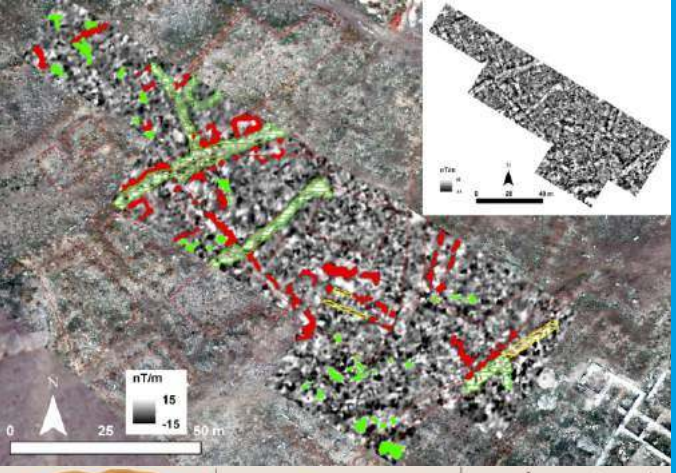


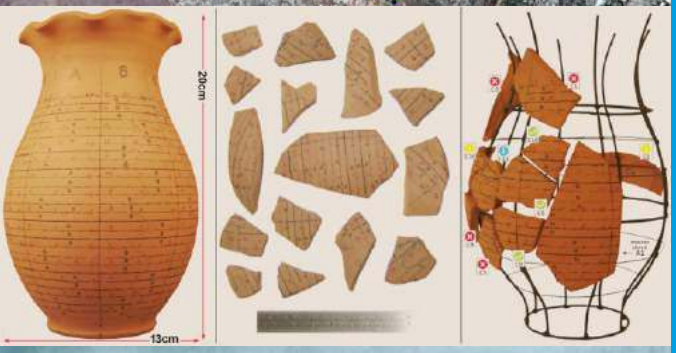



National and Kapodistrian University of Athens

CAA Greece

# 2nd CAA-GR conference

## 20-21 December 2016

Athens

National and Kapodistrian University of Athens

Main Building, 30 Panepistimiou St.
Amphitheatre “Alkis Argyriadis”

# 2nd CAA-GR Conference

With a history going back to 1972, CAA (Computer Applications and Quantitative Methods in Archaeology) is the premier international conference for all aspects of computing, quantitative methods and digital applications in Archaeology. The Greek chapter of CAA International (CAA-GR) (http://www.caa-gr.org/) was established in 2012, in order to develop a forum to discuss the various practical, theoretical and methodological issues involved in the increasing number of computer applications in Greek archaeological and cultural heritage contexts, and to share the results of related research.

The First CAA-GR conference was carried out at Rethymno by the GeoSat ReSeArch Lab of F.O.R.T.H. in 2014. The Second CAA-GR conference features 31 presentations and 10 posters on field prospection and recording methods for excavation and laboratory work, data modeling, management and integration, linked data and the semantic web, 3D modeling, virtual reality and simulations, Geomatics, GIS applications, aerial photography and remote sensing, Users and interfaces in education, museums and multimedia, Digital Cities, cultural heritage management and protection.

Dr. Jari Pakkanen, Director of the Finnish Institute of Athens, will deliver a keynote paper on the use of computer applications from almost as many different angles as possible in a single field project, the Kyllene Harbour Project.

**The Organizing Committee**

Giorgos Vavouranakis - Assistant Prof., National & Kapodistrian University of Athens
Markos Katsianis - PhD Archaeology, Member of the CAA-GR board
Yiannis Papadatos - Assistant Prof., National & Kapodistrian University of Athens
Marlen Mouliou - Lecturer, National & Kapodistrian University of Athens
Platon Petridis - Associate Prof., National & Kapodistrian University of Athens

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# 2nd CAA-GR sponsors

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SOKKIAHELLAS Precision and Reliability

Coffee breaks are organised by Mitos, a non-profit organisation for the promotion of solidarity towards communities at risk within the framework of the action “Coffee for a good cause” (https://mitos.org.gr/)

ΞΑΝΑΒΡΙΣΚΟΥΜΕ ΤΗΝ ΑΛΛΗΛΕΓΓΥΗ

# Conference Programme

## Tuesday, 20 December 2016

09.30-09.45 Opening Remarks

**09.45-11.30 Session 1: Field prospection and recording methods for excavation and laboratory work (chair: *G. Vavouranakis*)**

09.45-10.00 Late Roman and Byzantine urbanism at a glance: results from remote sensing and geophysical prospection at Amorium - *J.C. Donati, T. Kalayci, N. Tsivikis & A. Sarris*

10.00-10.15 Ποσοτικές μέθοδοι στη Διερεύνηση των επιδράσεων των περιβαλλοντικών παραγόντων στα οργανικά υλικά τεκμήρια φυσικής και πολιτιστικής κληρονομιάς - Η περίπτωση του οστού - *Ε. Παπαγεωργίου, Δ. Καρλής, Σ. Μπογοσιάν, Ε. Καραντώνη, Α. Χριστόπουλος, Ε. Φώτου, Κ. Βόσου & Γ. Παναγιάρης*

10.15-10.30 Geophysical Imaging of the interior of tumuli to save their integrity - *G.N. Tsokas, P.I. Tsourlos & G. Vargemezis*

10.30-10.45 Satellite based investigation for detection of ancient tombs' looting in Cyprus - *A. Agapiou & V. Lysandrou*

10.45-11.10 Q&A

11.10-11.30 Coffee break

**11.30-12.55 Session 2: Geomatics, GIS, aerial photography and remote sensing (chair: *J.Donati*)**

11.30-11.45 Species distribution models for the investigation of Neolithic sites in the Tavoliere plain (Southern Italy) - *M. Noviello, B. Cafarelli, C. Calcutti, A. Sarris & P. Mairota*

11.45-12.00 Towards a GIS-based reconstruction of a coastal landscape, integrating geomorphological and archaeological evidence - *G. Alexandrakis, K. Athanasaki & A. Kampanis*

12.00-12.15 Modelling the topography of the ancient Lavrion: epigraphical sources, mental maps and GIS - *E. Farinetti & A. Kapetanios*

12.15-12.30 Geoinformatic approaches to assess the landform characteristics of Minoan settlements and characterise the water management planning in Bronze Age Crete - *A. Argyriou & A. Sarris*

12.30-12.55 Q&A

12.55-15.00 Lunch break

**15.00-16.00 Session 3: Data modeling, management and integration, Linked data and the semantic web (chair: *M. Katsianis*)**

15.00-15.15 Μεθοδολογία μοντελοποίησης ανασκαφικής διαδικασίας με σωζόμενα αρχιτεκτονικά λείψανα - *Ε. Χρηστάκη, M. Doerr & Χ. Μπεκιάρη*

15.15-15.30 Μοντελοποίηση των ανασκαφικών συγκειμένων: εννοιολογική αρχιτεκτονική και συμβατότητα στην τεκμηρίωση προϊστορικών θέσεων - *Θ. Αγγελοπούλου & Γ. Βαβουρανάκης*

15.30-15.45 Creating the National Archive of Monuments: an on-going adventure towards the documentation, the digitalization and the promotion of cultural heritage – *Χ. Τσέλιος*

15.45-16.00 Q&A

16.00-16.20 Coffee break

**16.20-17.30 Session 4: Users and interfaces: education, museums and multimedia (chair: *M. Mouliou*)**

16.20-16.35 Brescia-Brixia (Italy). Travel across the ancient landscapes: Museum of the City and its archaeological area between research and enhancement - *F. Morandini*

16.35-16.50 Design and development of the video game Secrets of the Past: Excavating the City of Zeus - *L. Mantzourani & A. Giannakidis*

16.50-17.05 Εικονικό Μουσείο Μέγας Αλέξανδρος: από τις Αιγές στην οικουμένη - *Y. Aspiotis, B. Mitsiopoulos & H. Sidiropoulos*

17.05-17.20 Διαδικτυακές εφαρμογές για το νεανικό κοινό. Ένα παράδειγμα του e-Βυζαντινού και Χριστιανικού Μουσείου - *Π. Βοσνίδης*

17.20-17.40 Q&A

17.40-18.00 Coffee break

**18.00-19.00 Keynote: Kyllene Harbour Project: from survey to analysis - *J. Pakannen***

## Wednesday, 21 December 2016

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|---|---|
| **09.30-11.10** | **Session 5: 3D modeling, virtual reality and simulations -Part I (chair: *C. Papadopoulos*)** |
| 09.30-09.45 | Reconstructing ancient theatres based on their original acoustics - *M. C. Manzetti* |
| 09.45-10.00 | Ψηφιακή ανακατασκευή αγγείων άβαφης κεραμικής με φωτογραμμετρία και τη μέθοδο διατομής πάχους - *Μ.Ι. Σταματόπουλος & Χ.Ν. Αναγνωστόπουλος* |
| 10.00-10.15 | Living in the gloom - *D. Moullou, L.T. Doulos & F.V. Topalis* |
| 10.15-10.30 | In and out: fluent modeling of the temperature distribution inside an ancient updraft pottery kiln - *A. Hein, N.S. Müller & V. Kilikoglou* |
| 10.30-10.45 | Hagia Sophia: 1500 years of history, a digital reconstruction - *A. Antonakakis, D. Christopoulos & I.N. Arvanitis* |
| 10.45-11.10 | Q&A |
| 11.10-11.30 | Coffee break |
| **11.30-12.45** | **Session 6: 3D modeling, virtual reality and simulations - Part II (chair: *E. Paliou*)** |
| 11.30-11.45 | Digital engagements with clay: computational imaging and 3D printing for the study, interpretation and Dissemination of the Neolithic figurines from Koutroulou Magoula, Greece - *C. Papadopoulos, Y. Hamilakis, N. Kyparissi-Apostolika & M. Diaz-Guardamino* |
| 11.45-12.00 | Εφαρμογή σύγχρονων μεθόδων αποτύπωσης στην τεκμηρίωση της βορειοδυτικής γωνίας του Παρθενώνα - *Β. Ελευθερίου, Η. Καλησπεράκης, Δ. Μαυρομάτη & Ρ. Χριστοδουλοπούλου* |
| 12.00-12.15 | The use of computed tomography for creating virtual archives of conservation condition reports. The case study of a 17th century casket - *E. Kartaki* |
| 12.15-12.30 | Performing archaeological research with 3D technologies. Digitisation, visualisation and reconstruction - *D. Tsiafaki & N. Michailidou* |
| 12.30-12.50 | Q&A |
| 12.50-14.00 | Lunch break |
| 14.00-15.30 | Poster session |
| **15.30-16.45** | **Session 7: Linked data and the semantic web (chair: *Y. Papadatos*)** |
| 15.30-15.45 | Democritising the Digital: exploring a technological path towards the establishment of Cultural Heritage as a Common - *S. Lekakis* |
| 15.45-16.00 | The collection management system and open link data from the British School at Athens - *J.-S. Gros* |
| 16.00-16.15 | Towards modern Greek linked data in the domain of cultural heritage - S. *Markantonatou, M. Katsianis, P. Kamatsos, E. Lempidaki, D. Tsiafaki, A. Theocharaki & N. Michailido*u |
| 16.15-16.30 | OMEKA vs HEURIST: An historian's perspective - *K. Gardikas* |
| 16.30-16.50 | Q&A |
| 16.50-17.10 | Coffee break |
| **17.10-17.45** | **Session 8: Digital Cities, cultural heritage management and protection (chair: *P. Petridis*)** |
| 17.10-17.25 | Project Digital Enhancement of Peloponnese Castles: assessment, impact, perspectives and challenges - *D. Athanasoulis, X. Simou, V. Klotsa, A. Sfika, E.O. Deligianni, A. Georgiou, T. Zirogianni & C. Theodoropoulos* |
| 17.25-17.40 | "Invisible monuments... digital memory." Seven hidden archaeological sites of Thessaloniki becoming accessible through digital applications - *E. Theodoroudi, K. Kotsakis & K. Kasvikis* |
| 17.40-17.55 | Is user participation feasible in digital cultural heritage environments? - *Z. Koukopoulos & D. Koukopoulos* |
| 17.55-18.10 | Q&A |
| 18.10-18.30 | Coffee break |
| 18.30-19.30 | Closing Remarks & CAA-GR members general meeting |

# The Digital Helike Project in the Early Helladic Period: Further Insights from Archaeological and Geological Data Through Combined Modelling, 3D Reconstruction, and Simulation

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[2]Ephorate of Palaeoanthropology-Speleology, Ministry of Culture, Athens, Greece, skatsarou@culture.gr
[3]The Helike Project & The Helike Society, Athens, Greece, eliki@otenet.gr

The Helike Project [1] has located an Early Helladic II-III settlement buried 3—3.5m under the coastal plain on the Southwestern shore of the Corinthian Gulf. Evidence for elaborate town planning consists of buildings arranged across cobbled streets including a "Corridor House". Large amounts of stored domestic accessories and exotic wealth points to the regional importance of the settlement concerning overseas trade in the middle and early second half of the 3rd millennium BC [2].

Within this wider context of research, the first phase of the Digital Helike Project focusses on the Helike Corridor House (HCH). Using archaeological and geological data, 3D reconstruction of the HCH was performed followed by structural integrity analysis, an innovative and pioneering engineering technique within archaeology based on Finite Element Analysis. These new methods tested the existence of a second floor and roof structure, addressing conjectures regarding the plan and construction of such houses leading to hypotheses on their social and administrative roles. The research has provided solid evidence for the crucial structural function of the debated long narrow corridors [3]. It also demonstrated that the roof was tiled on the basis of the maximum weight the walls could support [4].

Moreover, GIS-based predictive modelling placed the house in the context of the ancient shoreline based on five landscape variables (sea level rise, deposition, subsidence, tectonic uplift, and pulse tectonic) [5]. The results show that the Early Helladic coastline would be at 170m from the settlement (currently 1km from the shore). The location and proximity to the shore are consistent with data acquired from bore hole drilling in the area and with other contemporaneous Corridor Houses across the Peloponnese.

## References

[1] Katsonopoulou, D. (2011). A Proto-urban Early Helladic settlement found on the Helike Delta. In: Katsonopoulou D. (ed.), *Helike IV. Ancient Helike and Aigialeia. Protohelladika: The Southern and Central Greek Mainland*, Athens: The Helike Society, 63—86.

[2] Katsarou-Tzeveleki, S. (2011) Morphology and distribution of pottery at the Early Helladic settlement of Helike, Achaia. In: Katsonopoulou, D. (ed.) *Helike IV. Ancient Helike and Aigialeia. Protohelladika: The Southern and Central Greek Mainland*, Athens: The Helike Society, 89—126.

[3] Kormann, M., Katsarou, S., Katsonopoulou, D., and Lock, G. (2015). Structural Integrity Modelling of an Early Bronze Age Corridor House in Helike of Achaea, NW Peloponnese, Greece. In: Campana, Stefano, Scopigno, Roberto, Carpentiero, Gabriella and Cirillo, Marianna, (eds.) *CAA2015 Proceedings of the 43rd annual conference on computer applications and quantitative methods in archaeology.* Oxford, Archaeopress Archaeology, 825—836.

[4] Kormann, M., Katsarou, S., Katsonopoulou, D., and Lock, G. (2016). On roof construction and wall strength: non-linear structural integrity analysis of the Early Bronze Age Helike Corridor House. In: *CAA 2016: 44th International Conference on Computer Applications and Quantitative Methods in Archaeology*, Oslo, Norway, 29 March to 2 April 2016 (under review).

[5] Kormann, M. and Lock, G. (2013). Dynamic models to reconstruct ancient landscapes. *In:* Contreras, F., Farjas, M. and Melero, F.J., (eds.) *CAA 2010: Fusion of Cultures. Proceeding s of the 38th Annual Conference on Computer Applications and Quantitative Methods in Archaeology.* BAR International Series (2494). Oxford, UK, Archaeopress, BAR 169—176.

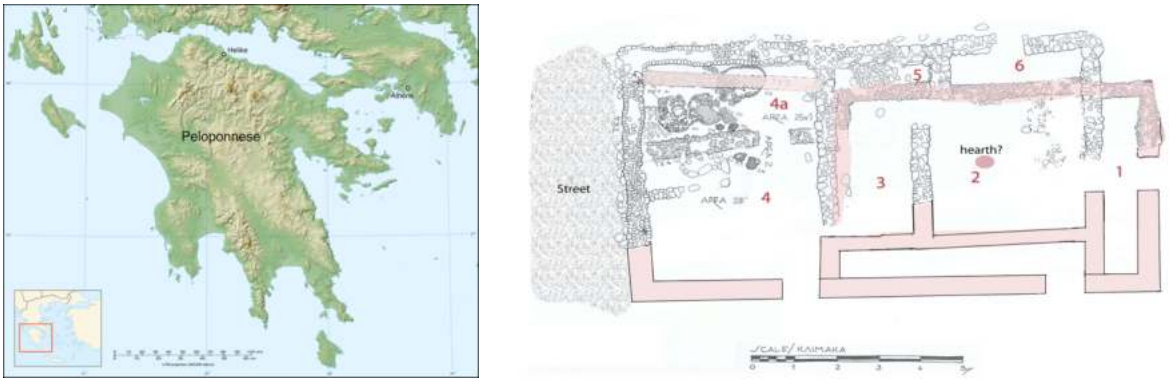


**Figure 1**: Left the location of ancient site of Helike; right, the Helike Corridor House excavated foundations.

**Figure 2**: The 3D reconstruction of the Helike Corridor House.

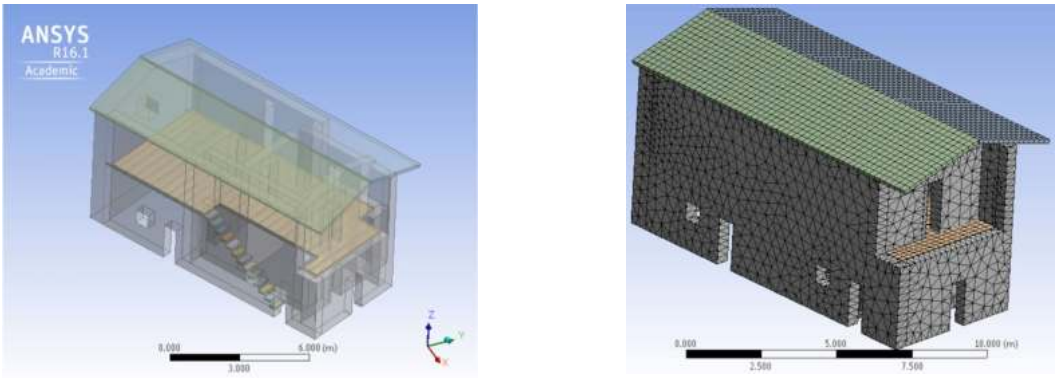


**Figure 3**: Modelling the Helike Corridor House with ANSYS Finite Element Analysis.

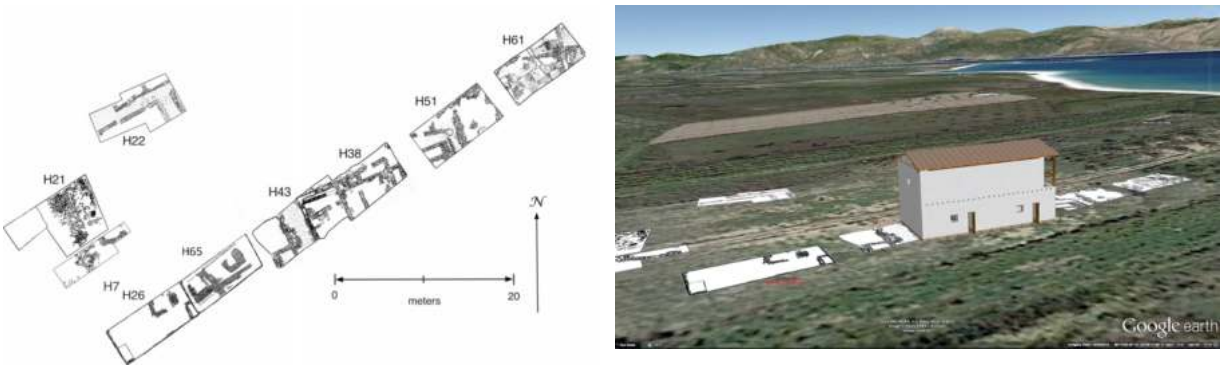


**Figure 4**: Left, the Early Helladic excavated site. Right, GIS based modelling and reconstruction of the ancient shore line registered on Google Earth.

**Paragraph with 100 words:**

The first phase of the Digital Helike Project focusses on the Helike Corridor House (HCH). Using archaeological and geological data, 3D reconstruction of the HCH was performed followed by structural integrity analysis, a pioneering technique within archaeology based on Finite Element Analysis. These new methods tested the existence of a second floor and roof structure, addressing conjectures regarding the plan and construction of such houses leading to hypotheses on their social and administrative roles. GIS-based predictive modelling placed the house in the context of the ancient shoreline based on five landscape variables (sea level rise, deposition, subsidence, tectonic uplift, and pulse tectonic). The location and proximity to the shore are consistent with bore hole data.