I have been reflecting on the passing of time recently: this year, in particular, seems to have flown by in a blur. All too often the pace of life and the amount of time spent indoors, sitting in offices, lecture theatres and meeting rooms in my case, means that it is easy to fall out of tune with the subtle markers of time marked by cyclical changes in our environment: the lengthening or shortening of days, successional change in flora and shifts in animal behaviour. I think this is why I value fieldwork so highly: excavating or surveying in a landscape for a sustained period encourages thoughts about seasonal variation in soils, plants, animals, the weather, and the ways in which people living in the past would have understood and negotiated these.

Spending nearly two months excavating in an upland landscape in the UK each year, certainly resets my sensitivity to these changes: in this landscape that has been used for hunting for the last 15,000 years the changing behaviour of the herds of red deer (*Cervus elaphus*) and fallow deer (*Dama dama*) have piqued my interest: the seclusion of the herd before calving/fawning, before their eventual emergence out of the rapidly grown bracken (*Pteridium aquilinum*), not to mention antler development in the less secretive males. This is one of the reasons why environmental archaeology is such a powerful set of approaches, with the ability to operate at multiple scales: from millennia spanning changes to seasonal indicators.

There is even a seasonal rhythm to AEA business: the committee convenes four times each year (once within each season) with our two annual meetings equinox-like in their timing and frequency. Preparations for our autumn conference in Rome are nearing completion and I am looking forward to it enormously. I hope to see many of you there and extend a warm invitation to the AGM, during which we will be summarising our achievements this year, as well as revealing the results of a number of awards and voting in new committee members. The AGM is also an important occasion during which members can make suggestions for activities and tasks that you would like to see us push forward in the coming year. Conference registration is now open and applications remain open for conference bursaries.

Change is an important theme at this conference – although here the focus centres as much upon the changing funding and intellectual landscape. Combined with a second, yet intertwined, theme of synthesis, it promises to be an exciting event indeed.
Late Pleistocene human used Musa banana: phytoliths evidence from Fahien rock shelter in Sri Lanka

Rathnasiri Premathilake\textsuperscript{a} and Chris O Hunt\textsuperscript{b}
premathilake@hotmail.com
\textsuperscript{a}Postgraduate Institute of Archaeology, University of Kelaniya, Sri Lanka
\textsuperscript{b} School of Natural Science and Psychology, Liverpool University, UK

Abstract
Knowledge of the late Pleistocene human rainforest occupation is poor in south and southeast Asia. A banana phytoliths record from Fahien rock shelter in the rainforest of southwestern Sri Lanka indicates that late Pleistocene human rainforest occupation, with the use of wild bananas (e.g. Musa acuminata and Musa balbisiana) as early as 48,000 BP. From the early Holocene, the dispersal pattern of domesticated bananas from their homeland in New Guinea to many other geographic areas is complex. Here we provide phytolith evidence of the early dispersal of domesticated bananas, probably by sea, to Sri Lanka, at 6,200-5,900 BP. This seems to be part of a pattern of dispersals of staple plants relatively early in the Holocene and is evidence that Sri Lanka was an early maritime centre of exchange. The location of the island of Sri Lanka in the Indian Ocean is likely to have been a maritime hub since ancient times. It is a likely staging-post for the dispersal of domesticated bananas.

Key words: banana, phytolith, dispersal, Sri Lanka, maritime interaction.

Introduction
The archaeobotanical records of Musa balbisiana and cf. Musa acuminata seeds from Terminal Pleistocene archaeological contexts at Beli-Lana rock shelter in Sri Lanka suggest that early use of wild bananas by prehistoric humans in association with the rainforests (Kajale, 1989; Deraniyagala, 1992). Archaeological evidence indicates that anatomically modern humans presence in rainforest environments of the island of Sri Lanka as early as 36,000 years BP (Perera et al., 2011) and Island Southeast Asian and Papua New Guinea region as early as 46,000 years BP (Barker, 2005; Barker et al., 2005; Barker et al., 2007). The earliest known domesticated banana is at 6,950-6,440 cal BP at Kuk Swamp in the highlands of Papua New Guinea (Denham et al., 2003). The dispersal of bananas from Papua New Guinea, the role of human agents and the arrival of the first domesticated bananas in many other geographical areas in the world have so far been poorly documented, but has recently been discussed using data from phytoliths, archaeology, genetics and linguistics (Mindzie, 2001; Lejju, et al., 2006; Donohue and Denham, 2009; Fuller and Madella, 2009; Perrier et al., 2009, 2011). Bananas are known from Munsa, Uganda by 4,500-4,000 cal. BP (Lejju et al., 2005; Lejju, et al., 2006) and Kot Diji, Pakistan by 4,500-3,900 cal. BP (Fuller and Madella, 2009) although their domestication status is unclear. By 2,760-2,300 cal. BP, bananas had reached Nkang, Camereroon, West Africa (Mbida et al., 2000; Mindzie, 2001; Mbida et al., 2004; Mbida et al., 2005, 2006). But the route and the arrival of domesticated bananas in different geographical areas are still disputed on chronological (Fuller and Madella, 2009; Neumann and Hildebrand, 2009), archaeological (Fuller et al., 2011; Neer, 1990; Eggert, 2005; Eggert et al., 2006) historical and linguistic (Vansina, 2003; Diamond and Bellwood, 2003;
Blench, 2009) and archaeobotanical (Vrydaghs et al., 2001; Neumann and Hildebrand, 2009) grounds. There is also discussion about the proposed mode of dispersal on terrestrial (De Langhe, 2007) and maritime routes (De Langhe, 1995; Blench, 2009) from Asia to Africa (Perrier et al., 2009). Many of those works and Vrydaghs et al. (2009) reported that banana phytoliths i.e. microscopic silica bodies deposited within the cells, intercellular spaces and cell walls are one of the best tools to address the questions in archaeology, e.g. banana domestication, dispersal throughout the tropical world and understanding human-rainforest occupation. Here, we document the early occurrence of the phytoliths derived from wild and domesticated bananas from Fahien rockshelter in Sri Lanka (Fig. 1).

Fahien rock shelter
Fahien Rockshelter is one of the oldest prehistoric sites in Sri Lanka (Deraniyagala, 1992; Wijayapala, 1997; Perera, 2010, 2015). Fahien rockshelter is situated at 80° 12’ 55” E 6° 38’ 55” N and 130 m above mean sea level in Yatagampitiya village near Bulathsinhala in the Kalutara District, in the humid southwest of Sri Lanka. It is a complex of interconnected rockshelters in coarse crystalline gneiss cliffs (Cooray, 1984). Its mouth has a width of 30 m and average height of 20m. The interior is about 10 m deep and the floor slopes downward into the rock shelter. The regional climate is humid-tropical with a mean annual temperature of 26° C and rainfall of 4,300 mm, based at the meteorological station in Sinharaja, some 10 km away and also in lowland rainforest (Zoysa and Raheem, 1987). The landscape around the rock shelter is characterized by disturbed lowland rainforest with Artocarpus nobilis, Mangifera zeylanica, Caryota urens, Dimocarpus sp., Dipterocarpus sp., Calophyllum sp., Madhuca sp., Mesua sp. and Palaquium sp. Cultivated paddy fields occur in the slightly incised valley system below the rock shelter.

Materials, chronology and methods
Eleven 30x10x8 cm monoliths were taken from the southern profile of Fahien rockshelter where the most impressive archaeological stratigraphy including five major layers (1-5) and approximately 250 contexts described. Profile contains several approximately 8 cm thick ash and charcoal-rich contexts, interpreted as hearths, and the stratigraphy has been dated by two OSL and 26 radiocarbon dates, which ranges from 48,046 to 3,844 cal. BP indicating that Fahien rockshelter is the earliest sites of anatomically modern humans in South Asia (Wijayapala, 1997; Kinnaird and Sanderson, 2010; Perera, 2010; 2015; Oshan, 2011; Premathilake and Hunt, 2014).
From the selected monoliths, seventeen subsamples were taken for phytolith analysis. The composition of the subsamples is generally sandy loam. The methods used in this study mainly follow (Lentfer and Boyd, 1998). Sediment samples of 10-15 g were used. They were dried at 40º C for a few hours and passed through 2 mm sieves. The fraction passing the sieve was used. CaCO₃ was removed using 10% HCl at 40º C in a hot water bath and the material was centrifuged at 2000 rpm for 5 minutes. The supernatant was decanted and the materials were checked with 1% AgNO₃ solution to ensure freedom from CaCO₃. The material was oxidized in 40 ml of 30% H₂O₂ at 80-90º C in an oven for 2-3 hours. After cooling a few drops of NH₄OH solution was added to check for excess H₂O₂. The resulting suspension was passed through a 150 µm sieve to remove coarse sand. The fraction less than 150 µm was mixed with 20 ml 0.5% Na₂P₂O₇·10H₂O. Clay particles were removed using density gradient techniques based on Stoke’s Law. The silty fraction was removed and dried. 0.5 g of dry materials were mixed with 10 ml ZnBr₂ solution (density exactly adjusted to 2.35 g cm⁻³) in a centrifuge tube. It was allowed to settle for 30 minutes and centrifuged at 2000 rpm for 30 minutes. This process allowed separation of phytoliths from silt and other heavy minerals. The phytolith fraction was removed and mixed with 1N HCl and centrifuged at 2000 rpm for 5 minutes. The final phytolith fraction was mounted in Canada Balsam and observed under the Olympus BX51 microscope. Micrographs were taken using F-View Soft Imaging System.

In each sample, a minimum number of 250 phytoliths were counted at X400. Three samples (C -44, C-5 and C-11) were mounted on three metal stubs and were gold coated. They were examined under the JEOL-Field Emission Scanning Electron Microscope at the Department of Physics, Queens University, Belfast. Images of the extracted phytoliths were recorded. Banana phytolith morphotype classifications and taxonomic identification were made according to the reference collection from 100 samples of modern and wild banana species collected from the Sri Lanka, India and Royal Botanic Garden, Kew (Ball et al., 2006). In addition, banana phytolith described in number of reference materials (e.g. Vrydaghs et al., 2001, 2009; Mindzie et al., 2001; Denham et al., 2003; Ball et al., 2006; Eggert...
et al., 2006; Mbida et al., 2000, 2006; Lejju et al., 2006; Lentfer, 2009) were used to understand archaeological phytoliths from the samples. In this procedure, comparative studies with shape (e.g. variants 1-8), size, crater and basal length and surface patterns of volcaniform phytoliths produced from leaf and seeds of bananas were useful for identifying archaeological phytolith.

Results and Interpretation

There is secure radiocarbon and OSL dated rockshelter stratigraphy (Fig. 2) including sediments, lithics, beads, animal and human bones, bone tools, terrestrial and marine shells, shell beads, charcoal, and plant macrofossils of breadfruit (Artocarpus nobilis) epicarps, Carnarium nuts, coprolites, postholes, hearths and two interred individuals coated with red ochre (Perera, 2010). Banana (Musa spp.) phytoliths from seeds and leaves are present throughout the late Pleistocene-Holocene stratigraphy at Fahien rockshelter (Fig. 3). High percentages of phytoliths of wild bananas and disturbed lowland forest taxa including Palmae, Artocarpus cf. nobilis, Burseraceae/Canarium sp., are evident in all habitation deposits. Phytoliths from woody (e.g. Dipterocarpaceae) and herbaceous (e.g. Cyperaceae and Poaceae) plants occur throughout the sequence. Herbaceous taxa become more frequent with the samples dating to the middle Holocene age. Substantial quantities of burned phytoliths (including Artocarpus sp., Musa spp. and Poaceae) in the late Pleistocene are indicative of frequent fire. All these are clearly suggestive of deliberate human activity – import and burning of plant material, gathering of fruits, use of leaves for various purposes (cf. Kennedy, 2009). Samples dated to 48,000 BP, yielded well-preserved phytoliths from wild banana seeds and leaves indicating a close association between wild bananas and late Pleistocene humans. Interesting phytolith evidence from our project is that the first appearance of banana phytoliths comparable with domesticated bananas is in the samples dated to 6,200-5,900 BP. However, the chronology and remarkable domesticated phytolith findings are under research yet. This includes developing the most suitable models for precise discriminating wild and domesticated banana phytoliths in archaeological samples based on large amount of samples from recent banana populations.

Fig. 3. A-C: Volcaniform phytoliths from leaf samples of recent domesticated banana. Domesticated banana volcaniform (D-E), wild banana (F) and seed phytoliths from Fahien sediment samples. Scale bar = 10 mm.

From the middle-late Holocene sequence, additional radiocarbon dating on several charred and charcoal
samples is requested and understanding the site and phytolith taphonomy is also expected further.

Discussion

Two wild species, *M. acuminata* and *M. balbisiana* known to occur naturally throughout the Indo-Malesian region, in tropical and subtropical rainforest from Sri Lanka and eastern India, across south China and Southeast Asia to the southwest Pacific and northern Australia with high temperature and humidity (Kennedy, 2009), which have originated nearly all the edible bananas (Chandraratne and Nanayakkara, 1951; Simmonds and Shepherd, 1954). It is more likely that records (e.g. Hooke, 1872-1897; Cheeseman, 1948; Chandraratne and Nanayakkara, 1951; Simmonds, 1956, 1962; Itino et al., 1991; Constantine 1999-2008, Ge et al., 2005; Häkkinen and Väre 2008) suggest that more than 50 *Musa* species (wild bananas) exist in the natural range above described. Most of the species are large perennial tropical herbs in disturbed lowland rainforests and edge habitats from which they colonize disturbed areas. Evidence for wild banana exploitation has been found in the form of their seeds from the archaeological contexts in Kitulgala Belil-lenena, a rock shelter in Sri Lanka, used by late Pleistocene-early Holocene (31,000-7,800 cal. BP) hunter-gatherers (Kajale, 1989; Deraniyagala, 1992; Kourampas et al., 2009. Perera, 2010; 2011). Our phytolith evidence suggests that late Pleistocene humans originally used wild banana plants, which probably occurred as an element in lowland rainforest, unstable hillsides and/or rainforest gaps in Sri Lanka, both for fruit consumption as well as for other uses such as textile making medicines and rituals (Fuller and , Madella 2009; Kennedy, 2009; De Langhe, 2009). The antiquity of this tradition is now pushed back to much early age as shown by the very significant occurrence of wild banana seed and leaf phytoliths from the Pleistocene cultural sequence at Fahien rockshelter. Our phytolith data demonstrates that wild bananas may have existed in Sri Lanka as early as 48,000 (cf. Perera, 2015). Thus, this very early *Musa* banana phytoliths records, together with the phytolith records from other lowland rainforest elements can be used to highlight the great antiquity of the Pleistocene human rainforest occupation in Sri Lanka, which is nearly 3000 years older than the previous records (Roberts and Petraglia, 2015) suggesting the oldest records among the archaeological sites in Africa, Southeast Asia, Melanesia and South Asia are from Sri Lanka.

In Sri Lanka, 29 *Musa* banana cultivars (domesticated) have been reported (Chandraratne and Nanayakkara, 1951). The *Musa* banana is one of the most important commercial crops in the world and its centre of origins appears to lie in Papua New Guinea (Denham et al. 2003; Kenneady, 2009; Donohue and Denham, 2009; Perrier et al., 2009, 2011). From there bananas seem to have been introduced to all tropical and subtropical regions of the world, where they gained great importance and popularity. Based on recent multidisciplinary investigations, e.g. genetic, archaeological and linguistic (Perrier et al., 2009, 2011; Ge et al., 2005; Lejju et al., 2006; De Langhe, 2007 and Fuller and Madella, 2009), it is possible to argue that, in the remote past, prehistoric humans were responsible for the introduction of the first domesticated bananas (i.e. *Musa acuminata* sub species) from Southeast Asia (e.g. Papua New Guinea and other Islands of Southeast Asia) to Sri Lanka by the middle Holocene age. This situation may have been an opportunity for meeting non-parthenocaphic *Musa balbisiana*, which is native species in Sri Lanka, producing domesticated bananas by the joint processes of hybridization, e.g. *M. acuminata* sub species x *M. balbisiana* (Simmonds, 1956, 1962; Fuller and Madella, 2009; Perrier et al., 2009, 2011). Because of the biology of domesticated bananas, which are propagated vegetatively, the appearance of phytoliths from Fahien comparable with domesticated forms implies deliberate import and planting of bananas. This suggests that Sri Lanka, as an island in the Indian Ocean was one possible locality for secondary centre for banana domestication as suggested by (Perrier et al., 2009, 2011; Lejju et al., 2006; De Langhe, 1995, 2007; Fuller
and Madella, 2009; Lentfer, 2009). Equally, Sri Lanka is important for understanding the dispersal of domesticated bananas and the evolution of the banana complex with hybridization process, which is a part of the history of banana domestication. However, our records are relatively early compared to the available records of domesticated bananas phytoliths from Kot Diji in Pakistan by 4,500-3,900 cal. BP (Fuller DQ, Madella, 2009; Fuller et al., 2011), Uganda in east Africa by 4,500-4,000 cal. BP (Lejju et al., 2005, 2006) and Cameroon in west Africa by 2,760-2,300 cal. BP (Mbida et al., 2004, 2006). This suggests that East-West dispersal of domesticated banana very closely followed the secondary domestication processes (e.g. hybridization), which may have occurred in Sri Lanka, and possibly some other geographical areas where the natural range of the genus Musa extends, after the first appearance at 6,950-6,400 cal. BP in Papua New Guinea (Denham et al., 2003). The rapidity of the dispersal is consistent with movement by sea. It is suggested that this dispersal was via Sri Lanka and that this provides evidence for an early maritime culture in the Indian Ocean. It is clear that very early maritime capacity including movement of artefacts and staples was in evidence in Island South East Asia/Australasia before 4,000 BP, as suggested by a growing body of literature (Bulbeck, 2008, Blench, 2010; Hunt and Premathilake 2012). However, we are still in a difficult position to argue that domesticated bananas may have reached Africa from South Asia via the Arabian Sea with the available phytolith and archaeological evidence.

**Conclusion**

Phytoliths recovered from the archaeological sequence at the Fahien rocks shelter show that rock shelter occupants have used wild bananas (e.g. Musa acuminata and Musa balbisiana), most probably for various purposes (e.g. fruit consumption, textile making, medicines and rituals) suggest that emergence of late Pleistocene human rainforest occupation in Sri Lanka dated to as early as 48,000 BP. Phytoliths from domesticated bananas, dated to the middle Holocene age have been positively identified from an archaeological samples in Sri Lanka first time. This chronology is under research yet. Our records and (e.g. Bulbeck, 2008, Blench, 2010; Hunt and Premathilake 2012) indicate that movement of staples and artefacts through the wet tropics of Island South East Asia and around or across the Indian Ocean have been as part of the maritime culture before 4,000 BP. This discovery also shows that the engagement of prehistoric cultures with the management of starchy staples in the rainforests of Asia has been underestimated and should be the focus for future research.

**Acknowledgements**

Financial support for the first author through a British Academy Visiting Fellowship and National Research Council (NRC; NRC-14-43), Sri Lanka is gratefully acknowledged. We thank Professors Keith Bennett and Paula Reimer, Queens University, Belfast, for supporting the project. Cooperation received from Mrs. Elizabeth Woodgery and Mr. Martin Xanthos at the Herbarium Royal Botanic Garden, Kew is appreciated. We thank Dr. Senerath Dissanayake, Director General, Dr. Nimal Perera, Director Excavation, Dr. S. U. Deraniyagala, Former Director General, Mr. W. M. C. Oshan, Chief Excavation Supervisor from the Department of Archaeological Survey for providing permission, field support and valuable discussion. Mr. Asoka Perera and Mr. Sampath Perera at the Postgraduate Institute of Archaeology (PGIAR), University of Kelaniya for field support. Authors thanks Professor Jagath Weerasinghe, the Director and the Board of Management at the PGIAR, University of Kelaniya for leave to complete this project. Personal support from Mr. Jim Bradley to the first author is much appreciated.

**References**


We would like to make the following reminder about the scope of the AEA mailing lists:

The AEA@jiscmail.ac.uk list is a moderated list for use by the committee to contact members about committee news, membership initiatives and reminders about subscriptions etc. as well as the newsletter. If members unsubscribe from it they will no longer receive important notices or the newsletter. Messages to this list require approval by the moderator.

The Env-arch@jiscmail.ac.uk list is an open discussion list for non-AEA matters, or between members. Messages on this list do not require approval by the moderator.
Deposit Modelling for Archaeological Projects

Andy J. Howard¹, Chris Carey², Jane Corcoran³, Jen Heathcote⁴ and David Knight⁵

¹ Landscape Research & Management, Bridgnorth, UK (andy.howard@landscape-research-management.co.uk); ² School of Environment & Technology, University of Brighton, UK (c.j.carey@brighton.ac.uk); ³ Historic England, Guilford, UK (Jane.Corcoran@HistoricEngland.org.uk); ⁴ Historic England, Swindon, UK (jen.heathcote@HistoricEngland.org.uk); ⁵ Trent & Peak Archaeology, Nottingham, UK (dknight@yorkat.co.uk).

Introduction
Archaeological remains are usually stratified within and beneath sedimentary deposits that have accumulated through a combination of anthropogenic and natural processes. Deposition can occur over a range of timescales and across numerous geomorphic contexts, often resulting in highly complex, deeply stratified sequences. Therefore, understanding the spatial distribution and preservation potential of archaeological remains requires knowledge of the 3-dimensional geoarchaeological architecture of sites, which can only be achieved through some form of deposit modelling.

However, across development-led, curatorial and academic archaeological communities there has been variable application of deposit modelling, both in terms of its quality and suitability, and sometimes a misunderstanding and/or absence of deposit modelling from written archaeological briefs and proposed evaluation and mitigation strategies.

To address these challenges, Historic England has commissioned a research project co-ordinated by the authors of this brief note (Carey et al. 2015) aimed at collating and critically reviewing approaches to deposit modelling applied by geoarchaeologists working across the commercial and academic archaeological sectors. The geographical focus of the study is British terrestrial environments, including perimarine areas (i.e. estuaries, coastal), but excluding offshore zones. The principal output of the project will be an edited volume of case studies (guidance) that will supplement the development of best practice guidelines for the historic environment sector (in the Historic England guidance series).

Workshop
As part of this research project, a workshop was held in London on the 30th June 2016 to bring together experienced professionals working within heritage management who regularly construct or use deposit models in a variety of landscape and stratigraphic contexts (i.e. as geoarchaeo-logical practitioners, project managers, curators, consultants etc.). In total, around 50 delegates attended the day, which comprised a series of invited talks and posters as well as 4 break-out sessions.
Table 1. Oral papers delivered at the workshop

<table>
<thead>
<tr>
<th>Invited Paper</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not the whole story: some thoughts on 30 years of geoarchaeological ground investigation</td>
<td>Martin Bates, University of Wales, Trinity St David</td>
</tr>
<tr>
<td>Deposit modelling at Site A, Shellhaven, the Thames estuary</td>
<td>Chris Carey, University of Brighton</td>
</tr>
<tr>
<td>Breaking new ground: deposit modelling work within south London</td>
<td>Mark Stevenson, Historic England</td>
</tr>
<tr>
<td>The Battersea Channel Project: Geoarchaeological deposit modelling as a unifying and dynamic resource for historic environment mitigation and dissemination</td>
<td>Virgil Yendell, MOLA</td>
</tr>
<tr>
<td>Examples of geoarchaeological approaches and deposit modelling: Bexhill to Hastings Link Road [A3], East Sussex.</td>
<td>Carl Champness &amp; Liz Stafford, Oxford Archaeology</td>
</tr>
<tr>
<td>Identifying Palaeolithic remains in deeply stratified Pleistocene sediments: Brooksby quarry, Bytham River, Leics.</td>
<td>Andy Howard, Landscape Research &amp; Management, Matt Beamish and Lynden Cooper, University of Leicester Archaeological Service</td>
</tr>
<tr>
<td>Deposit modelling in York</td>
<td>John Oxley, York City Council &amp; Kurt Hunter Mann, Independent</td>
</tr>
<tr>
<td>Seeing the bigger picture: making models from masses of data</td>
<td>Roger Thomas, Historic England</td>
</tr>
</tbody>
</table>

The invited talks (Table 1) commenced with a scene-setting paper by Martin Bates (University of Wales, TSD) drawing on his experience of deposit modelling over a 30-year period. This paper was followed by 6 case studies focusing on a range of settings: deeply alluviated Holocene wetland sequences in the Thames Valley (Mark Stevenson, Historic England; Virgil Yendall, MOLA; Chris Carey, University of Brighton), juxtaposed dryland and wetland sequences on the Sussex coastal plain (Carl Champness and Liz Stafford, Oxford Archaeology), deeply buried Pleistocene sands and gravels of the Bytham River system of midland Britain (Andy Howard, Landscape Research & Management; Matt Beamish and Lynden Cooper, ULAS); and the thick urban sequences of York (John Oxley, York City Council and Kurt Hunter-Mann, Independent). The invited talks closed with an insightful paper from Roger Thomas (Historic England) considering how deposit modelling can fit within the broader framework of large data synthesis, which is a major challenge for Heritage Management in the future.

Punctuated throughout the day were break-out sessions that sought to capture delegates’ views on four key themes relating to deposit modelling best practice, namely: (1) Archives and Long-Term Data-Management; (2) Skills and Capacity; (3) Data Integration; and (4) Minimum Standards & Outputs. The results of these break-out sessions are currently being reviewed by the project team and will be incorporated into the guidance document as it develops.

**Post-Workshop Action Plan**

The workshop provided a stimulating forum for discussion and feedback after the event has been very positive. The project aims to complete editing of the Draft guidance document by the end of the current financial year (March 2017) with final publication envisaged during late 2017. The final guidance will be made available as a free downloadable PDF as well as in hard-copy format.

**Bibliography**

CONFERENCE REPORT - IWGP 2016, Paris


Lisa Lodwick, University of Reading

The 17th meeting of the triennial International Work Group for Palaeoethnobotany (IWGP) took place at the Muséum national d’Histoire Naturelle in Paris from the 4th-9th July 2016. Around 250 delegates from 35 countries attended for a week of seeds, cereals and sampling.

The first day kicked off with a session dedicated to hunter-gatherers, with highlights including Dilkes-Hall (UWA) on plant exploitation at Riwi cave, western Australia, Chrissie Sievers (Wits) on the use of marula in Late Pleistocene southern Africa, and Jacob Morales (Uni of the Basque Country) on some results of the PALEOPLANT project investigating Upper Palaeolithic plant use. A brief foray into north Africa, with Philippa Ryan (British Museum) presenting on ethnographic evidence in Nubia, and Erica Rowan (Exeter) on archaeobotanical results from Utica, Tunisia, was followed by an afternoon of tree domestication, where Dorian Fuller (UCL) demonstrated the usefulness of relatively simple measurements of domesticated fruits. The first night saw welcome drinks at the Musée de l’Homme, with some especially good macaroons.

Tuesday morning kicked off with the presentation of various ritual assemblages of plant remains, from funerary practices in prehistoric Greece presented by Evi Margaritis (STARC) to Klaus Oeggl’s (Innsbruck) talk on plant remains recovered alongside the Incan “Ice Maiden” in southern Peru. Clarissa Cagnato (Washington) further presented results from a feasting deposit excavated at a Classic Maya site, which included charred flowers. “Ritual” was followed by “DNA” with updates on some of the fantastic work taking place in this field, including the effect of charring on aDNA (Jannine Forst, Manchester), DNA evidence for the domestication of tetraploid wheats (Hugo Olivier, Manchester), maize domestication (Nathan Wales, Copenhagen), followed by some token phytoliths from Welmoed Out (Moesgaard Museum).

The Neolithic was a particularly strong theme at this year’s IWGP, with presentations ranging from the isotopic with Amy Bogaard’s (Oxford) AGRICURB project, to a range of exciting new assemblages from PPNB sites in the Levant. A wide range of food resources were identified from Aşikli Höyük by Müge Ergun (Istanbul), including pasta type charred food remains, wild pea, chickpea and pistachio. Jade Whitlam (Oxford, and former AEA student representative) presented on the fascinating results of her PhD research at Sheikh-e Abad, and current AEA student representative Laura Green (Oxford) informed us about her ongoing PhD research on Neolithic farming in the Near East and FIBs. If anyone needs any Bromus seeds identifying, talk to Laura! Ehud Weiss (Bar Ilan) provided a sneak peak of recently published aDNA results from Chalcolithic barley grains from Yoram cave. Manfred Rösch (Stuttgart) gave the conference a quick introduction to his vineyard on the shores of Lake Constance, to set us up for an enjoyable evening tasting his wine.

Midway through the conference, the Neolithic theme continued, with Rosie Bishop (Durham) discussing the challenges involved in studying plant use in Scotland, and Lucy Kubiak-Martens (BIAX Consult) considering the consumption of wild plant foods, such as dogwood fruits in the Mesolithic Netherlands. One of the biggest ‘big data’ papers came from Angela Kreuz (Landesamt für Denkmalpflege), who used 770,000 plant remains from 67 sites to compare Karanovo and LBK agriculture. Other papers
CONFERENCE REPORT - IWGP 2016, Paris

August 2016

Included Wiebke Kirleis (Kiel) who integrated archaeobotanical data with zooarchaeology and settlement evidence to demonstrate the late adoption of farming in the south-west Baltic region. At the other end of the sample size spectrum, Dragana Filipović (Serbian Academy of Sciences and Arts) presented some preliminary results from an exquisite assemblage of crops preserved within a burnt down houses at Neolithic Vinča.

An enjoyable series of papers on Thursday reminded us of the detailed insights into past societies that can be gained from waterlogged lakeshore assemblages. Highlights included the presence of different plant remains inside and outside houses at the Zurich Parkhaus Opera site (Ferran Antolín, Basel) and a Bronze Age site at Lake Garda, with abundant flax remains and intact cereal ears (Renata Perego, Basel). Swiftly moving away from the lakes and into later prehistory, Mans Schepers (Groningen) presented a new project combining archaeobotany with experimental archaeology, phytoliths and public engagement to study the Iron Age Dutch Terps. Laura Motta (Michigan) highlighted some interesting variations between the range of cereals found at different cities in Iron Age and archaic Italy. The final paper of the day presented some of the results from the Roman Rural Settlement Project (Lisa Lodwick, Reading).

After a conference dinner with a surprisingly high ratio of meat to plant foods for archaeobotanists, the brave delegates who made it in to the final day of the conference enjoyed papers on the Early Byzantine Balkans (Anna Elena Reuter, Kiel), as well as changing crop spectrums in the Migration period of eastern Europe (Maria Hajnalova, Nitra). Perhaps to keep the delegates awake, some of the most archaeobotanically intriguing talks were on the final afternoon. Isabel Figueiral (INRAP) presented a very nice assemblage from the excavation of a French garden, including evidence for a Roman orchard, a castor oil seed, and some spatial analysis of mollusc assemblages. Moving to Switzerland, Örni Akeret (Basel) presented the stunning find of an in situ meadow, covered by a land slide in AD 1295, whilst Lara Gonzalez (UCL) demonstrated the usefulness of the amorphous lumps of charred food remains known to all archaeobotanists, by presenting a new typology for identifying cooking techniques. The surprisingly low number of correspondence analysis plots was made up for by Catherine Longford (Sheffield), who in closing the conference highlighted some impressive patterns between crop choice and rainfall areas in the Near East.

Throughout the conference we remembered a number of archaeobotanists who have sadly left us in recent years, including Lydia Zapata, Ahmed Fahmy, and Alice Berger, whose postgraduate work was presented by Longford in the final paper.

The next meeting of the IWGP will take place in Lecce, southern Italy in summer 2017, and archaeobotanists are already looking at the best beach side apartments.

Some of the UK postgraduate archaeobotany contingent. Left to Right: Hyunyoung Kim (Oxford), Laura Green (Oxford), Leslie Bode (Nottingham) and Stacey Adams (Historic England).
1st Call for papers
Benchmarking Interdisciplinarity in Archaeological Science - new methods, new theories, new data -

The XII Nordic Conference on the Application of Scientific Methods in Archaeology SMIA XII, organized by the Aarhus University network STAR – Science and Technology in Archaeological Research, are pleased to invite you to Aarhus (DK) for an international conference on interdisciplinarity in archaeological science.

Abstract
Applications from the natural science are enjoying strong and increasing currency in archaeological research – some even talk of a ‘science revolution’. But critical voices can also be heard. With funding and publishing pressures increasingly pushing towards rapid-fire projects and applications, are traditional approaches and scholarly values of archaeology sidelined? And, critically, how do we integrate scientific methods more fully and more even-handed into archaeological research. This conference aims to bring together scholars to discuss interdisciplinary problem-generation and problem-solving in archaeological research. We invite papers, posters and online lightning talks reporting on interdisciplinary archaeological scientific projects as well as reflections on interdisciplinarity in archaeology per se. We ask: Can we benchmark interdisciplinarity in archaeological science?

Where: Moesgård Museum, Aarhus, Denmark.
When: December 13-14, 2016.

Invited keynote speakers will share their experiences of challenges, opportunities and rewards of working across disciplinary boundaries

Confirmed keynotes:
Prof. Mathew Collins, York University
Prof. Kerstin Lidén, Stockholm University
Dr. Tamsin O’Connell, Cambridge University

We invite presentations in the following formats:
Short oral presentations, Poster presentations, Video presentations

Topics
Biomolecular archaeology
Prospection
Dating
Palynology & vegetation history
Diet, demography and health
Palaeoclimate
Human-environment interactions
Novel methods & techniques
Interdisciplinarity
Geoarchaeology
Zooarchaeology

Note that individual papers do not have to directly address the topic of interdisciplinarity, but can be focused on particular methods or case studies.

Information on how to submit paper/poster proposals will be sent out with the 2nd Circular.

Thanks to support from AU STAR, conference participation for students will free of charge.

There will be the opportunity to publish papers from the conference in a special issue of the Journal of Archaeological Science: Reports.
2016 AEA Managing Committee Election

Following calls in the last newsletter and via email, we have received the following nominations for candidates wishing to serve on the AEA Managing Committee.

The elections will be held at the autumn conference in Rome. Voting will be in person at the AGM or by proxy (see below).

Nominations from AEA members are welcome up until the start of the AGM. Further details of the available roles were included in the last Newsletter.

Please email AEA Secretary, Fay Worley fay.worley@HistoricEngland.org.uk if you would like to stand, or with any additional queries.

For Treasurer
(four-year term, one position available, one nomination received)

   Mark McKerracher
   Nominated by Jacqui Huntley, seconded by Richard Thomas

I am an archaeobotanist and Anglo-Saxonist with a head for figures. Having been a member of the AEA since 2012, I’m now enthusiastic about serving in the crucial role of Treasurer. I completed my DPhil ‘Agricultural Development in Mid Saxon England’ - in 2014 at the University of Oxford, building on a Masters in European Archaeology and BA in Classical Archaeology and Ancient History. As a student I was involved in several committees, serving as library rep for the graduate committee, IT rep for the archaeological society, and successively Treasurer and Secretary of the University Morris Men. I also co-organized an international conference on the history and archaeology of ploughing, and launched my popular agricultural archaeology blog, ‘Farming Unearthed’. Since graduating, I have continued to publish and present the results of my research, and to undertake freelance and voluntary archaeobotanical work alongside a day-job in project administration. I have completed an Open University short course in basic bookkeeping, and have a keen interest in efficient data-management, which would help me to meet the demands of the Treasurer’s brief.

For Ordinary Committee Member
(four-year term, three positions available, four nominations received)

Lynne Gardiner
Senior Project Officer (Palaeoecology), Northern Archaeological Associates Ltd., Barnard Castle, Co. Durham
Nominated by Don O’Meara, seconded by Jacqui Huntley

I started working as a post-excavation assistant with NAA in 2005 soon after my MA Archaeology dissertation submission. The dissertation was a viewshed analysis of bastles in Northumberland. It was not long after starting with NAA I became enchanted by environmental archaeology and soon wanted to know more about it and what it could tell us. In 2009 I returned to Durham University to undertake an MSc in Human Palaeoecology and five years after submitting my bastles dissertation I was submitting another; this time focusing on plants and charcoal from the Holy Island of Lindisfarne. It was during this period of learning that I became a member of the AEA.

I am now NAA’s archaeobotanist and charcoal specialist along with a passion for all things molluscan. I also manage the environmental section of the post-excavation department I have responsibility for all environmental remains; animal bone, fish bone, human bone, pollen, and anything else that may pop up. I also co-ordinate our radiocarbon dating programme. I have written numerous reports to assessment, analysis and publication levels, which also includes Environmental Archaeology. I have to have a wide working knowledge of environmental archaeology and advise pre-, during and post-excavation as well as having knowledge of other aspects of archaeological science. As we are currently working on the A1 road-widening scheme in North Yorkshire I have to ensure that the logistics of dealing with all environmental material are dealt with in the appropriate manner, such as processing over 4,000 samples. In this job it helps to be enthusiastic not just about my own specialisms but about all elements of environmental archaeology.

To this end I believe I would be an asset to the committee as I am keen to partake in the advancement of environmental archaeology and all the delights it can bring.
Jen Harland
Lecturer in Archaeology, Orkney College, University of the Highlands and Islands
Nominated by Ingrid Mainland, seconded by Suzi Richer
I am currently working as a Lecturer at the Archaeology Institute, University of the Highlands and Islands, based in Kirkwall, Orkney. I’ve been in the post for 2 years, and I teach a variety of modules including those relating to archaeozoological sciences and environmental archaeology. I am a zooarchaeologist first and foremost, and I have specialised in fish remains from the British Isles. As one of the organisers of the Spring AEA conference this year, I had the delight of meeting many AEA members and renewing acquaintances with old friends and colleagues. I would like to become more involved with the AEA, and therefore I would like to stand as ordinary member.

I completed a PhD in 2006 in zooarchaeology at York, working on the mammal and fish remains from two sites in Orkney dating from the Viking Age and medieval periods. One of these was the site of Quoygrew, subsequently published in 2012 (Barrett, JH [ed.] Being an Islander: Production and identity at Quoygrew, Orkney, AD 900-1600. Cambridge: McDonald Institute for Archaeological Research). After my PhD, I completed a Leverhulme post-doc at York and subsequently Cambridge, working with James Barrett on the Origins of Commercial Sea Fishing in Medieval Europe project. Following a spell of maternity leave, I completed a post-doc with Matthew Collins at York on an AHRC speculative project using ZooMS to identify fish remains. After this was completed, I moved up to Orkney and spent a few years at home with my children before returning to work in 2014. Throughout this time I have continued to work on small commercial assemblages of fish remains when they arise. My research interests are currently focussed on the fish remains from the North Atlantic region, the medieval fish trade, and marine historical ecology. I am an active member of ICAZ (particularly the fish remains and palaeopathology working groups) and I am a fellow of the Society of Antiquaries of Scotland.

Niklas Hausmann
Marie Curie Fellow at the Institute of Electronic Structure and Laser at FORTH, Crete
Nominated by Richard Thomas, seconded by Lee Broderick
I am a coastal archaeologist and palaeoecologist, who works on environmental datasets from carbonates and shell mounds.

My undergraduate degree in Archaeology and Geosciences was awarded in Kiel, Germany, where I worked on the Mesolithic site of Duvensee. This research continued during my MA in Mesolithic Studies at the University of York.

Shortly after that, I shifted my research to coastal exploitation and palaeoclimate. During my PhD at York I excavated and analysed shell middens from Europe, South America, and Arabia, although the core of my thesis were the shell middens on the Farasan Islands in the Red Sea. I continued to work on these island sites as a PDRA in the DISPERSE Project, which came to an end earlier this year.

In May this year, I started my Marie Curie Fellowship at the Institute of Electronic Structure and Laser at FORTH, Crete. The project is based on the idea that more data is always more helpful. Hence, we are developing a method which will enable the mass production of environmental data from shell carbonates from around the world for a low price. Ideally, this will help to make small scale studies more affordable and feasible.

I have been a member of AEA since my PhD, and every meeting has brought new insights into my own research, and has strongly developed my research network. Especially, helping out with hosting the meeting in York last year was a great way of getting to know many AEA members. I think that the AEA has a fantastic sense of community and I have gained helpful connections for this early stage of my career. If elected, I hope to consolidate myself in this community, as well as provide insights to the association from my areas of expertise (Palaeoclimlate, Arabian Archaeology, Shell Middens and Carbonate Analysis). I also aim to be a voice for members outside the UK and to work towards a less centralised community by facilitating international collaborations.

Michael Wallace
Research Fellow, Department of Archaeology, University of Sheffield
Nominated by Glynis Jones, seconded by Ruth Pelling
I gained my BSc in Archaeological Science at the University of Sheffield in 2005, and this was later followed by an MSC in Environmental Archaeology and Palaeoeconomy. During these degrees my passion for archaeobotany emerged, with two dissertations on a much loved subject: the taphonomy of dung-derived plant remains. My PhD was part of the Crop Isotope Project (PI: Amy Bogaard), during which I focused on the use of stable carbon isotope analysis to infer water conditions during crop growth, and with application across multiple Neolithic and Bronze Age Near Eastern sites. Since my PhD I have taken on a series of postdoctoral positions and other professional and teaching posts, including a small role in the Sheffield Archaeobotanical Consultancy. I recently began a three-year fellowship at the University of Sheffield.
during which I will focus on agricultural economies of prehistoric Europe, and develop morphometric techniques for archaeobotany.

My research interests are primarily the domestication of crops and the spread and evolution of agricultural systems. Of particular importance to my work is how local environmental adaptation in crops shaped palaeoeconomies. My specialisms include developing ‘big data’ quantitative approaches, and this has involved creating a sample-level database of early Neolithic plant remains for the Near East. The insights gained by these kinds of meta-analyses have demonstrated to me the need for open sharing of research data, something I am a passionate believer in. A large element of my current work is to assess the potential of modern morphometrics to provide novel, subspecies information about ancient crops. I hope this will provide a low-cost, non-destructive means of identifying distinct crop varieties allowing for their occurrence through the archaeological record to be traced.

I am a long-standing member of the AEA, who has contributed to AEA conferences. I am an enthusiastic team member with useful practical skills, including those developed whilst redesigning the website of Sheffield’s Department of Archaeology and serving as their publicity officer. I am also actively involved in equality and diversity initiatives. If elected I would be a committed member and endeavour to support the AEA in continuing its excellent work.

For Student Representative
(two-year term, one position available, one nomination received)

Daisy Spencer
Nominated by Laura Green, seconded by Michael O’Connell

I am currently in the 2nd year of an Irish Research Council funded PhD project at the National University of Ireland, Galway investigating human-environment interactions during the Neolithic and Bronze Age in western Ireland. I am an interdisciplinary student within the school of Geography and Archaeology co-supervised by Dr Carleton Jones and Dr Aaron Potito. I completed a BSc (hons) in Archaeology at the University of Durham graduating in 2011 and went on to complete a research MPhil at the University of Cambridge the following year. My research has been varied in terms of the techniques involved but has always been firmly grounded in the realm of environmental archaeology. I started my research career analysing the DNA of feral pigs on Hawaii with Dr Greger Larson and became interested in the domestication of animals and the processes involved in this.

I then went on to be trained in soil micromorphology under Prof Charles French and investigated a Bronze Age ploughed landscape where my interest in ancient agriculture heightened. This curiosity over prehistoric farming has continued into my PhD where I am using pollen, chironomid and isotope analysis to examine changing land use and the human impact upon the landscape.

I have around 3 months experience of excavating in the commercial sector and over 10 months of research projects in both excavation and survey across the UK, Ireland, Greece and Libya. The projects I have been involved in have used varying environmental sampling strategies; from limited use on commercial sites to a project that processed 100% of excavated material and as such gained an incredible amount of environmental information to aid interpretation. As a student representative I would, through the use of conference attendance, social media and possible workshops, aim to promote both the advantages of AEA membership and the current issues relevant to environmental archaeology.

Having joined the AEA and attended my first conference in Orkney I have felt more integrated with other members of the archaeological community and would relish the opportunity to promote this cause amongst other students and researchers on both sides of the Irish Sea.

How to vote in the election

Every AEA member is entitled to vote in the election. You can vote for up to three candidates for Ordinary Member, one for Treasurer and one for Student Representative.

Members can vote in person at the AGM, or by proxy. Your proxy can be any other member of the Association who is attending the AGM, including members of the committee. To vote by proxy, you must provide a signed or emailed statement appointing your proxy to a member of the committee before the AGM. Your proxy will be given your voting slip in addition to their own. If you need help to find a proxy, please contact Fay Worley (fay.worley@HistoricEngland.org.uk)
AEA Newsletter 133

August 2016

News from the Committee

AEA Annual General Meeting

It is planned that the AGM will be held on Friday 30th September at the AEA autumn conference in Rome
http://www.aea2016rome.com/overview.html

Agenda

Report on Committee activities and John Evans Prize Result
Election of new committee members
Treasurer’s report including summary accounts
Any Other Business
Election Results

If you have any business for item 4, please contact the Secretary (Fay Worley fay.worley@HistoricEngland.org.uk) or Chair (Richard Thomas rmt12@leicester.ac.uk) before the AGM.

———

Musings from Social Media

Association for Environmental Archaeology added 5 new photos.
Posted by Suzi Richer
17 June • 0

Thr JIA2016 Santander conference ended with great success! Many young archaeologists contributed interesting communications and the AEA-sponsored Spanish wine reception on the first evening was a great networking opportunity for the young scientists!
Notes from the Newsletter Editors

Please note that thesis submission forms can be found on the website which gives AEA members an opportunity to publish abstracts of their postgraduate thesis.

We are always keen to receive newsletter content, especially from our non-UK members. To submit an article, please email word documents and images to;

newsletter@envarch.net

Rob Batchelor, Danielle de Carle, Laura Green
Conference Fund Application Form
Autumn Conference 2016 - Rome
Deadline: Friday 31 August 2016

Name: 
Occupation: 

Address: 
E-mail: 

Date you joined the AEA:

I am presenting a Paper/ Poster (please delete as appropriate) entitled:

Please provide full breakdown of costs

<table>
<thead>
<tr>
<th>Registration:</th>
<th>Cost:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode of transport (rail/air etc):</td>
<td>Cost:</td>
</tr>
<tr>
<td>Type of accommodation:</td>
<td>Cost:</td>
</tr>
<tr>
<td>Meals included:</td>
<td>Cost:</td>
</tr>
<tr>
<td>Other (Please specify):</td>
<td>Cost:</td>
</tr>
</tbody>
</table>

Total Cost: 

Have you attempted to obtain funding from other sources? Yes / No
If not, why not?

If yes, how much have you requested?

How much have you obtained?

If other applications are still pending, when do you expect to hear the outcome?

How much do you request from the AEA:

I certify that the information I have given is true.
Signature:

Postgraduate applicants should include a letter of support from their supervisor.

Please return completed forms via email:
Dr Robin Bendrey (AEA Conference Officer) - r.bendrey@reading.ac.uk