

Multidisciplinary Approaches Accelerating Developments in Archeogenetics & Paleontology

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- **Institute of Molecular Biology & Biotechnology**
  Genomics, Archeogenetics,
  Bioinformatics
- **Institute of Electronic Structure & Lasers**
  Spectral imaging, Chemical analysis
  Structural diagnostics, Restoration
- **Institute of Computer Science**
  Cultural informatics
  Ambient Intelligence applications
- **Institute of Applied & Computational Mathematics**
  GIS, Spatial statistical modeling
  Remote Sensing
- **Institute of Mediterranean Studies**
  Geophysical mapping, Virtual reality,
  Ancient environment reconstruction

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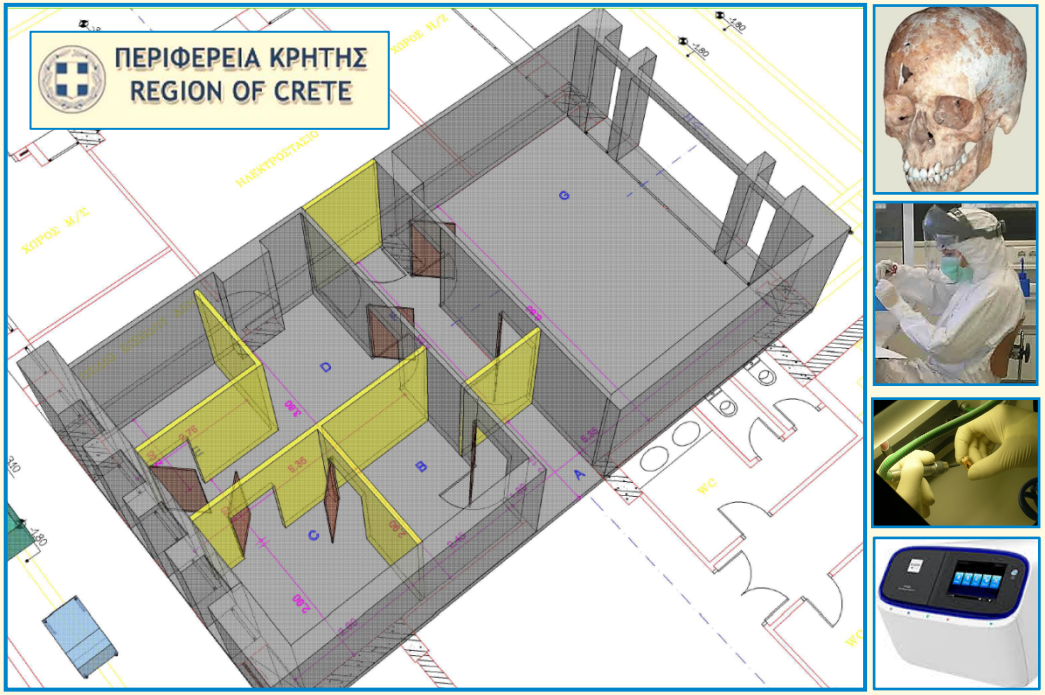


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- **Institute of Molecular Biology & Biotechnology**

Genomics, Archeogenetics, Bioinformatics

Ancient DNA Lab:



Technical & operational guidelines

- DNA free building
- Isolated laboratory rooms
- HEPA filtered ventilation
- Positively pressurized chambers
- Waste and drill dust collectors
- UV and bleach decontamination
- Monitor view-supervision
- Controlled limited access
- Standard operating procedures
- Dedicated equipment
- Pre- and post- handling protocol keeping

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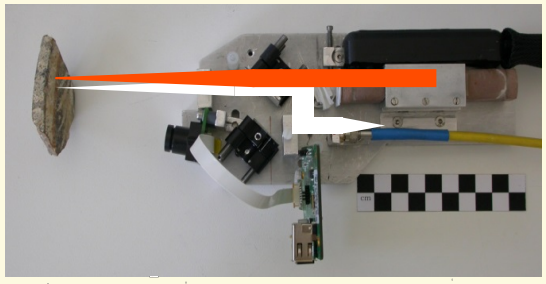


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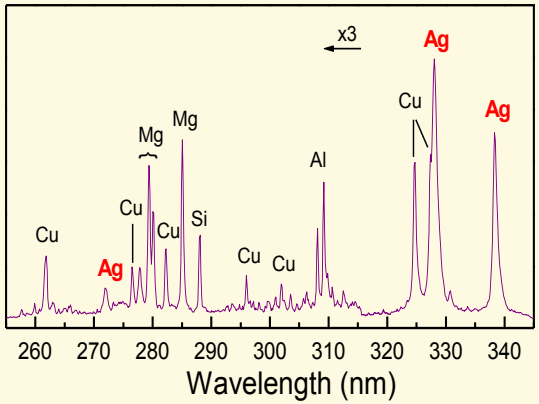
- **Institute of Electronic Structure & Lasers**

Spectral imaging, Chemical analysis
Structural diagnostics, Restoration

Mobile LIBS

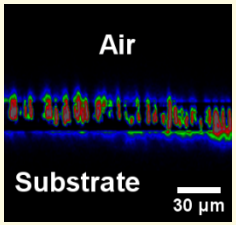








Interferometric techniques



THG imaging

Laser Cleaning of the Caryatids



Laserlab Europe

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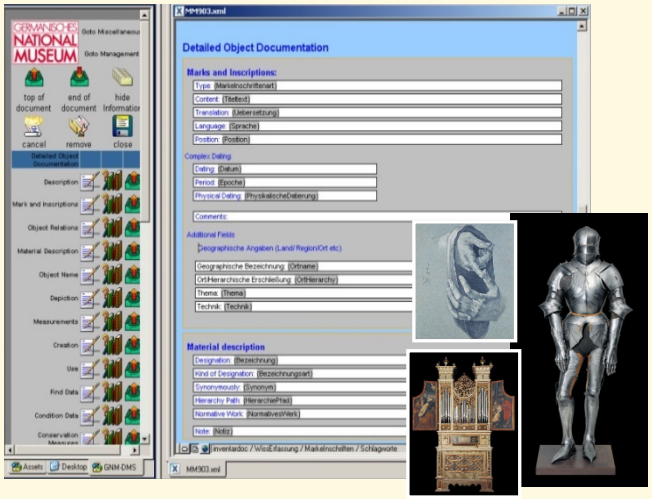
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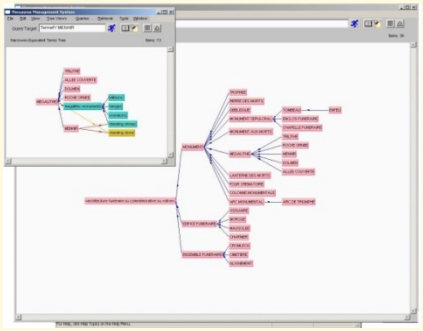
- **Institute of Computer Science**

Cultural informatics
Ambient Intelligence applications

semantic interoperability, information integration and integrated access
new computer uses and concepts

Museum Management Systems





Heterogeneous multilingual thesauri and ontologies



Multimedia trips

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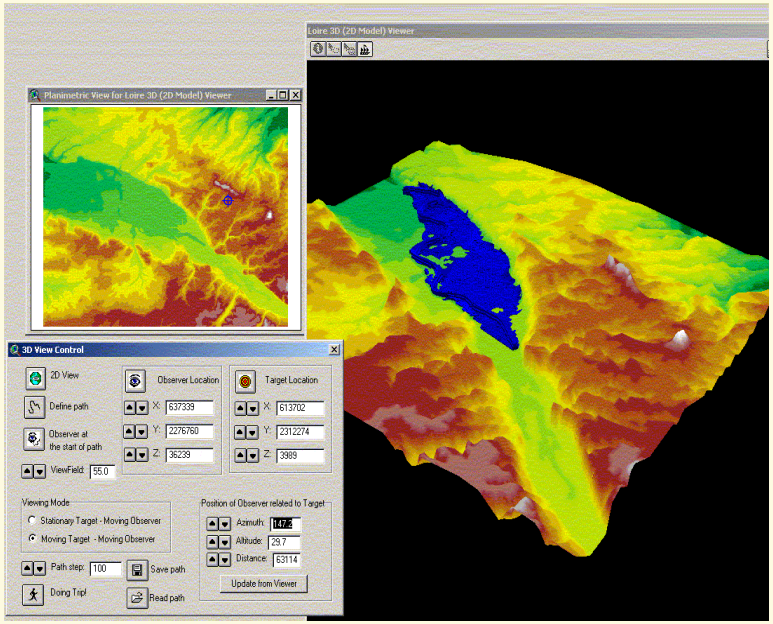


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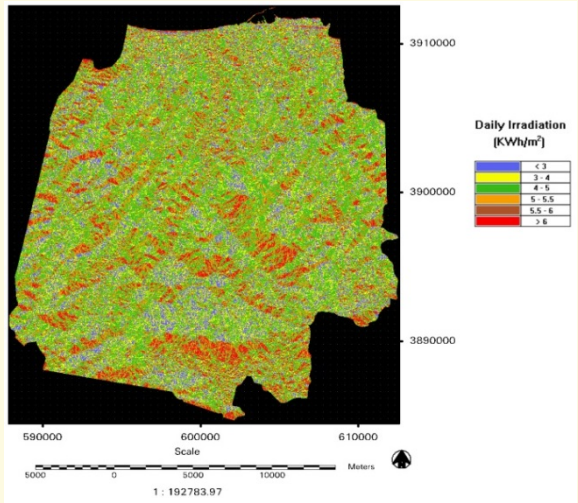
- **Institute of Applied &Computational Mathematics**

Geographical Information Systems
Spatial statistical modeling
Remote Sensing

SPATIAL DECISION SUPPORT SYSTEMS



REMOTE SENSING APPLICATIONS:



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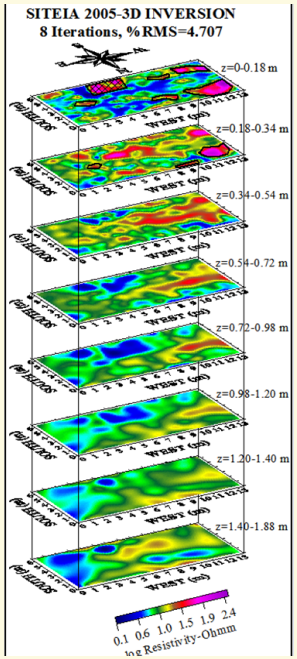
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Geophysical mapping, Virtual reality, Ancient environment representation



Deinotherium fossil mapping
Electric tomography & Geo-radar



Κρητικός... ελέφαντας 7 εκατ.

Ο σκελετός ενός δεινοθηρίου εντοπίστηκε με ραντάρ κοντά στη Σητεί

Με ένα ραντάρ σαν και εκείνα που χρησιμοποιούν στην Αμερική και στη Σιβηρία για να «ξεθάβουν» δεινοσαύρους, Έλληνες επιστήμονες στην Κρήτη προσπαθούν τον τελευταίο καιρό να ανακαλύψουν ολόκληρο τον απολιθωμένο σκελετό ενός από τα μεγαλύτερα θηλαστικά που έζησαν ποτέ στη χώρα μας...

ΡΕΠΟΡΤΑΖ: Στέφανος Κρίκκης

Βρήκαν με ραντάρ τον γιγάντιο ελέφαντα

Περιοχή ανασκαφής

ΚΡΗΤΗ

Θέση Γκέλα, παραλία Αγίας Φωτιάς

Σητεία

Αγία Φωτιά

Περιοχή κρητ

Αυτός είναι ο χαυλιόδοντας και ένα τρίτημα από το κάτω σαγόνι του δεινοθηρίου.

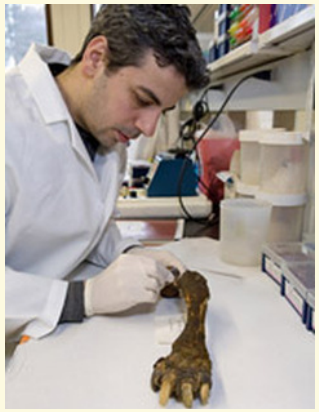


Environment reconstruction
of a Neolithic settlement

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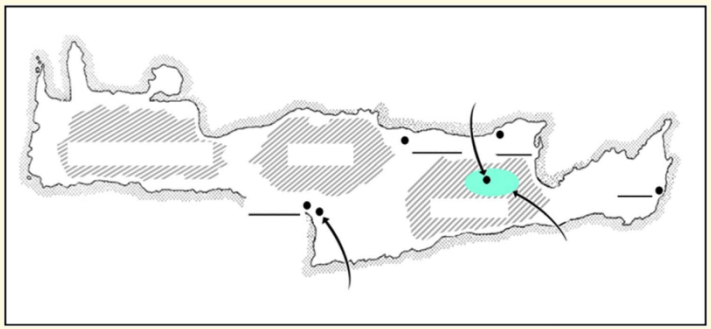
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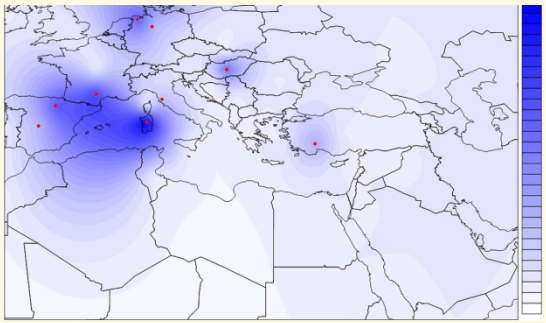
University of Crete
Natural History Museum
Molecular Systematics lab





Forensic Medicine Dept.





Origin of the Minoans



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Our vision:

Expertise + know-how + infrastructure

Innovative, reliable and efficient tools for addressing demanding challenges in cultural heritage research

Our concepts:

Micro	Macro	Info
Analysis	Geophysical	Data
Diagnostics	Geochemical	Documentation
Restoration	Landscape mapping	Information
Archaeogenetics	Underwater arch.	Management

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Message 1:

Multidisciplinary, Quality Research Environments, Innovative, Enabling Technologies and Data Integrative Approaches, Accelerate Developments in the Field of Paleontology and Cultural Heritage

Common needs & challenges

Specimen handling: Natural history findings and cultural heritage objects are **unique** and in most cases **complex**. Extensive research, accurate modeling and non-intrusive methodologies are needed before any intervention. Mistakes are not allowed!

Developing special methods & equipment: Cultural heritage objects are **diverse**, spatially **distributed** and – in some cases – **difficult to access**. Mobile instrumentation, special analytical methods and remote technologies are needed

Crossing barriers: Different research communities speak their own **scientific and technological "dialects"** making difficult to address issues requiring multidisciplinary approaches

Process information : The overwhelming **volume of heterogeneous data** from a multitude of sources and different domains makes management, interpretation and integration of information critical for new knowledge discovery

Sharing mentality: Even within one research community it is difficult to **share** information, **federate** data, and build **common** infrastructure and provide **access** to facilities

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EATRIS
European Infrastructure for Translational Medicine

multidisciplinarity

data federation

ECRIN
EUROPEAN CLINICAL RESEARCH INFRASTRUCTURES NETWORK

Message 2:

Transfer of expertise, adoption of best practices and standards from similar multidisciplinary domains and activities (i.e. Biomedical Informatics, Clinical Biobanking, Art Restoration etc.) can facilitate the technological developments and provide with solutions in the emerging field of Archeogenetics, Paleontology and Cultural Heritage infrastructures.

elixir Data for Life

sharing tools

standardization

BBMRI
Biobanking and Biomolecular Resources Research Infrastructure

Interoperability & integration

DARIAH-EU

Message 3:

Promoting **access** to well structured, functional, central facilities (ex. via competitive calls for users) may be more efficient than investing heavily on fancy equipment for the few or distributing recourses with limited use to the many,

and

Avoid **duplication** of effort

Maximize the **benefit** from scarce resources

Foster quality **research** (JRA) & advanced **training**

Promote **innovation** via multidisciplinarity

Operate as dual **Physical & Virtual organization**

Employ **Micro, Macro & Info** approaches

Develop **sensitive or non-destructive** methodologies

Bridge **Physical** and **Classical** Sciences

Involve the "**right staff**"…

…and but most important,
address one of the most primordial concerns of human beings:

Who we are & where do we come from?!


Thank you