

## Toward a Better Knowledge of *Elephas Tiliensis* Skeletal Proportions and Morphology

**E. Theodorou<sup>1</sup>, V. Mitsopoulou<sup>2</sup>, T. Vasilopoulos<sup>1</sup>, C. Provatidis<sup>1</sup>, S. Roussiakis<sup>2</sup>**

<sup>1</sup>National Technical University of Athens, School of Mechanical Engineering, Mechanical Design & Control Systems Section, Zografou Campus, PO 15780, Athens, GR.,  
etheod@gmail.com<sup>1</sup>, cprovat@central.ntua.gr<sup>2</sup>, theodor@e-gr.net<sup>5</sup>

<sup>2</sup>National Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Zografou Campus, PO 15784, Athens, GR.sroussiak@geol.uoa.gr<sup>2</sup>, vamitsop@geol.uoa.gr<sup>2</sup>

*Elephas tiliensis* fossil bones have been excavated inside Charkadio Cave on Tilos Island, since 1971. An interdisciplinary team has been put together under the auspices of Thalís MIS380135 project, in order to fill in the missing taphonomical data and to reconstruct a complete three dimensional elephant, using Rapid Prototyping technologies. The focus of this presentation is targeted on deciding and testing the correct allometric proportions of the fore-limb and hind-limb using CT Scan and CAD manipulation software, along with classical palaeontological methodologies. Up to now there is no available material from both limbs of one animal, although different bones have been found in anatomical connection. With a mathematical formula still under development, the above methods are already producing significant data sets and in turn, alternate bone geometries. The first results are quite promising towards the reconstruction of the proper anatomical CAD model. This project is still ongoing, with very good initial results towards the three dimensional reconstruction of the *Elephas tiliensis*. The final 3D mechanical reconstruction will be housed in the new permanent exhibition site on the island of Tilos. The objective of this is to combine vertebrate palaeontology and state of the art Rapid prototyping technologies employed for the first time in any Greek endemic form, in reality of the last Mediterranean elephant that migrated to Tilos island from the mainland about 45.000 years and became extinct during Holocene.

**Keywords:** *Elephas tiliensis*, rapid prototyping, CAD, engineering, allometry

### References:

- Bachmayer, Von F., Symeonidis, N., Seemann, R. & Zapfe, H. (1976): Die Ausgrabungen in der Zwergelefantenhöhle „Charkadio“ auf der Insel Tilos (Dodekanes, Griechenland) in den Jahren 1974 und 1975. *Annalen des Naturhistorischen Museums Wien*, 80: 113-144.
- Lister, A. M. (1996): Dwarfing in island elephants and deer: processes in relation to time of isolation. *Proceedings of a Symposium held at the Zoological Society of London*, 69: 277-292.
- Palombo, M. R. (2007): How can endemic proboscideans help us understand the ‘island rule’. A case study of Mediterranean islands. *Quaternary International*, 169-170: 105-124.
- Stathopoulou, E. T. & Theodorou, G. E. (2001): Observations on the diagenesis of dwarf elephant skeletal remains from the island of Tilos (Dodecanese, Greece). *The world of elephants. Proceedings of the 1<sup>st</sup> International Congress*, Rome, 557-562.
- Theodorou, G.E., Symeonidis, N.K. & Stathopoulou, E.T. (2001): *Elephas tiliensis* n. sp. from Tilos island (Dodecanese, Greece). *Hellenic Journal of Geosciences*, 42: 19-32.