

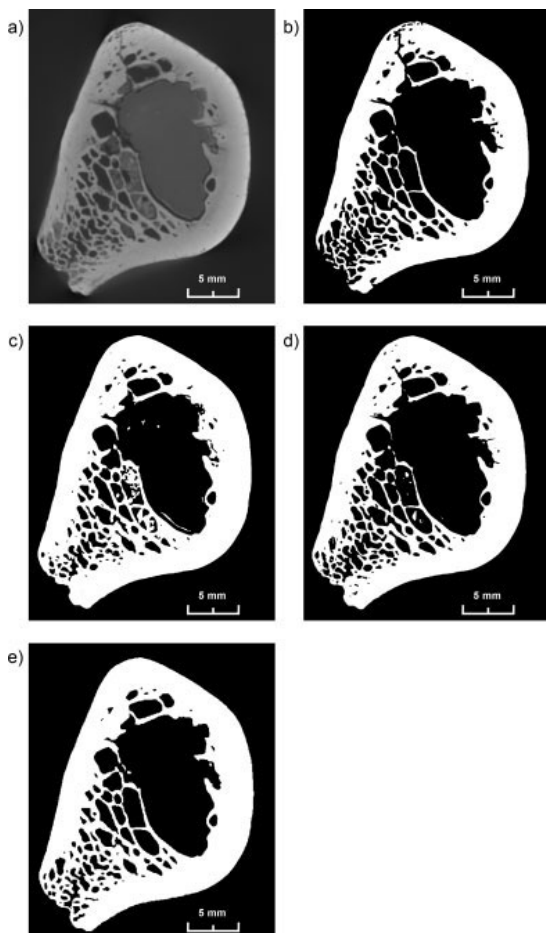
Technology Offer

## Ray Casting Algorithm (RCA) for Unprecedented Bone Segmentation Analysis

Ref.-No.: 1306-4111-LI

### Background

In the last decade, high-resolution computed tomography (CT) and microcomputed tomography (micro-CT) have been increasingly used in anthropological studies and as a complement to traditional histological techniques. This is due in large part to the ability of CT techniques to nondestructively extract three-dimensional representations of bone structures. Despite prior studies employing CT techniques, no completely reliable method of bone segmentation has been established.



**Fig. 11.** Transversal CT slice of the fossil femur of *Paidopithecus rhenanus* in the region of the lesser trochanter. (a) original slice, (b) RCA segmentation, (c) after adaptive iterative thresholding, (d) after HMM thresholding segmentation, (e) manual segmentation.

### Technology

Accurate preprocessing of digital data is crucial for measurement accuracy, especially when subtle structures such as trabecular bone are investigated. The technology presented here is a new, reproducible, accurate, and fully automated computerized segmentation method for high-resolution CT datasets of fossil and recent cancellous bone: the Ray Casting Algorithm (RCA).

Compared to methods of image thresholding (i.e., the half-maximum height protocol and the automatic, adaptive iterative thresholding procedure), **the RCA method is robust** regarding the signal to noise ratio, beam hardening, ring artifacts, and blurriness. Tests with data of extant and fossil material demonstrate the exceptional quality of RCA compared with conventional thresholding procedures (see Figure from reference).

### Intellectual Property Information

The algorithm and related software is available under a copyright and KnowHow agreement.

Contact  
**Dr. Dieter Link**

Senior Patent- & License Manager, Biologist  
Phone: +49 89 / 29 09 19-28  
Email: dieter.link@max-planck-innovation.dede