Geometric morphometrics and virtual biology in R

Date: April 6 & 7
Instructors: Dr. Antonio Profico & Dr. Alessio Veneziano
Location: Rümelinstraße 23, room 703 (last floor)

Program:

Day 1

9:00 – 11:00 Lesson 1 - Organizing R: Scripts, Packages, Code and Comments
a) Packages used in geometric morphometrics (Morpho, geomorph)
b) Packages used in computational geometry (Rvcg, Morpho)
c) Packages used in virtual anthropology (Arothron Morpho)
d) Packages on CRAN and Github
e) Useful handbooks (Morphometrics with R)

11:00 – 11:30: Break

11:30 – 13:30: Lesson 2 - Mesh Processing
a) Reading, cutting, rotating meshes, transformation matrices, etc.
b) Smoothing, decimation and other filters

13:30 – 14:30: Lunch Break

14:30 – 16:30 Lesson 3 – Analytical Tools and Virtual Biology
a) Mesh distance, mesh curvature, 3D volume calculation, surface areas
b) How to build an endocast in R in a few minutes? CA-SLE and AST-3D (Arothron R package)

Day 2

9:00 – 11:00 Lesson 4 – Landmark protocols
a) Reading and saving landmark data (Avizo, Morphologika, and other formats)
b) Geometric Morphometrics examples in Morpho and geomorph: landmark, semi-landmark sliding and shape variation

11:00 – 11:30: Break

11:30– 13:30: Continuation Lesson 4 – Landmark protocols
c) Bezier curves
d) Mirroring, estimation missing landmarks

13:30 – 14:30: Lunch Break

14:30 – 16:30 Lesson 5 - Virtual Reconstruction and Shape Variation
a) How to align two disarticulated models (Arothron R package)?
b) Morphing via Thin Plate Spline
c) Shape variations using colour maps