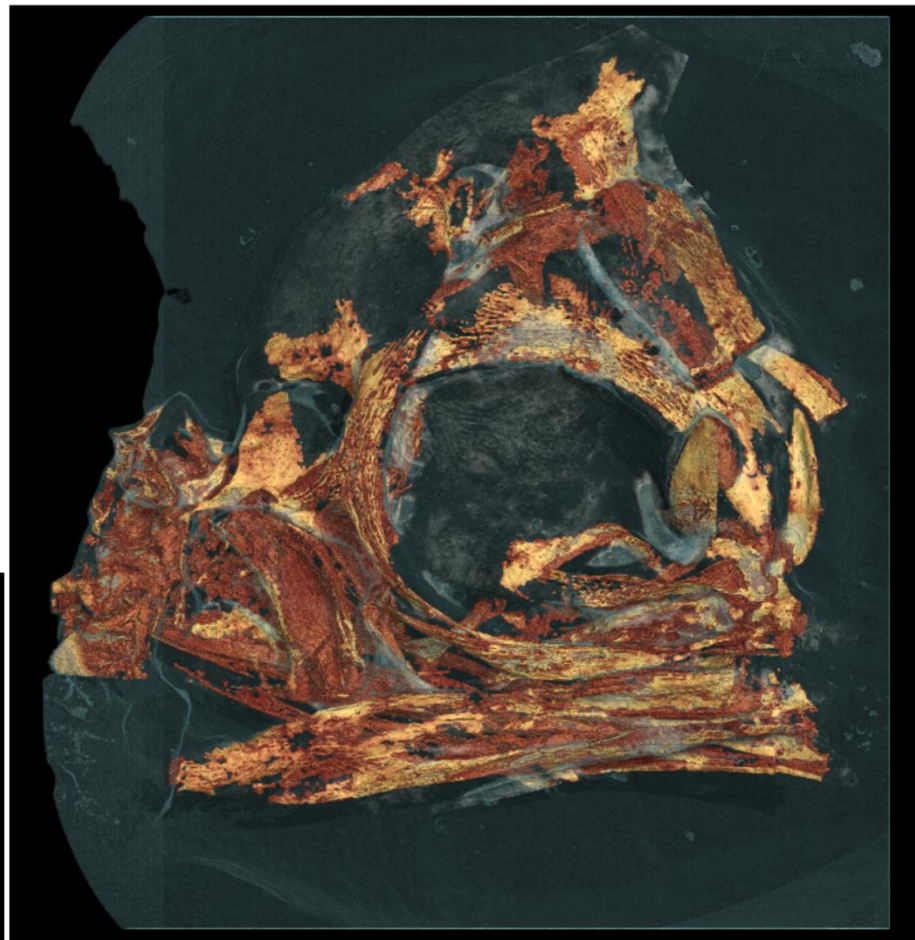
June 22, 2015 6:46am SAST



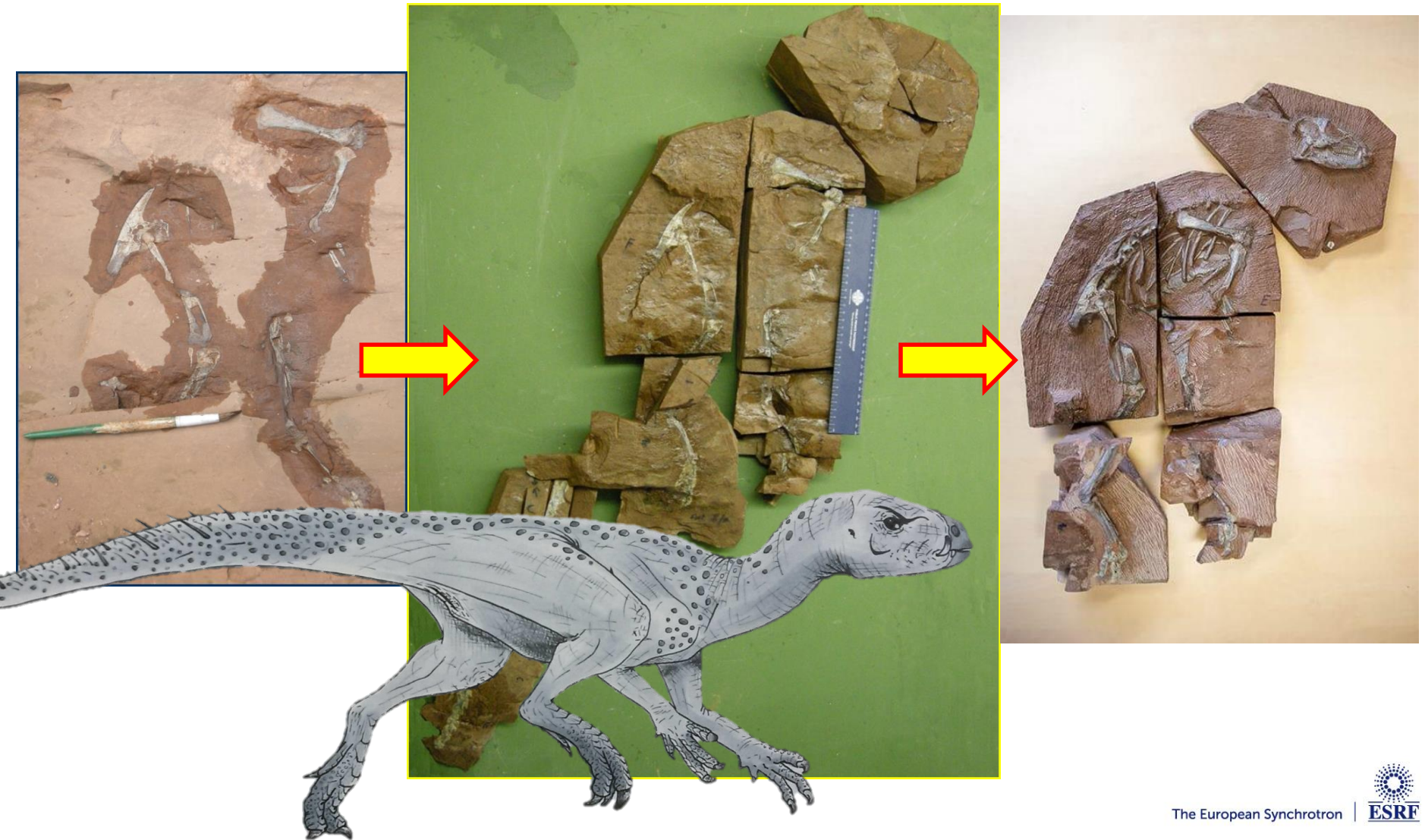
One of Kitching's original find of eggs, after being prepared by Diane Scott. Supplied



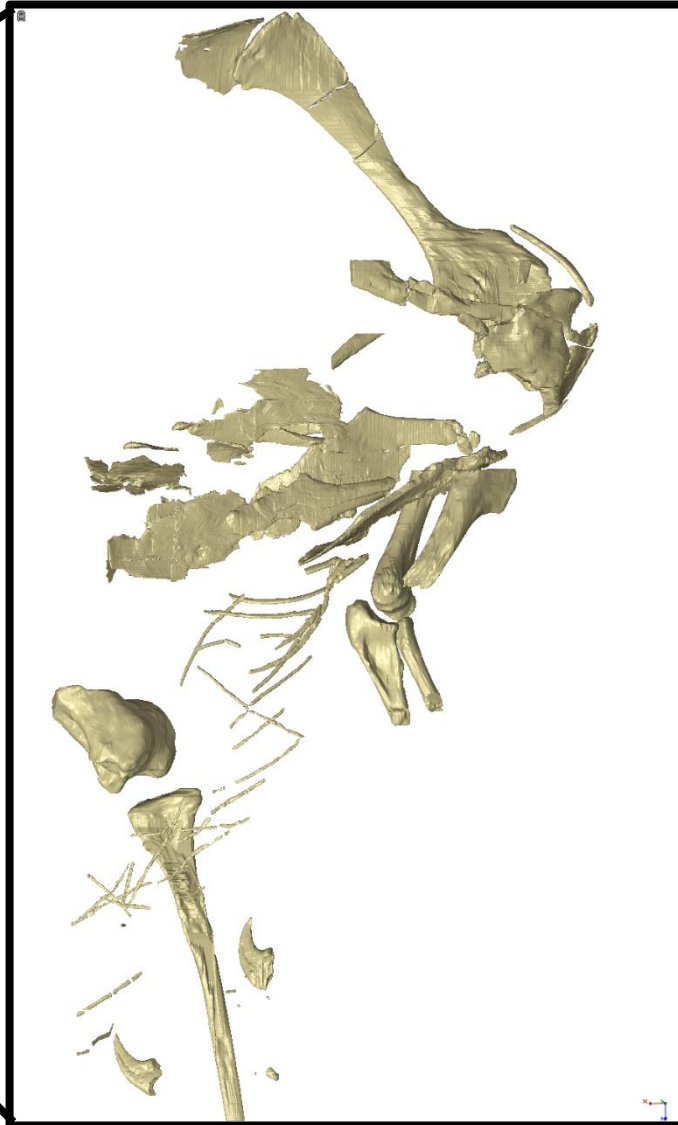
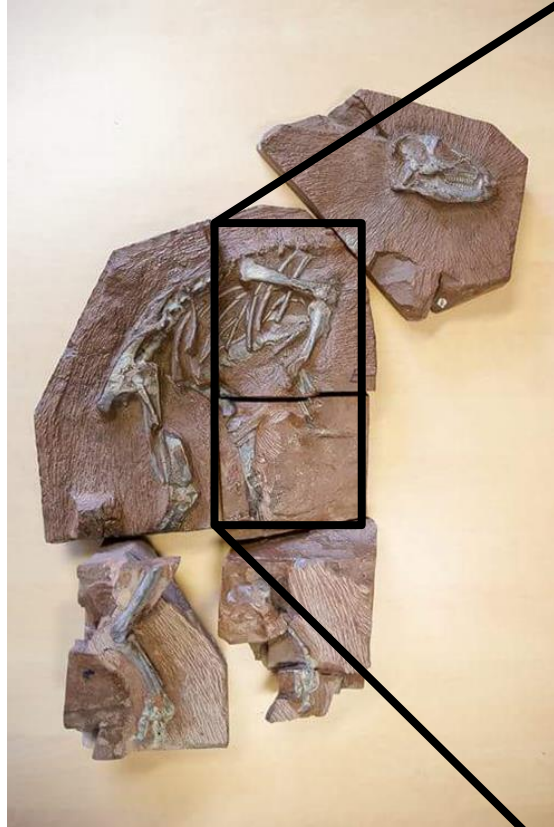
Side view of a 3D model of a juvenile Massospondylus produced from CT scans. Kimi Chapelle, MSc candidate



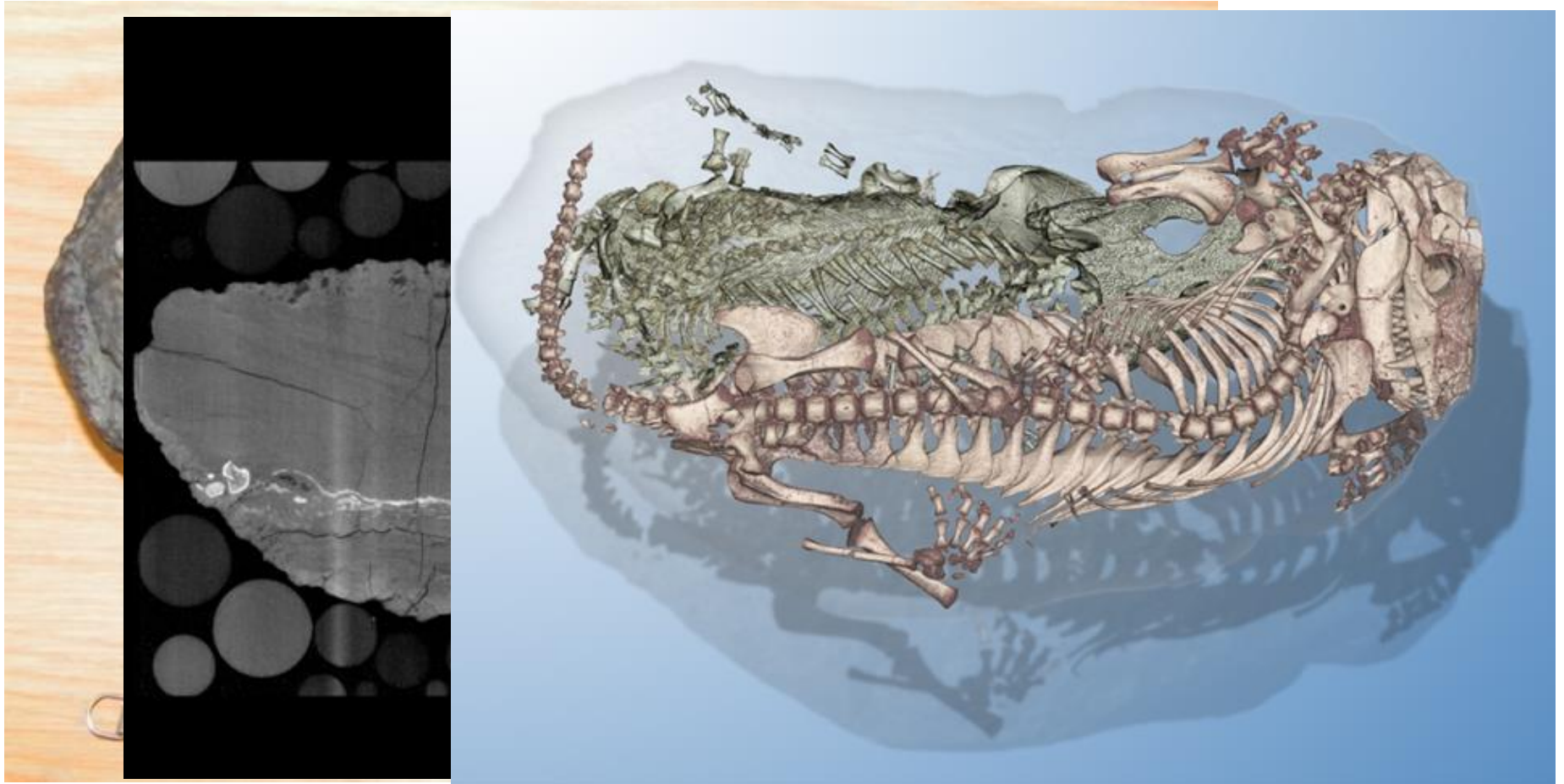
HETERODONTOSAURUS



ESRF REVEALS NEW ANATOMY



The fossil burrow



Synchrotron Reveals Early Triassic Odd Couple: Injured Amphibian and Aestivating Therapsid Share Burrow

Vincent Fernandez^{1*}, Fernando Abdala¹, Kristian J. Carlson^{1,2}, Della Collins Cook², Bruce S. Rubidge¹, Adam Yates^{1,3}, Paul Tafforeau⁴

1 Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg, Gauteng, South Africa, **2** Department of Anthropology, Indiana University, Bloomington, Indiana, United States of America, **3** Museum of Central Australia, Araluen Cultural Precinct, Alice Springs, Northern Territory, Australia, **4** European Synchrotron Radiation Facility, Grenoble, France

Abstract

Fossorialism is a beneficial adaptation for brooding, predator avoidance and protection from extreme climate. The abundance of fossilised burrow casts from the Early Triassic of southern Africa is viewed as a behavioural response by many tetrapods to the harsh conditions following the Permo-Triassic mass-extinction event. However, scarcity of vertebrate remains associated with these burrows leaves many ecological questions unanswered. Synchrotron scanning of a lithified burrow cast from the Early Triassic of the Karoo unveiled a unique mixed-species association: an injured temnospondyl amphibian (*Broomistega*) that sheltered in a burrow occupied by an aestivating therapsid (*Thrinaxodon*). The discovery of this rare rhinesuchid represents the first occurrence in the fossil record of a temnospondyl in a burrow. The amphibian skeleton shows signs of a crushing trauma with partially healed fractures on several consecutive ribs. The presence of a relatively large intruder in what is interpreted to be a *Thrinaxodon* burrow implies that the therapsid tolerated the



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Thank you