Annual Report

1st August 2018 - 31st July 2019

> *"You can't really call yourself an archaeologist if you haven't read something from the @ADS_Update or @IntarchEditor library"*
>
> *Twitter user*

Julian Richards and ArchAIDE project partners on the walls of Pisa. © University of York.

DIRECTOR'S FOREWORD

Like the rest of the country, the ADS and *Internet Archaeology* have been much engaged with European issues during 2018-19. For the ADS, however, the experience has been collaborative and constructive, and has provided significant benefits. Between February and March 2019 we launched no less than three new EU-funded projects, each of which will run for four years: ARIADNEplus, SSHOC, and SEADDA. ARIADNEplus, in which we play the role of Deputy Coordinator, now has 41 partners. ARIADNEplus's enhanced portal will provide an exciting interface to UK data brokered by the ADS. Already, we have produced an Open Access book on the Impact of ARIADNE, which was published in time for the European Archaeological Association meeting in Bern in early September 2019.

Secondly, our role in the Social Sciences and Humanities Open Cloud (SSHOC)

means that we are working with the major European research e-infrastructures: CESSDA, CLARIN, DARIAH and E-RIHS, as they plan how to engage with the European Open Science Cloud (EOSC) and we are able to represent the needs of a well-developed digital data user community – archaeology – within that context.

Finally, we were delighted that the COST Association agreed to fund SEADDA, a COST Action which aims to Save European Archaeology from a Digital Dark Age (SEADDA). The ADS is the lead organisation for the Action which already includes 31 European member countries, as well as international partners. A Brexit hitch and the threat of No-Deal has meant that we had to transfer grant holder status to another member at short notice, but fortunately our good friends at Inrap, the state archaeological service

OPEN TO EXPLORATION

for France, agreed to take up the role, and the SEADDA working groups kicked off their activities in Zagreb in June as planned.

Meanwhile in May the highly successful ArchAIDE project drew to a close, launching a mobile application which uses the latest Artificial Intelligence and Image Recognition techniques to help in pottery identification. The preparatory phase of E-RIHS will also draw to a close in December 2019, but our work with E-RIHS UK will hopefully secure investment in research infrastructure within the UK.

At UK level the launch of the pre-Beta version of the new OASIS form represents a major milestone in the HERALD project, and the number of unpublished fieldwork reports in the ADS Library exceeded the 50,000 threshold. We were also pleased to see the work of CIfA and DigVentures

on an Historic England sponsored project to provide guidance on Digital Archives in Archaeology. We particularly welcome the recommendation that archives must be deposited with accredited digital repositories, hopefully safeguarding the future of primary research data. Already at least seven county councils have mandated deposit of digital archives with a Trusted Digital Reporistory.

Last, but by no means least, we began work on a scoping study for the HighSpeedTwo (HS2) historic environment digital archive. This follows our work on the major Channel Tunnel Rail Link and Crossrail archives but HS2 will be the largest archaeological digital archive ever compiled in the UK, and the ADS will provide a single cohesive sustainable and accessible archive for all the data produced as a result of the extensive archaeological fieldwork, safeguarding it for future generations.

OUR VISION

Over the next five years ADS and Internet Archaeology aim to further enhance their position within the UK historic environment community, capitalise on their standing within the international archaeological and digital heritage communities, and leverage their reputations in different spheres to become the first port of call for Open Access data and publication in Archaeology. ADS will also further enhance its standing within the international digital preservation community by assuring its work is aligned to appropriate international digital preservation accreditation and data management standards, by proactively engaging with the preservation community, and advocating its work on guidelines and standards to a wider community to ensure the ADS remains at the forefront of data management and digital preservation.

ARCHIVE NOW. ACCESS FOREVER

STRATEGIC GOALS

1 To be the lead UK **preservation service** for historic environment data following relevant standards for trusted digital repositories.

2 To host the most important UK-level **collection** of high quality digital data sets created in the course of historic environment research in the UK.

3 To provide **open** and **easy** online access to primary data and digital **resources** created in the course of historic environment research.

4 To develop and encourage the adoption of new models of **electronic publication,** providing a holistic service, covering publication and archiving.

5 To be the primary UK-level historic environment data **aggregator** and to provide appropriate finding aids and **resource discovery** mechanisms.

6 To be the primary point of **advice** in the UK on the creation, dissemination, documentation, and preservation of historic environment data.

7 To develop and implement agreed **standards** to ensure appropriate documentation and preservation of historic environment data and resources.

8 To encourage and support the **re-use** of primary data and digital resources created in the course of historic environment research.

9 To take a lead international role in **research and development** into preservation, access and interoperability of historic environment data,.

10 To maintain effective **service management** and administration in pursuit of all the above aims, and to maintain financial sustainability.

# CONTENTS

PRESERVATION SERVICES

1 To be the lead UK **preservation service** for historic environment data following relevant standards for trusted digital repositories.

Preservation Report

This year ADS staff have worked hard to provide the technical infrastructure necessary to support our preservation services, and ensure a robust and reliable framework. Updates to ADS-easy and OASIS Images have improved user experience and workflow for both repository staff and data depositors. The migration of our deep storage to Amazon Web Services (AWS) has ensured the continued remote backup of datasets; playing an important role in the creation of an effective preservation infrastructure. This year work on our Core Trust Seal application has ensured that all our workflows were formalised through dedicated policies and procedures, which are themselves subject to regular review, ensuring that the ADS provides a reliable service to data depositors and consumers.
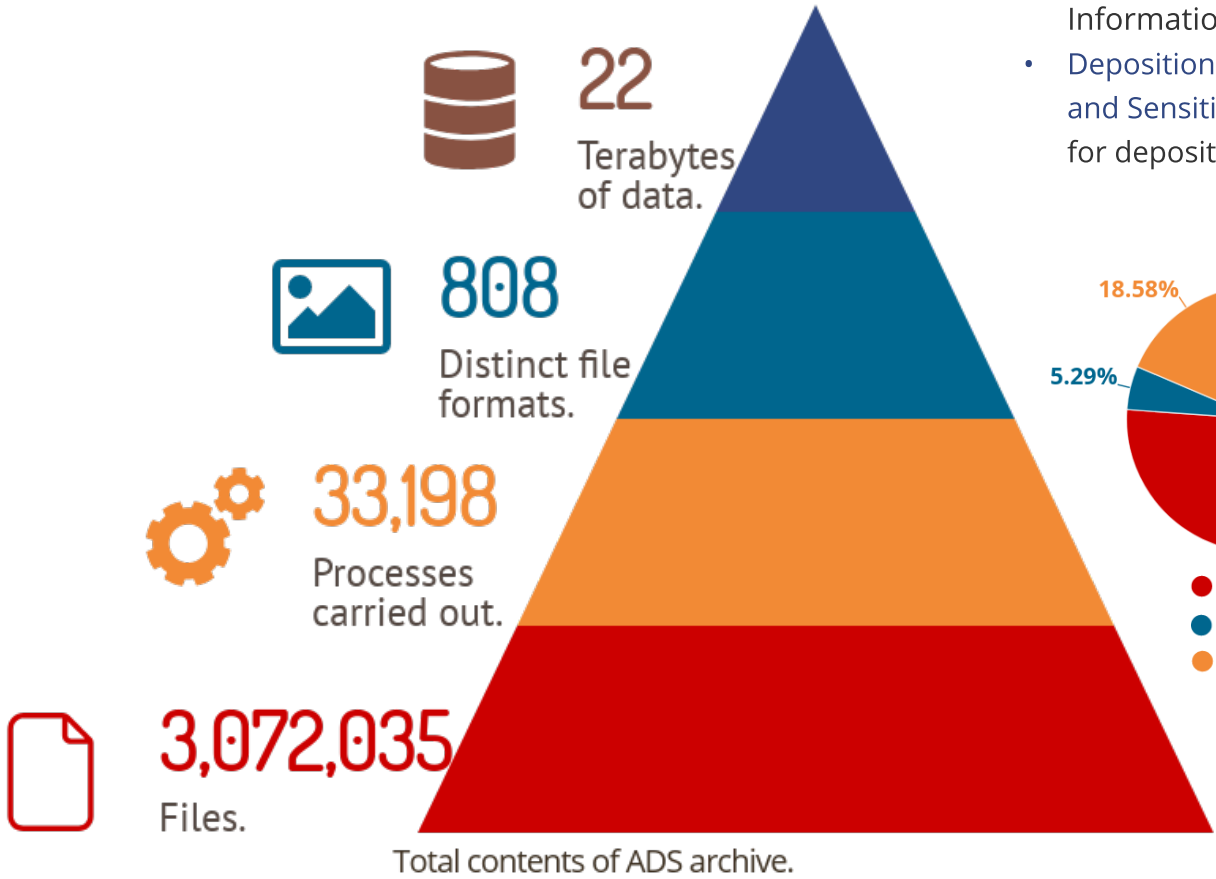
Policy and Procedures

During 2018-19 we carried out a review of all policies and procedures, including the appraisal and updating of the Preservation Policy, Repository Operations, Ingest Manual, Systems Overview, Security Overview and Disaster Recovery Plan. In addition we formalised our policies on:
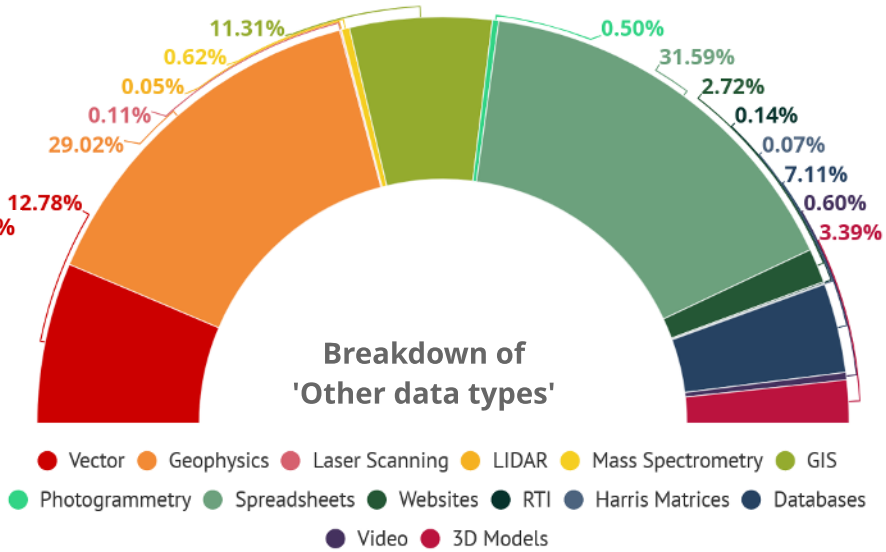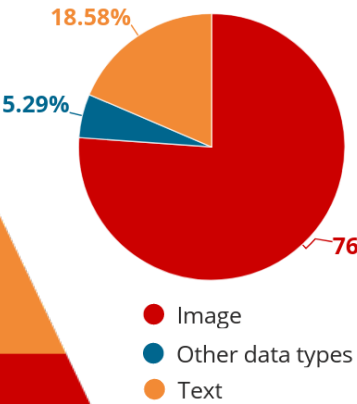
- Appraisal and Deaccession: a framework of policies and procedures put in place to retrospectively appraise datasets and deaccession data.
- Information Security Risk Assessment: assessing risks to ADS Information Security.
- Deposition of Personal, Confidential and Sensitive Data policy and guidance for depositors.

Digital Archivists also carried out their usual annual review of metadata, file formats and data procedures. The simultaneous deployment of changes in ADS-easy, OASIS Images and our Guidelines to Depositors ensured parity between these systems.

Accreditation Update

Accreditation remains essential to the ADS, allowing formal and reflective assessment of repository workflows and procedures and ensuring that current practices and activities are in line with industry standards. Such certification ensures the confidence of both depositors and funders alike as they increasingly mandate the long-term preservation, storage and accessibility of

22 Terabytes of data.

808 Distinct file formats.

33,198 Processes carried out.

3,072,035 Files.

Total contents of ADS archive.

The ADS Archive by Data Type

18.58%
5.29%
76.13%
12.78%

- Image
- Other data types
- Text

Breakdown of 'Other data types'

11.31%
0.62%
0.05%
0.11%
29.02%
0.50%
31.59%
2.72%
0.14%
0.07%
7.11%
0.60%
3.39%

- Vector
- Geophysics
- Laser Scanning
- LIDAR
- Mass Spectrometry
- GIS
- Photogrammetry
- Spreadsheets
- Websites
- RTI
- Harris Matrices
- Databases
- Video
- 3D Models

digital datasets in Trusted Digital Repositories.

The ADS continues to hold the latest version of the Data Seal of Approval (DSA), and carries out annual reviews of self-certification standards including Digital Repository Audit Method Based on Risk Assessment (DRAMBORA) and Trusted Repositories Audit and Certification (TRAC). The ADS also remains an accredited MEDIN Data Archive Centre.

Throughout 2018-2019 we have been working towards an application for the CoreTrustSeal, the replacement for the DSA, due for submission in October 2019. If successful, the ADS will become one of only three certified repositories in the UK, and the only one focused on archaeological and heritage data. The CoreTrustSeal, formed by the World Data System of the International Science Council (WDS) and the Data Seal of Approval (DSA), provides a core level of certification for data repositories based on the DSA-WDS Core Trustworthy Data Repositories requirements.

Remote Storage Solutions

In order to build resilience and preserve datasets in line with the *Preservation Policy and Disaster Recovery Plan* the maintenance of an off-site copy of our archived data is required. An in-depth review, carried out in 2018, identified Amazon Web Services (AWS) as the most suitable replacement for our previous arrangement with the United Kingdom Data Archive (UKDA). Working with colleagues at the University of York IT Services a programme for the movement of our current holdings to AWS was finalised over summer 2019, and is currently being enacted. The use of AWS will be subject to continual review, both in regards to internal needs but also any developments in large-scale data storage in the wider archival sector.

Absolutely love @ADS_Update. Their #openaccess library has been the answer to many of my urgent research needs over the years #ReadABookDay.

Twitter user.

Photogrammetric 3D model from the Star Carr and Lake Flixton digital archive. © University of York
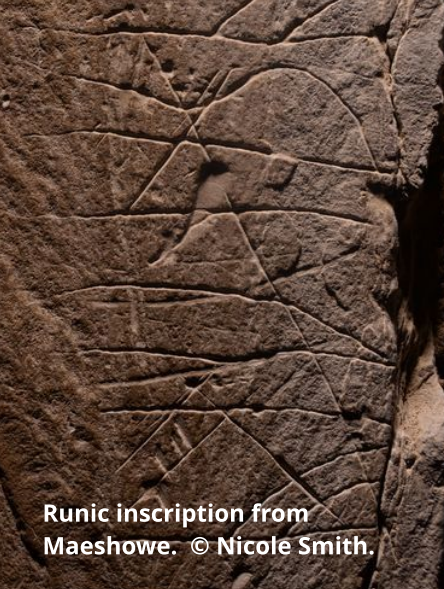
COLLECTIONS DEVELOPMENT

Runic inscription from Maeshowe. © Nicole Smith.

2 To host the most important UK-level **collection** of high quality digital data sets created in the course of historic environment research in the UK.

New deposit enquiries reached a record high this year, as did the usage of the ADS-easy costing calculator, indicating more projects are factoring in digital archiving from the outset of a project. This implies a potential increase to archives being deposited in future years, and is likely the result of concerted efforts over the past few years to improve the understanding of the importance of digital preservation within the heritage sector and mandate deposition. It may also have been impacted by improvements we have made to our costings transparency and methodology, through the introduction of new standardised quotation templates and a three working day response time to enquiries.

Released collections are somewhat down on last year, however we have worked on several large and/or multi-collection data-sets, such as the Crossrail and Staffordshire Hoard digital archives, both of which have not yet been formally released this year.
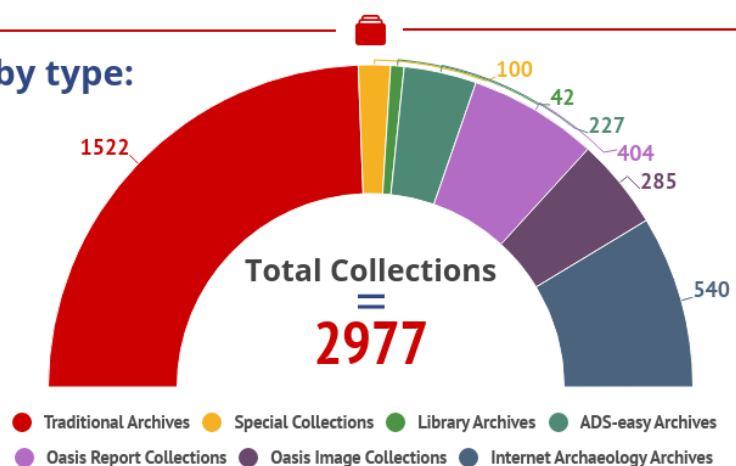
Following the publication of the ALGAO report Planning for Archives: Opportunities and Omissions, which confirmed our long-held opinion that only one percent of planning led archaeological investigations in England deposit a digital archive with ADS, we have further ramped up our efforts to engage with planning archaeologists and museum services, and we now have at least 17 Councils and museum groups mandating deposition with a Trusted Digital Repository.
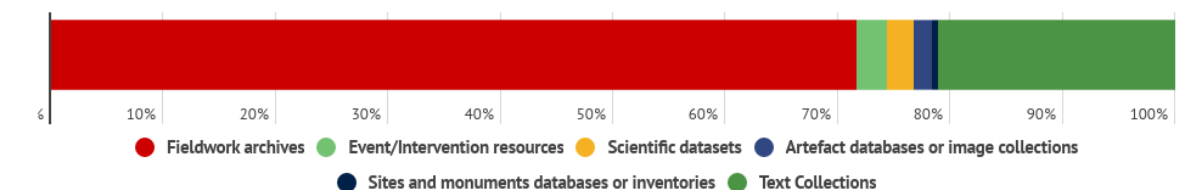
This year we have also been focused on developing our relationships with large infrastructure projects. As we have seen with Crossrail large infrastructure projects are key players in the production of high quality archaeological research in the UK. We are currently engaged in a Scoping Project for HighSpeed2 to assess the potential digital archive that will result from the historic environment works.

ADS Collections

Collections by type:

- 1522
- 100
- 42
- 227
- 404
- 285
- 540

Total Collections = 2977

- ● Traditional Archives
- ● Special Collections
- ● Library Archives
- ● ADS-easy Archives
- ● Oasis Report Collections
- ● Oasis Image Collections
- ● Internet Archaeology Archives

Collections by contents:

- ● Fieldwork archives
- ● Event/Intervention resources
- ● Scientific datasets
- ● Artefact databases or image collections
- ● Sites and monuments databases or inventories
- ● Text Collections

153 New Collections Released 2018-19

164 New Deposit Enquiries 2018-19

Collections released by year:

- ● Traditional Archives
- ● ADS-easy
- ● OASIS Images
- ● Library Archives

Deposit enquiries by month:

- ● 2014-15
- ● 2015-16
- ● 2016-17
- ● 2017-18
- ● 2018-19
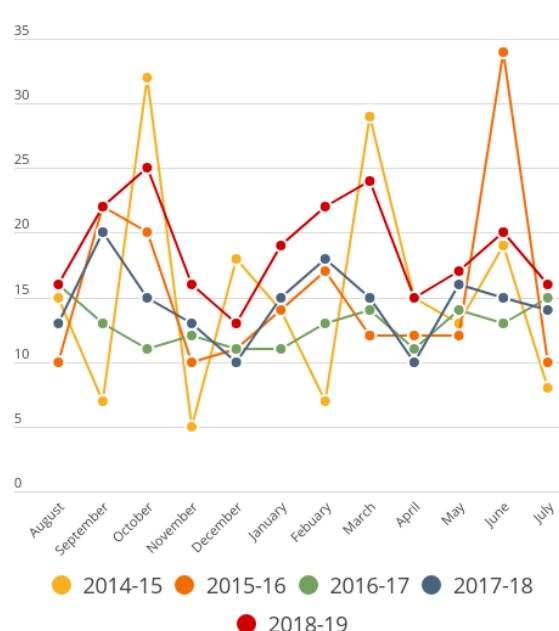
© Lieven Verdonck, Prof Martin Millett

Beneath the Surface of Roman Republican Cities
https://doi.org/10.5284/1052663
This archive holds the ground penetrating radar data from two Roman Republican Cities in Lazio (Italy).
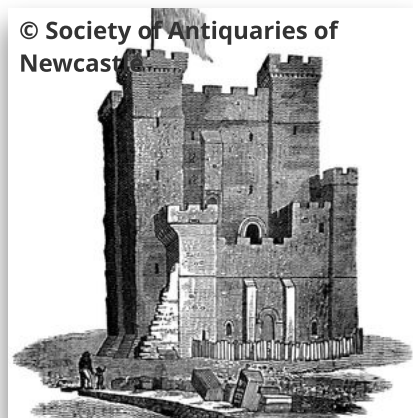
© Society of Antiquaries of Newcastle
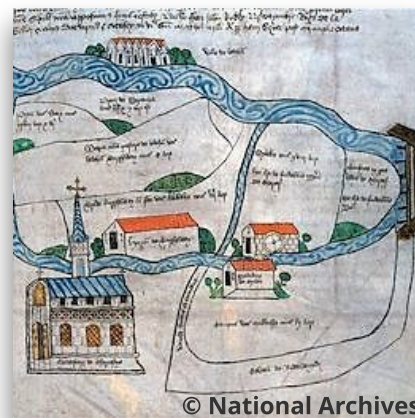
Archaeologia Aeliana
https://doi.org/10.5284/1053682
This archive contains the digitised issues of *Archaeologia Aeliana*, the journal of the Society of Antiquaries of Newcastle-upon-Tyne,

© National Archives

Thames through Time
https://doi.org/10.5284/1051620
This archive contains the results of a wide-ranging synthetic study of the past 1000 years of social, cultural, political and economic history of the Thames Valley.
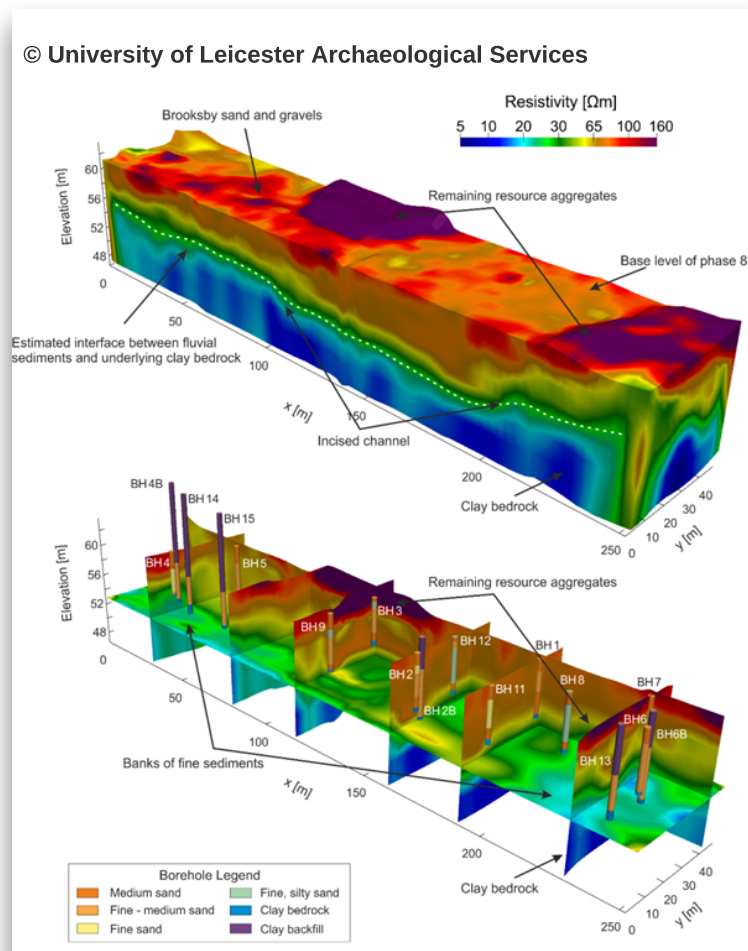

Wheel Wreck Investigation 2018
https://doi.org/10.5284/1055091
This archive holds digital drawings, photographs, & 3D models from the designated wreck site of The Wheel Wreck.

© CISMAS, Kevin Camidge

COLLECTION HIGHLIGHTS

© University of Leicester Archaeological Services

Brooksby Quarry: Investigations of the incised channel
https://doi.org/10.5284/1052202
Electro Resistance Tomography survey of deposits from the the Bytham river, a major Pleistocene river system at Brooksby.

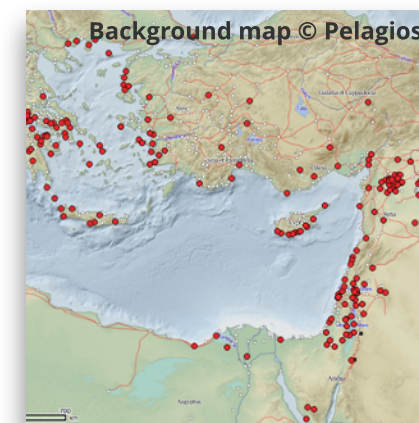A list of all our collections can be found on our Collections History Page.

© HCMAG

The Fortifications of Hull between 1321 & 1864
https://doi.org/10.5284/1052665
This archive contains a report that presents the results of 50 years of investigations of Hull's town defences.

Background map © Pelagios.

Inventory of Crafts and Trade in the Roman East
https://doi.org/10.5284/1050900
This archive contains a database of 33,939 diagnostic sherds from 275 excavations & surveys from the Roman East.

© Worcestershire Archive & Archaeology Service

Archive from the 1972-73 rescue excavation at Redhill Roman fort (Uxacona)
https://doi.org/10.5284/1052665
This archive contains the digitised site notebooks, photographs and drawings from the 1972–73 excavations by David Browne at Redhill Roman Fort.
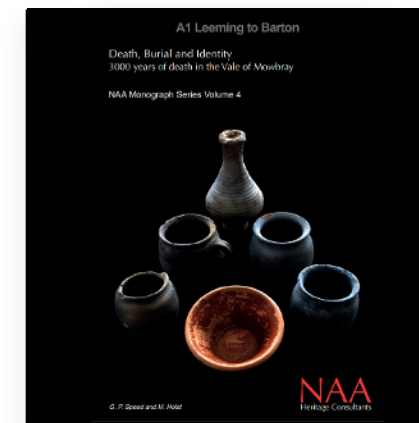
Death, Burial & Identity: 3000 Years of Death in the Vale of Mowbray
https://doi.org/10.5284/1050910
This archive contains the publication and data from one of the largest and best dated burial assemblages from northern England.

Not the End of the Line:
Archiving Crossrail

For those not in the know, 'Crossrail' is the name given to the project currently constructing a new east-west railway/tube line (the Elizabeth line) through central London, connecting Reading to Shenfield via 10 new stations and 26 miles of tunnel. While trains aren't set to be running until 2020 (fingers crossed!) much of the construction work has been completed and has involved significant archaeological investigations at a number of sites through the creation of new stations and the expansion of existing ones.
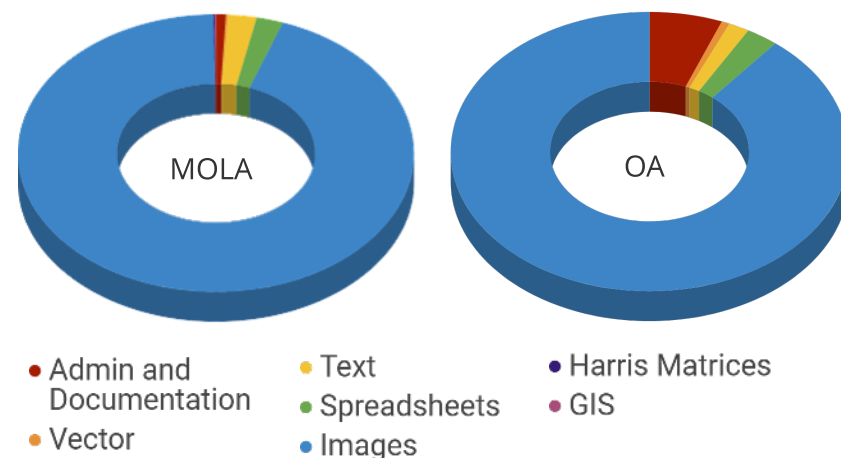
The archaeological work itself has been undertaken by both Museum of London Archaeology (MOLA) and Oxford Archaeology (OA) with ADS involvement starting with initial discussions in late 2016 and finishing this year with a final tranche of digital archiving between January and June. The resulting digital archive was ingested by ADS on a site-by-site basis and covers 29 sites in total - each an archive in themselves - with 21 projects coming from MOLA and 8 from Oxford Archaeology. The data deposited totals 17,512 files or 113GB (16,440 files/111.3GB from MOLA, 1,072 files/1.9GB from OA). Interestingly almost two thirds of the total files delivered come from a single site, Liverpool Street (XSM10).

MOLA

OA

- Admin and Documentation
- Vector
- Text
- Spreadsheets
- Images
- Harris Matrices
- GIS

Top: Glass Bottle Lids from Tottenham Court Road.
Middle: Gold coin (AD 1501-21) found at Liverpool Street Worksite.
Bottom: Selection of English Stoneware Bung Jars from Tottenham Court Road.
All images © Museum of London Archaeology, Crossrail Ltd.

A key element in getting this volume of data ingested successfully and efficiently was early negotiations with MOLA and OA archive staff to discuss deposit formats and metadata requirements. While the site archives themselves are consistently structured with relatively few data formats, metadata at the file level was a larger concern in light of sheer numbers of files. Significant focus was placed on what was already being recorded by the archaeologists in registers and databases (MOLA's in particular) and how this could be efficiently re-used as file-level metadata for ADS purposes. Another important aspect was to look at the use of OASIS records (being created by both MOLA and OA as part of the archive process) to ensure that these were linked to the relevant site archives during deposit. This allowed us to avoid duplication of report data in the archive (OASIS reports make their own way into the ADS Library) but also to ensure that links were maintained back from ADS Library records to the digital archives datasets.

Another aspect of these early meetings was to allow ADS to identify unexpected elements and to assess and investigate data that ADS hadn't dealt with in detail prior to deposit. The main examples here involved assessing format and metadata options for x-ray and CT datasets, primarily those resulting from the excavation of c.3750 burials from the Old Bedlam burial ground at the Liverpool Street site.

The resulting digital archive contains a rich variety of content that you would expect from such urban datasets and comprises reports and specialist datasets at all levels: excavation and evaluation reports, building recording reports, and specialist reports covering environmental remains, human remains, artefacts and building materials along with a wide range of images covering the sites, finds, environmental sampling, conservation, osteology, and so on. The images are probably our favourite element of the archive, particularly those that convey the scale of the work undertaken within London's dense, urban landscape. The images from the Tottenham Court Road (TCG09) site do this particularly well with the excavations happening right at the intersection with Oxford Street, under the gaze of Centre Point.

CT scan of a cremation vessel from Liverpool Street Worksite. © Museum of London Archaeology, Crossrail Ltd.

ADS-EASY DEVELOPMENT

Developments to ADS-easy and OASIS Images continued this year with the aim of improving workflows and efficiency for both depositors and repository staff. This work has brought OASIS Images into line with ADS-easy, with programmatic validation of metadata at upload allowing for a more efficient workflow. Additionally, an increase in file-size limit now supports the submission of larger and uncompressed image formats.

Following comments from depositors, and rigorous testing by ADS staff, we have been able to extend the number of files accepted through ADS-easy. This, alongside the increase in file-size seen in OASIS Images, means that the submission of greater quantities of data is now possible. In order to support the

geophysical community we have also been able to extend the quantity of geophysical data accepted through the system. Changes to the ADS-easy interface and updates to the help system have improved user experience and streamlined the submission process for users.

These updates to the code and improvements to the backend have increased stability of both systems. Meanwhile, the changes have also allowed us to improve the import process and transfer of data and metadata to the Collections Management System (CMS), the Object Management System (OMS) and file store.

ADS Archives Manager Ray Moore presenting ADS-easy at a workshop. © University of York.
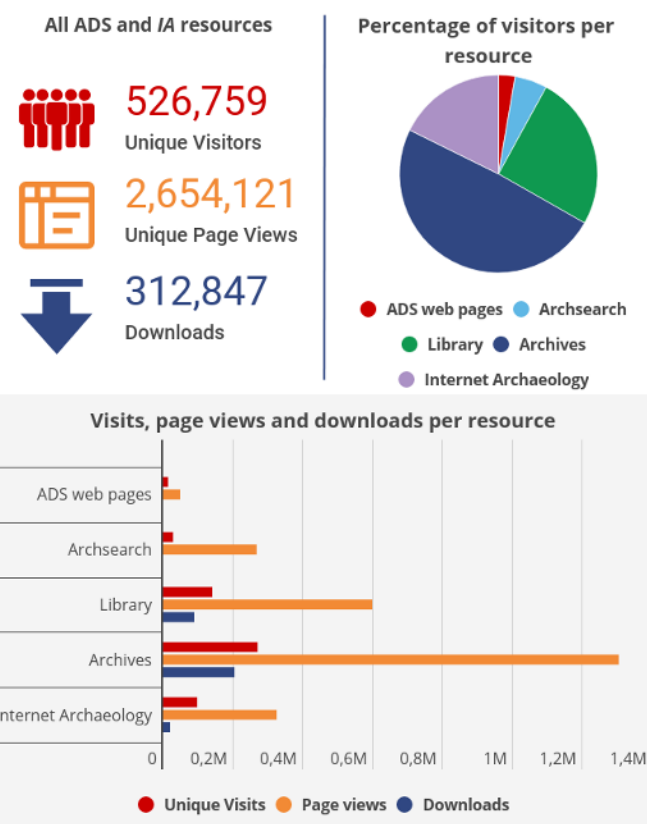
RESOURCE DELIVERY

Alongside ensuring the long-term preservation, and increasing the coverage of our collections, it is essential that the ADS provides easy online access to the resources we hold. We have three primary search mechanisms, according to the type of resource. ArchSearch continues to provide the means of searching our main catalogue, with over 1.3 million thin metadata records for the archaeology of the British Isles, many brokered on behalf of other organisations. Our Archives search now provides access to over 1,600 data rich archives, whilst the ADS Library search gives access to over 335,000 bibliographic references, including over 95,000 journal articles and unpublished fieldwork reports immediately available for download from the ADS and *Internet Archaeology*, and links to over 11,500 other online publications. All our resources continue to be well accessed.

> *"Internet Archaeology has been and hopefully will continue to be a truly groundbreaking, inspirational publication, thanks to the open and inclusive attitude and insight of @IntarchEditor So many great articles! So many avid readers! Keep up the great work please "*
> Twitter user.

Website User Statistics 2018-19

All ADS and *IA* resources

526,759
Unique Visitors

2,654,121
Unique Page Views

312,847
Downloads

Percentage of visitors per resource

- ADS web pages
- Archsearch
- Library
- Archives
- Internet Archaeology

Visits, page views and downloads per resource

- ADS web pages
- Archsearch
- Library
- Archives
- Internet Archaeology

0   0,2M   0,4M   0,6M   0,8M   1M   1,2M   1,4M

- Unique Visits
- Page views
- Downloads

Visitor Access Locations
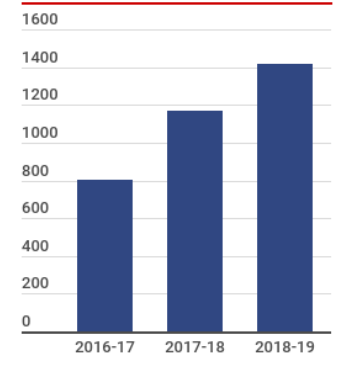
Countries

World-Wide ▼ | Visits

OPEN ACCESS ARCHAEOLOGY FUND

Free, open access to archaeological research and data offers significant and enduring academic, professional and social benefits. Although many have access to funds via their research sponsors to cover an article or deposit charge, there are other researchers for whom funding is simply not available despite research quality and whose digital data is potentially at greater risk.

The Open Access Archaeology Fund was established by the ADS and *Internet Archaeology* with the specific aim of supporting the publishing and archiving costs of researchers who have no means of institutional support. The Fund is going from strength to strength, and over the course of this year has accrued the record high of £1,417.63 in revenue from one-off and recurring donors alike. **A big thank you goes to all our donors!**

Reconstruction of a double ellipsoide ornithomorph bottle with a whistle from the *Internet Archaeology* article, The song of air and water: Acoustic experiments with an Ecuadorian Whistle Bottle. © Mónica Ayala

Total Income £3389.51

1600
1400
1200
1000
800
600
400
200
0
2016-17   2017-18   2018-19

Publications supported by the Fund this year:

- Ayala, M. A. et al. 2019 The song of air and water: Acoustic experiments with an Ecuadorian Whistle Bottle (c.900 BC-100 BC), Internet Archaeology 52. https://doi.org/10.11141/ia.52.2
- Whittaker, C. 2019 Breedon Hill, Leicestershire: new surveys and their implications, Internet Archaeology 52. https://doi.org/10.11141/ia.52.6

Digital archives supported by the Fund this year:

- Whittaker, C. 2019. Breedon Hill, Leicestershire: Geophysical surveys. https://doi.org/10.5284/1052664
- Di Pietro, Grazia (2019) Photographs from the archive of the IUO Italian Archaeological Mission to Upper Egypt (1977-1986). https://doi.org/10.5284/1056618
- Boughey, K. (2019) Legacy Lithic Collection. Coming soon.

ELECTRONIC PUBLICATION

4 To develop and encourage the adoption of new models of **electronic publication,** providing a holistic service, covering publication and archiving.

Internet Archaeology Update

Over the course of this year the digital journal *Internet Archaeology* has published 26 articles (although the mixed issue for 2019 will remain open until the end of December 2019). Articles have continued to be funded by a diverse range of sources, many for the first time, including CADW, Carleton University Curie Fund, Europae Archaeologiae Consilium (EAC), European Commission, Historic Environment Scotland, Hunter Archaeological and Historical Trust, National Heritage Science Forum, The Strathmartine Trust, UCL and the University of Brighton.

2019 saw the publication of the second article in a series of important studies into human remains trafficking on the internet by researchers Damien Huffer and Shawn Graham. By virtue of being open access, both articles have been picked up by a large number of press outlets across North America, including a feature in Wired.

Now in its third year of collaboration, the journal is proud to be the publication venue of choice for the European Archaeological Council Heritage Management Symposium proceedings. These special themed issues are authored by a wide range of leading archaeology and heritage managers from across Europe and is helping to establish closer and more structured co-operation and exchange of information.

In 2019, the Editor was successful in obtaining support from an internal University fund to attend the CIfA conference in Leeds with the aim of engaging with commercial field archaeology units, and which has resulted in invites to speak to project managers at two of the largest field units in the country about data and fieldwork publication in the journal with a view to making more use of the journal's capabilities.

Liaising with staff from the University's Marketing and Communications teams, the Editor has also embarked on the development and implementation of a communications plan. A key aim of this is the redevelopment of the journal homepage which will be launched in Autumn 2019, along with a revised catalogue of back issues (for easier browsing).

New Online Submission System

In 2019, the Editor has embarked on an enhancement plan for the journal, focusing initially on automating the proposal submission system with help from Tom Smith in IT Services at the University of York. Released in August and already accepting submissions, the new system enables prospective authors to 'save and resume later', sends them a copy of their proposal once it has been submitted and creates a 'Drop Off' area for the submission of files. The new system provides a solid foundation from which to develop the next stage of article tracking which will further improve and make more efficient the editorial workflow. This work has acted as a prompt to revise and refine the journal's Author Guidelines which have already been released.

"I found it very straight forward. It was particularly good to feel that I was submitting something through a proper process, as opposed to sending to an email address. All the different options available demonstrated the potential of publishing with you, and made me wish that I had been a bit more imaginative with my format and the potential for interaction." Proposal submitter.

"Apart from the fact that everything you produce is free to everyone, I love how open to new ideas Internet Archaeology is. It might not seem like a lot, but it's boundary pushing and there aren't enough venues for this that are also well respected by the establishment. It's important work!" Twitter user.

internet archaeology by numbers

328,624 page views per year (2018–19 figures)
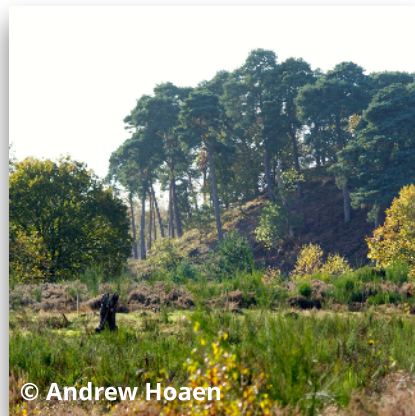
280 average daily readers

166 countries reached

53 volumes produced

560 articles published

97,442 visits

1 Full-time staff members

Graphic: Lesley Collett

© Andrew Hoaen

Themed issue: Environmental Archaeology - Theory and Practice: Looking Back, Moving Forwards
Edited by Benjamin Gearey, Suzi Richer, Seren Griffiths and Michelle Farrell. With contributions by Terry O'Connor, Lisa Lodwick, Seren Griffiths, Andy J. Howard, Daryl Stump, Robert Marchant, Andrew Hoaen, Elizabeth Pearson, Matt Law, Erin Kavanagh and Martin Bates.
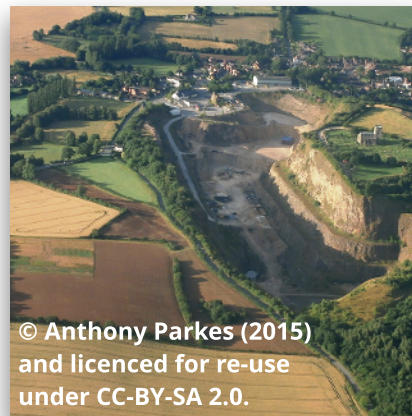https://intarch.ac.uk/journal/issue53/index.html

© Alison Cameron, Judith A. Stones, & Chris Croly.

Excavations at Aberdeen's Carmelite Friary, 1980-1994
Alison Cameron, Judith A. Stones and Chris Croly.
https://doi.org/10.11141/ia.52.1

© Anthony Parkes (2015) and licenced for re-use under CC-BY-SA 2.0.

Breedon Hill, Leicestershire: new surveys and their implications.
Christopher Whittaker.
https://doi.org/10.11141/ia.52.6

"To someone without an institutional log in, like me, it's utterly brilliant to be able to access journals like [Internet Archaeology]. Plus the papers are always fantastic, so even if I did have an institutional log in, I'd still be checking internet Archaeology regularly anyway".
Twitter user.
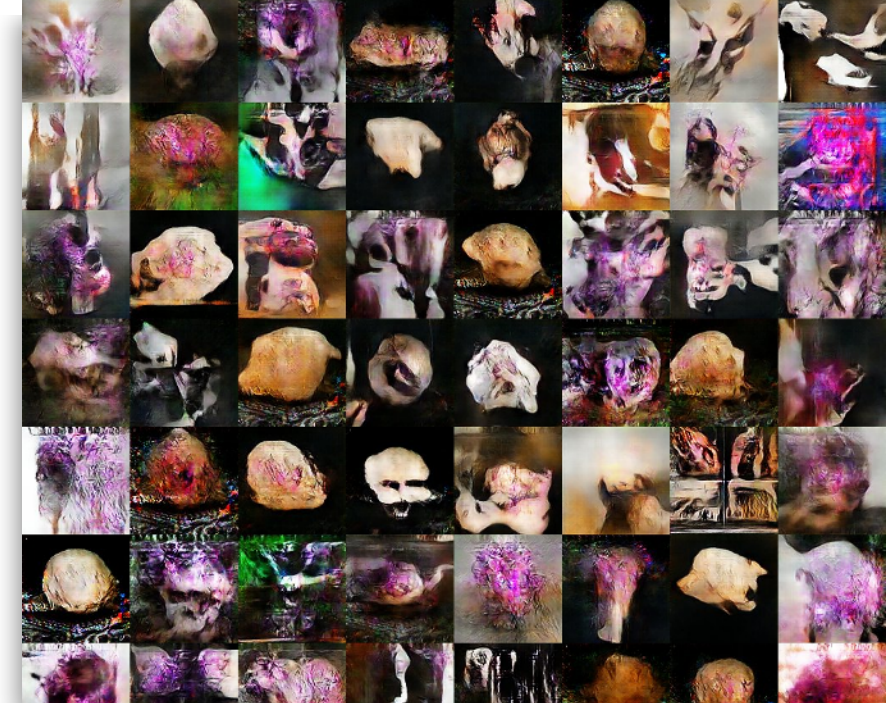
What the Machine Saw: some questions on the ethics of computer vision and machine learning to investigate human remains trafficking.
Damien Huffer, Cristina Wood and Shawn Graham.
https://doi.org/10.11141/ia.52.5
Image © Damien Huffer, Cristina Wood and Shawn Graham.

ARTICLE HIGHLIGHTS

"[Internet Archaeology is an] accessible and engaging publication of immense benefit to the public and professionals"
Twitter user.

© Mónica Ayala

The song of air and water: Acoustic experiments with an Ecuadorian Whistle Bottle (c.900 BC-100 BC)
Mónica Amparo Ayala Esparza, Galo Fernando Gallardo Carrillo and Miguel Molina-Alarcón
https://doi.org/10.11141/ia.52.2

© RCAHMW

Archaeological and environmental investigation of three prehistoric field systems in Gwynedd, north-west Wales.
George Smith, Astrid E. Caseldine, David Hopewell, Robert Johnston and Richard I. Macphail.
https://doi.org/10.11141/ia.47.2

© Cornwall Archaeological Unit

The social organisation of metalworking in southern England during the Beaker period and Bronze Age: absence of evidence or evidence of absence?
Chris Carey, Andy M. Jones, Michael J. Allen and Gill Juleff.
https://doi.org/10.11141/ia.52.4

FORTHCOMING ARTICLES

Excavations at Hollis Croft

Excavations in 2017 revealed evidence for industrial processes as well as domestic quarters at Hollis Croft, Sheffield. The remains of cementation and crucible furnaces together with workers' housing, public houses and other evidence will be described and used to examine the working lives of the inhabitants of this part of Sheffield at a time of great change. Sheffield was the centre of innovation in the steel industry. While the technical processes are well known, relatively little attention has been paid to the people who worked and lived around these industrial centres. This article will examine the archaeological evidence identified for the processes, and using historic maps and other evidence from archival sources create a picture (literally in the form of a comic strip) of living and working conditions during this part of the Industrial Revolution.

Developing the ArchAIDE application: A digital workflow for identifying, organising and sharing archaeological pottery using automated image recognition.

This article will summarise the work of the ArchAIDE project, funded by the European Union's Horizon 2020 Research and Innovation Programme. The collaborative work of the archaeological and technical partners created a system for the automatic recognition of archaeological pottery.
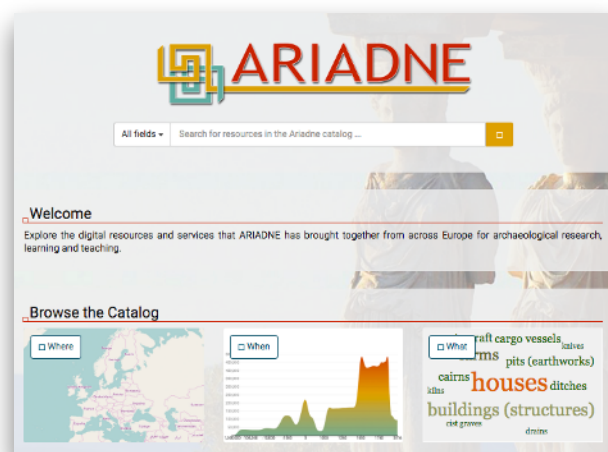
RESOURCE DISCOVERY

ADVISORY SERVICES

In order that researchers can find resources held by the ADS, and others, it is essential that as well as our own search interfaces, we provide metadata for other online services to ingest. The ADS provides data to data aggregators, such as library catalog services like EBSCO, Ex Libris and the Keepers Registry. The primary heritage portals for which the ADS provides data to are Heritage Gateway, Discovery and Excavation in Scotland and the Marine Environment Data Information Network (MEDIN). At an international level the ARIADNE portal is the main resource discovery tool, for which the ADS acts as a UK data aggregator. As part of ARIADNE*plus*, we provided archaeological input to the development of the AO-Cat, the ontology which will underpin the ARIADNE data infrastructure and the next phase of portal development. The AO-Cat will allow the aggregation of collection level and item level resources across multiple data providers, and is itself mapped to the CIDOC-CRM.

> *"the digital repositories (ADS, DANS, SND) directly influenced our institution by being good examples of concrete implementations of data sharing.'*
> Feedback from Inrap on the ARIADNE Project.

ARIADNE

Welcome
Explore the digital resources and services that ARIADNE has brought together from across Europe for archaeological research, learning and teaching.

Browse the Catalog

4 **OAI PMH Targets**
Archives, Articles, Journals, Oasis Reports.

8 **Web Mapping Services in Heritage Gateway**
Excavation Index, Exeter, Greater London, Historic Milestones, Lake District, Merseyside, Parks and Gardens, Yorkshire Dales.

11 **External Aggregators**
Ex-Libris, EBSCO, ARIADNE, EUROPEANA, UKRDDS, MEDIN, DES, Heritage Gateway, The Keeper's Registry, MOLA, BBC.

16m **Linked Data Triples**
Roman Amphora (5648 triples), Archives (1559467 triples), Chartex (76168 triples).

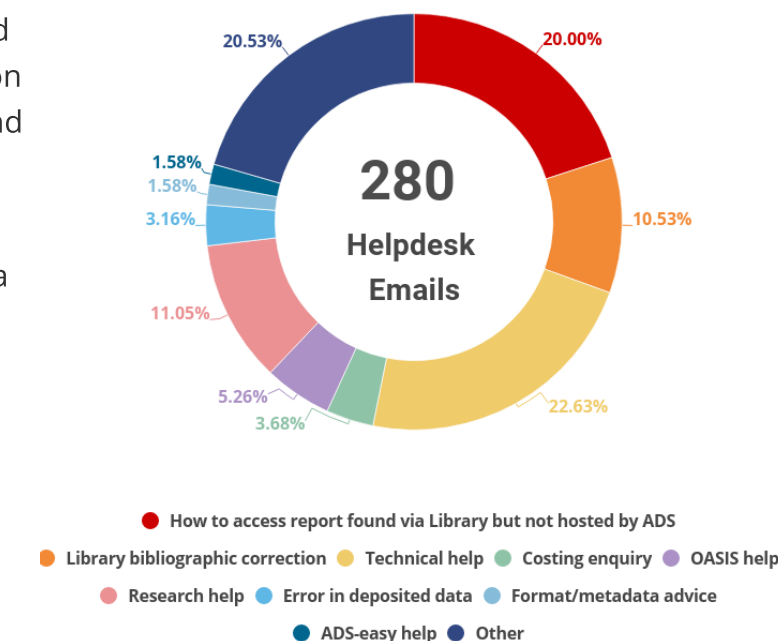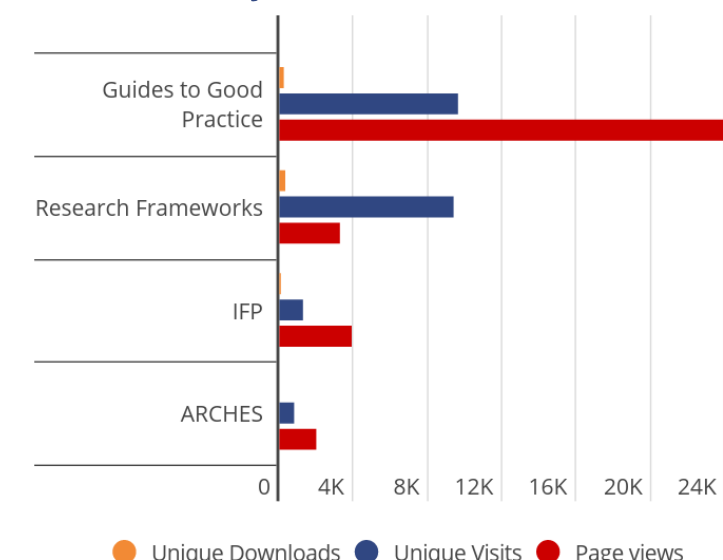The ADS Guides to Good Practice remain a primary source of references for data and metadata standards within the heritage sector and beyond. This year the Guides have been updated through collaborations with our US partners at Digital Antiquity, and via a number of European projects, with sections translated and adapted by partners in the Netherlands, Germany, Sweden, and Japan. During 2018-19 we worked with our partners in the Preparatory Phase of E-RIHS to develop data policies for heritage science, and we have collaborated on two key Historic England funded projects to develop guidance and training materials on developing selection strategies for archaeological archives, and data management plans.

ADS staff have been active promoting best practice in digital archiving and data management at workshop and conference sessions throughout the world, and continued to provide expert data management advice to academic, independent, and professional researchers, during the preparation of their funding applications.

Advisory Websites User Statistics

Category	
Guides to Good Practice	
Research Frameworks	
IFP	
ARCHES	
	0 4K 8K 12K 16K 20K 24K

● Unique Downloads ● Unique Visits ● Page views

280 Helpdesk Emails

20.53%
20.00%
1.58%
1.58%
3.16%
10.53%
11.05%
22.63%
5.26%
3.68%

● How to access report found via Library but not hosted by ADS
● Library bibliographic correction ● Technical help ● Costing enquiry ● OASIS help
● Research help ● Error in deposited data ● Format/metadata advice
● ADS-easy help ● Other

Membership

List of committees and groups that ADS has a representative on:

- Archaeological Archives Forum
- Bedern Group
- CIfA Archaeological Archives Group
- CIfA Information Management Group
- Community Standards for 3D Data Preservation Forum
- Digital Antiquity Board of Directors
- Heritage 2020 Discovery, Identification and Understanding Working Group
- Historic Environment Information Resources Network
- Forum on Information Standards in Heritage
- OASIS Advisory Board
- MEDIN Data Archive Centres Committee
- MEDIN Heritage Data Archive Centre

Photograph from the archive of the IUO Italian Archaeological Mission to Upper Egypt (1977-1986). © University of Naples 'L'Orientale', Grazia Di Pietro, Elena D'Itria.

DEVELOPING STANDARDS

To develop and implement agreed **standards** to ensure appropriate documentation and preservation of historic environment data and resources.

7

Engagement with our designated community to create and enhance the necessary standards to ensure the sufficient documentation and preservation of digital datasets continues to be of central importance to the ADS, and features prominently in our strategic goals. These activities are not isolated, and we continue to both engage with and contribute to activities within the wider data management and preservation sectors.
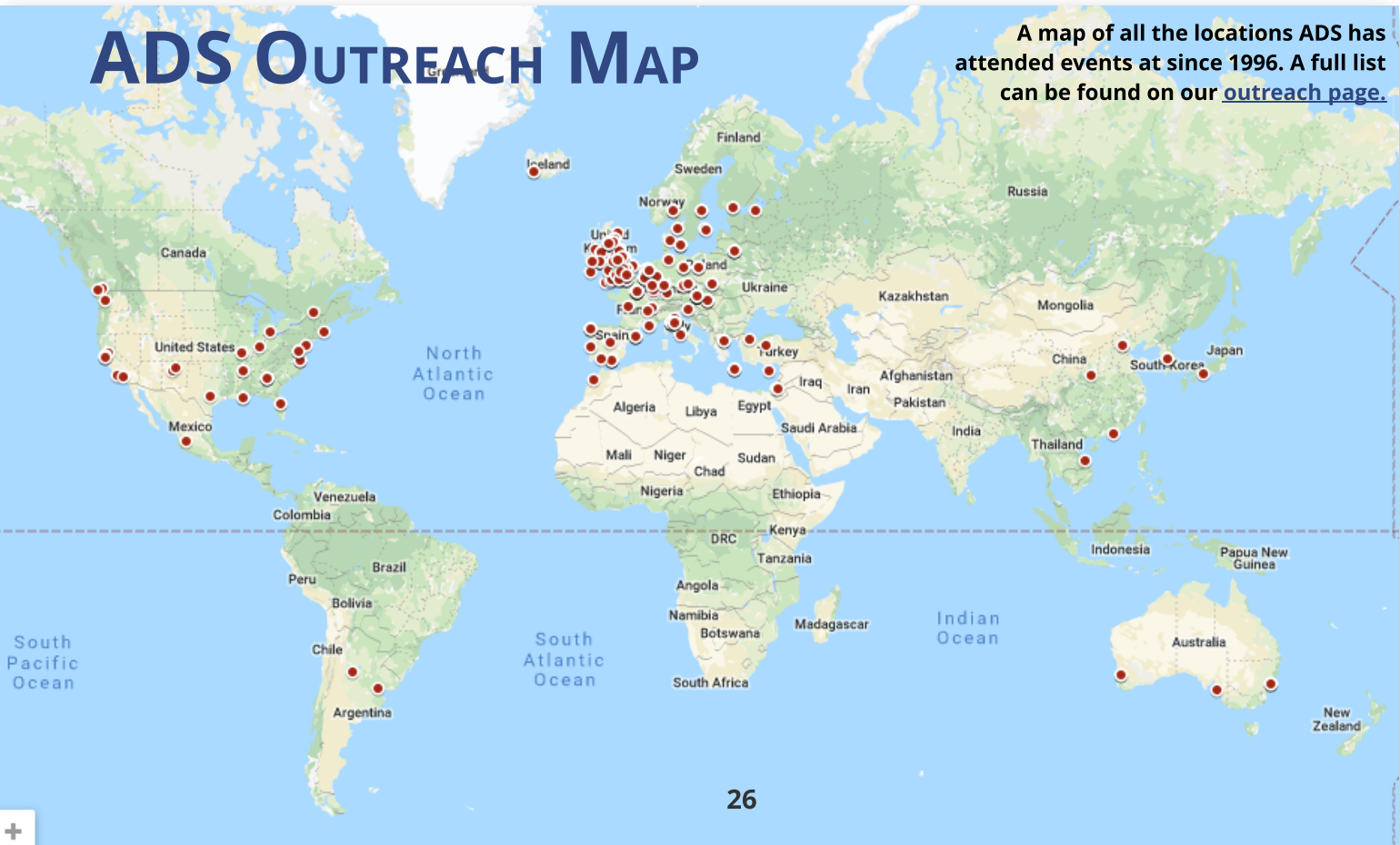
Throughout 2018-19 we have continued to take an active role in the creation of the CIfA Selection Toolkit for Archaeological Archives and make contributions to the DigDigital project which is developing standards for archaeological digital archive compilation and data management planing. Collaboration with external agencies and organisations has allowed us to enhance and implement new data procedures and metadata templates for data types that are becoming more common within the archaeological and heritage sectors. We continue to engage and work collaboratively with colleagues across the archaeological and heritage sectors and beyond, through both formal and informal engagement. These activities also promote active reappraisal of internal standards and procedures within the ADS, and highlight where the development of new ones may be necessary.

Working Collaboratively

The ADS recognises that collaborative activities aid the development and reappraisal of standards and procedures. With this in mind, we hosted an informal collaborative meeting with colleagues from the *Historic Environment Scotland* (HES) to discuss policies and practices in an attempt to identify common problems, improve workflows and enhance standards. At the same time, we continue to engage with data standards and developments within the wider preservation and data management communities through attendance and contributions to workshops, seminars and webinars. Attendance of events on 3D data, audio and video, PDF, etc. all contributed to the reappraisal of current, and the development of new ADS standards and procedures in the past year.

ADS OUTREACH MAP

A map of all the locations ADS has attended events at since 1996. A full list can be found on our outreach page.

Laser Scanning, Photogrammetry and LiDAR

ADS has continued to work with partners in Historic England, Historic Environment Scotland, and the Welsh Royal Commission to develop a standardised template for recording metadata and project documentation for laser scanning and photogrammetry datasets. A full schema and template has been developed, building on previous work undertaken as part of the Guides to Good Practice, and this has been successfully trialled with a number of ADS archives.

Additionally, recent deposits have also allowed ADS to revisit and revise our metadata requirements for LiDAR datasets and to work with depositors to ensure that the appropriate level of technical capture metadata is recorded.

More widely, 3D standards and good practice research has continued via ADS involvement in the US-led CS3DP project. The community-focussed project is entering its writing-up stage with a view to publishing early in 2020. The ADS contribution has primarily focussed on 'Best Practice' components.

Infrared Lidar image from the New Forest Historic Landscape Survey. © New Forest National Park Authority.

Historic ship graffiti from St Oswald's Church roof. © Historic England & John Buglass.

International Image Interoperability Framework

At the start of the year, ADS attended a workshop in Edinburgh run by the IIIF Consortium on the increasingly popular International Image Interoperability Framework. The Framework provides a standardised way to display, compare, and access image-based resources, allowing data to be shared between repositories and easily re-used. Subsequent work was undertaken to see how easily ADS could incorporate IIIF into its existing framework with a view to potentially using the technologies in selected future archives.

SUPPORTING RE-USE

8 To encourage and support the **re-use** of primary data and digital resources created in the course of historic environment research.

The ADS has been interested in the re-use of the data in our archive for as long as we have been preserving data. Providing access and preserving data for others to re-use is why we do what we do.

While we track quantitative usage statistics (see page 18) as is standard for most online archaeological resources, gaining qualitative understanding and strong examples of data re-use has always been more difficult.

This year we have instigated a guest blog series intended to acknowledge the wide range of research carried out that re-uses data preserved and disseminated by the ADS, and raise awareness of the research potential of data re-use in archaeology and beyond.

We have already published two re-use blogs since we started the series. We already have two more exciting posts lined up, and as the year progresses we will publish more guest posts from archaeological and historic environment researchers from around the world, highlighting the wonderful and varied ways in which ADS collections are re-used.

Get involved!

The ADS would love to hear of your experiences re-using our archived data. Pitch us a post by emailing help@archeologydataservice.ac.uk

Data from the 'The Rural Settlement of Roman Britain: an online resource' archive loaded to in QGIS for teaching at the University of Vienna. © Dominik Hagmann & Fabiola Heynen. Boundary lines: Ordnance Survey data, Crown copyright.
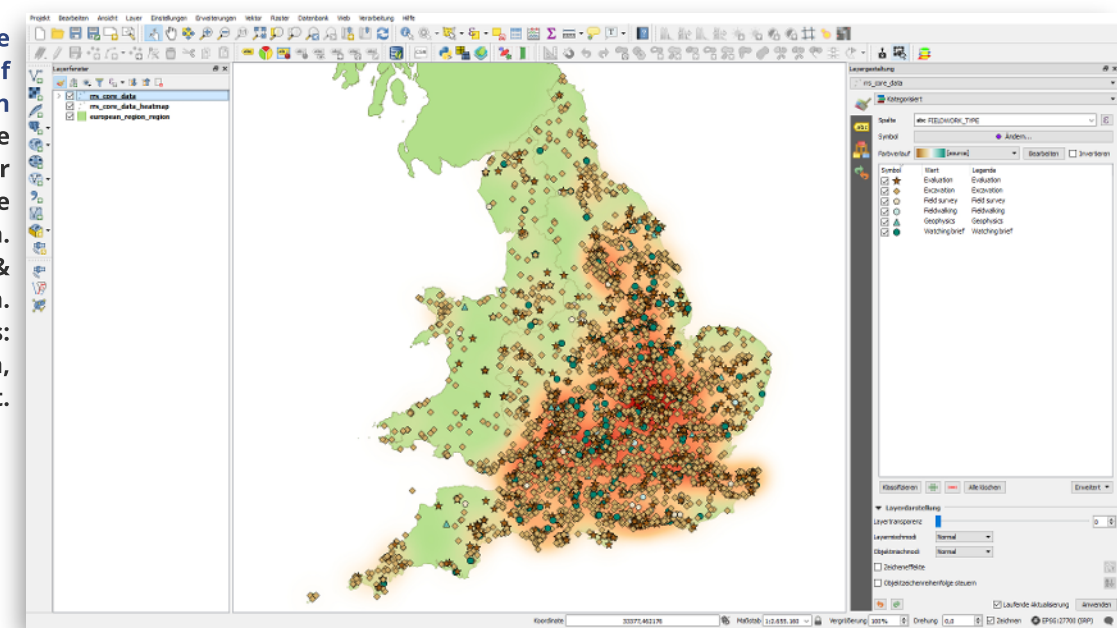
Social Media

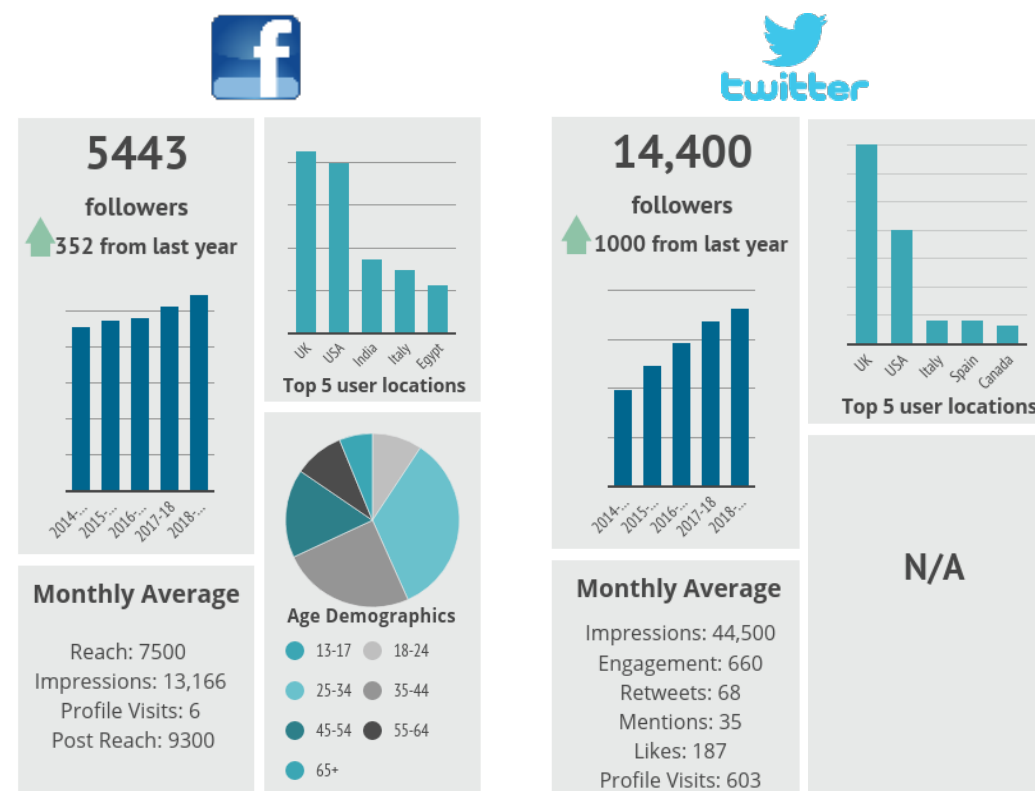The promotion of ADS and *Internet Archaeology* resources and collections is also a key part of our strategy to encourage the re-use of our collections. Social media is a key tool in this promotion. This year, following the appointment of two new trainee digital archivists, we have been able to rededicate staff time to social media activities and blog post writing, which has reinvigorated our online presence and seen an increase in user engagement.
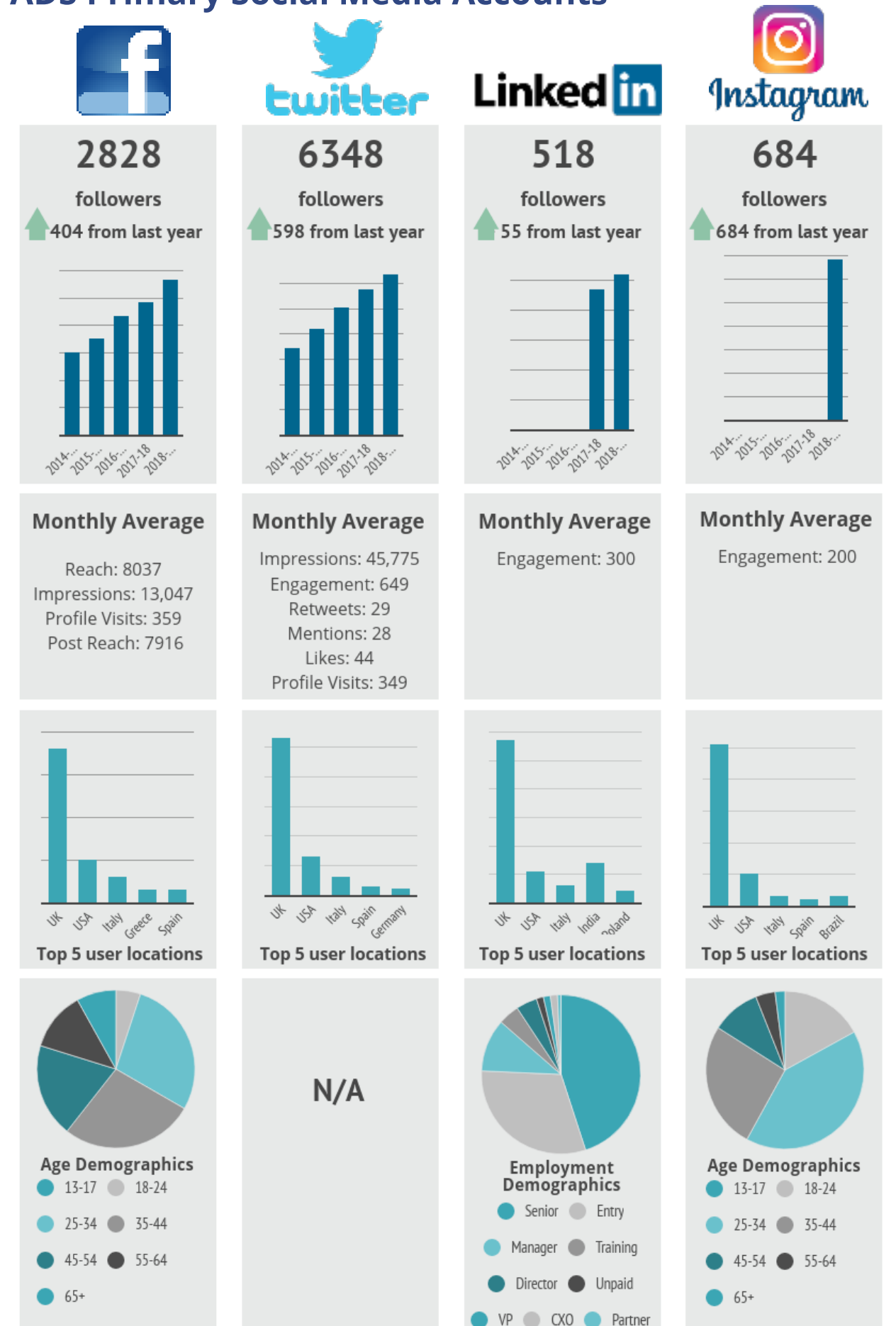
As the third largest social media outlet in the UK, after Facebook and Twitter, the ADS also decided to take the plunge and set up an ADS Instagram account. This has allowed us to reach a whole new demographic, and as we have lots of wonderful images in our archive it has been a perfect medium to showcase our content. We have been steadily gaining followers each week and have had good discussions on some of our posts. People are excited to see sites they may have dug on or ask questions about issues we've raised with digital preservation.

Internet Archaeology Social Media Accounts

Facebook

5443 followers
352 from last year

Top 5 user locations: UK, USA, India, Italy, Egypt

Monthly Average

Reach: 7500
Impressions: 13,166
Profile Visits: 6
Post Reach: 9300

Age Demographics
- 13-17
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

Twitter

14,400 followers
1000 from last year

Top 5 user locations: UK, USA, Italy, Spain, Canada

Monthly Average

Impressions: 44,500
Engagement: 660
Retweets: 68
Mentions: 35
Likes: 187
Profile Visits: 603

N/A

ADS Primary Social Media Accounts

Facebook

2828 followers
404 from last year

Monthly Average

Reach: 8037
Impressions: 13,047
Profile Visits: 359
Post Reach: 7916

Top 5 user locations: UK, USA, Italy, Greece, Spain

Age Demographics
- 13-17
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

Twitter

6348 followers
598 from last year

Monthly Average

Impressions: 45,775
Engagement: 649
Retweets: 29
Mentions: 28
Likes: 44
Profile Visits: 349

Top 5 user locations: UK, USA, Italy, Spain, Germany

N/A

LinkedIn

518 followers
55 from last year

Monthly Average

Engagement: 300

Top 5 user locations: UK, USA, Italy, India, Poland

Employment Demographics
- Senior
- Entry
- Manager
- Training
- Director
- Unpaid
- VP
- CXO
- Partner

Instagram

684 followers
684 from last year

Monthly Average

Engagement: 200

Top 5 user locations: UK, USA, Italy, Spain, Brazil

Age Demographics
- 13-17
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

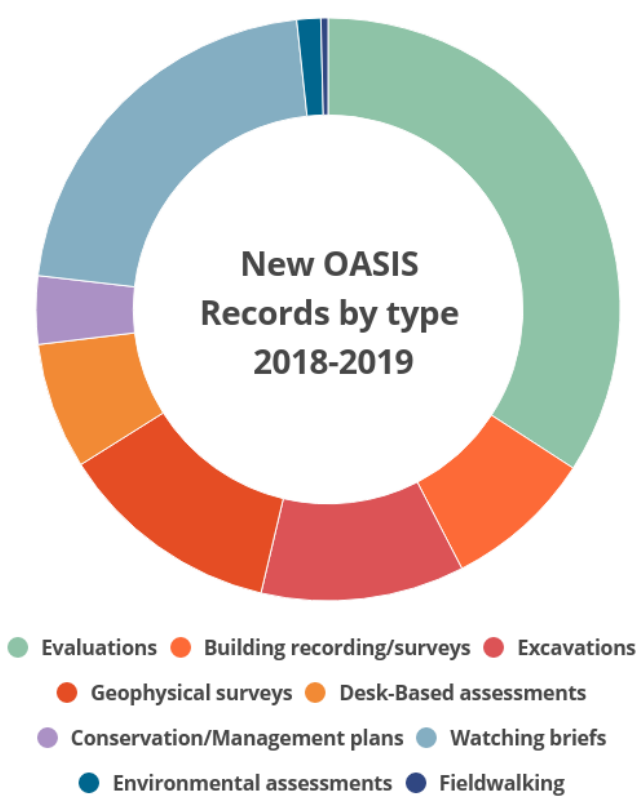# OASIS

The reports, made available via the OASIS system now form one of the largest collections of Open Access unpublished heritage reports in the world.

Over the last year, 118 new users have opened an OASIS account, an increase of 11%, and over the past few months we have seen an unprecedented transfer of reports from OASIS into the ADS Library, with almost half of the 6,213 reports added this year being uploaded over the past three months.

The OASIS system is an information gathering tool which aims to facilitate the flow of information from heritage professionals and researchers to local and national record managers.

New OASIS Records by type 2018-2019

- ● Evaluations
- ● Building recording/surveys
- ● Excavations
- ● Geophysical surveys
- ● Desk-Based assessments
- ● Conservation/Management plans
- ● Watching briefs
- ● Environmental assessments
- ● Fieldwalking

6213 OASIS Records Created 2018-19.

8208 OASIS Reports Released 2018-19.

● OASIS records created ● OASIS reports released
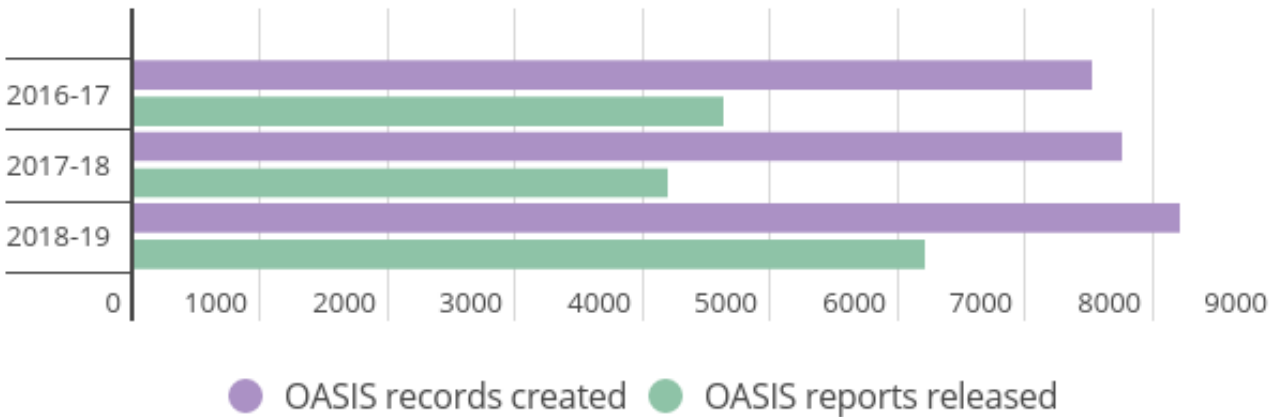
HERALD

The HERALD Project (the redevelopment of the OASIS system), has continued to schedule, with early versions of the basic form being circulated for testing throughout Spring and Summer 2019.

The new online form is a significant overhaul in terms of content, technology, and presentation. It aims to deliver a modern attractive interface, simplified data entry and improved data accuracy.

Enhancements include:

· Use of Linked Open Data heritage thesauri;

· Use of web mapping services for more accurate spatial recording;

· An improved archive module.

The effort to raise the profile of OASIS and HERALD to the wider sector has also increased this year with presentations and workshops involving ALGAO, CBA and FAME, as well as a range of small case studies about the impact of OASIS on research being included in the newsletters of such publications as the Prehistoric Society and The Society of

Medieval Archaeology.

The Beta version of the form is due for delivery in Spring 2020, followed by a transition to full public release. Please see the HERALD Project page for more details about the project's background and timeline.

HERALD is funded by Historic England as part of the Heritage Information Access Strategy (HIAS). Additional resources have been provided by Historic Environment Scotland to to support reporting to Archaeology Scotland's annual summary of fieldwork: Discovery and Excavation in Scotland
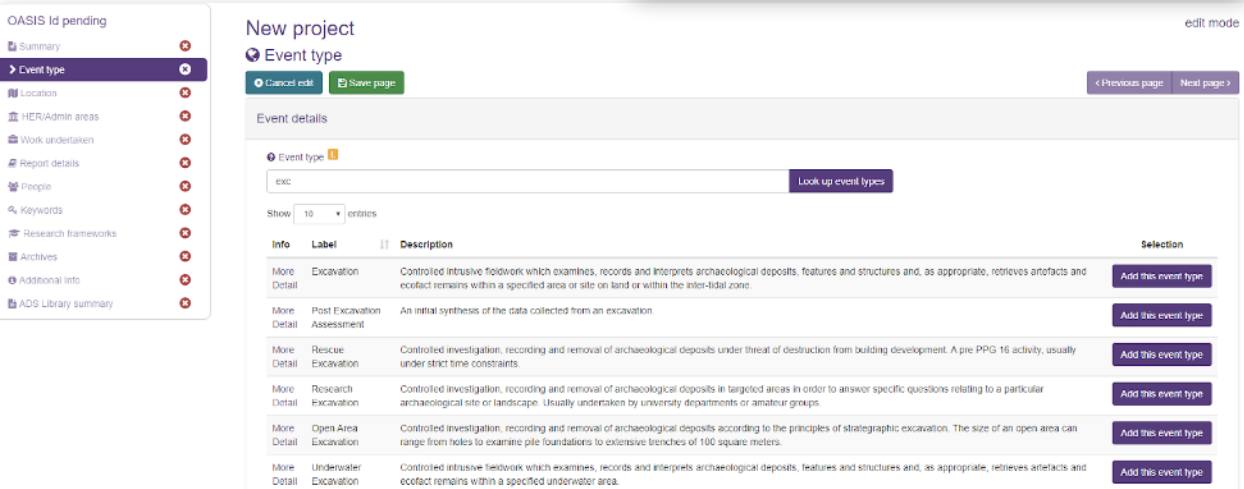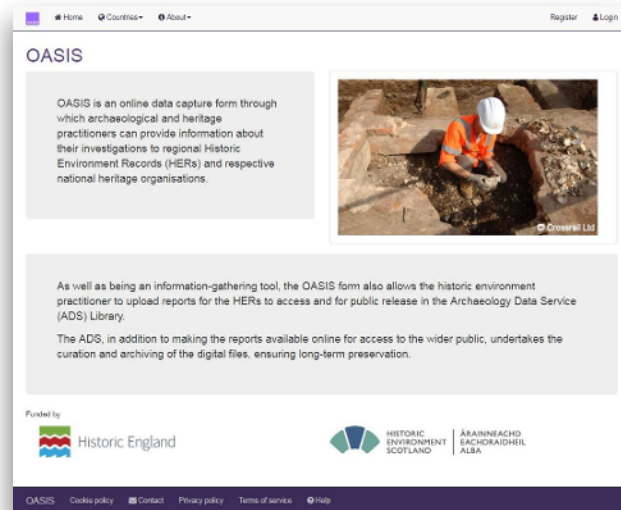
RESEARCH AND DEVELOPMENT

Active involvement in research, particularly where it combines archaeological data with the latest information science techniques, is a core component of ADS activity, as it feeds back into our own approaches and infrastructure, and provides welcome collaboration opportunities both at UK and international level. The ArchAIDE project has highlighted the value of data re-use, whilst ARIADNEplus, E-RIHS and SSHOC allow us to operate at the heart of European research e-infrastructure initiatives, collaborating on data standards, new ontologies, interoperability, and policies for preservation and access. Whatever happens as as result of Brexit, our engagement in this activity makes the ADS well placed to take advantage of future investment in infrastructure at UK level. We have also developed new collaborations in Argentina and Japan, and strengthened our links with the United States. Closer to home, our work on projects such as DEBS and WIST has continued, and will lead to important national research resources, being hosted by the ADS. Our major investment of developer effort, however, has gone into HERALD, including enhancements to the ADS Library, but primarily working towards the release of the pre-Beta version of the new OASIS online recording for archaeological events. Meanwhile, our involvement in the development of a Selection Toolkit for Archaeological Archives will encourage the development of effective selection strategies and our advisory role to the DigDigital Project will help set standards for digital archiving across the whole of the field profession, ensuring that data preservation is fit for data re-use.
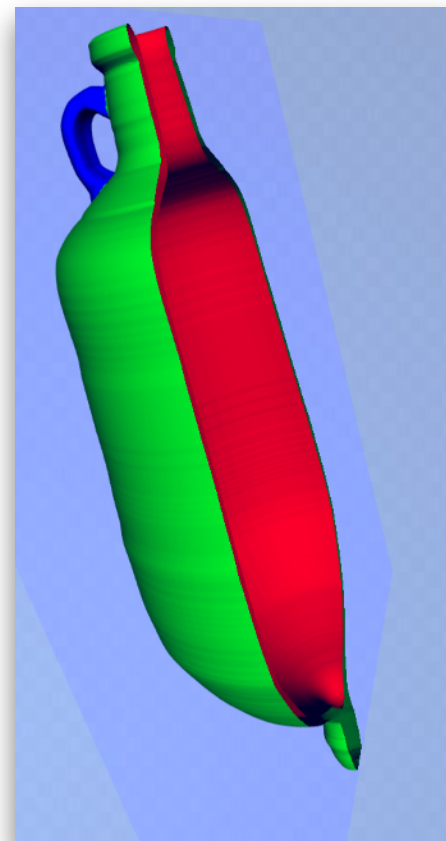
3D model of Africana 2B Tripolitanian DR450 for the ArchAIDE archive.
https://doi.org/10.5284/1050896.
© ArchAIDE consortium.

The EU H2020 funded ArchAIDE project, was brought to a successful conclusion in May 2019, with the launch of the ArchAIDE app at a conference in Pisa. ArchAIDE has been a three-year project, coordinated by the University of Pisa, which began in June 2016. Its aim was to support the classification and interpretation work of archaeologists, with innovative computer-based tools for semi-automatic description and matching of archaeological ceramics. The primary output of ArchAIDE was the creation of an app to support archaeologists in recognising and classifying sherds during excavation and post-excavation analysis. The app used decoration-based, and shape-based deep learning algorithms to recognise pottery types using the same diagnostic characteristics used by archaeologists. The ArchAIDE app was successfully implemented and is now available for download on Android and iOS mobile devices.

As the UK partner the ADS led on the design of the databases to hold both the comparative collection, and the user data. As several European languages were represented in the project, the ADS re-used the technologies developed by the University of South Wales for the ARIADNE project to create multilingual pottery vocabularies. These were mapped to the Getty Art & Architecture Thesaurus and rendered as Linked Open Data.

The ADS also archived key components of the project for re-use, including the multilingual pottery vocabularies and the 2D and 3D digital models derived from one of the most popular ADS archives: Roman Amphorae: a digital resource. Users can now access the models for download and/or 3D printing either directly from the new ArchAIDE archive, or via the specific pottery type within the original Roman Amphorae archive, creating an exemplar of re-use.

ArchAIDE was able to use the ADS Roman amphorae archive to both create part of the comparative collection for the ArchAIDE app, and the virtual training data necessary for the development of the shape-based image recognition training data; a use which was never imagined when the archive was deposited in 2005. In turn, the 2D and 3D models used to create the training data now enrich the original archive.

Email from David Williams, on learning how the ArchAIDE project has used the *Roman amphorae: a digital resource* archive he deposited with ADS in 2005: "I am truly amazed with all the additional things that you have been able to do with the **amphora website.** I never imagined that it would give birth to so many different "offspring".

![ARIADNEplus logo]

After a two year hiatus, the ARIADNE project resumed active development in January 2019 under the updated name 'ARIANDEplus'. ARIADNE was a four-year EU FP7 Infrastructures funded project, coordinated by PIN at the University of Florence and the ADS (Deputy Coordinators), and was made up of 23 partners across 16 European countries.

ARIADNEplus is a new programme of work, funded by the European Commission under Horizon2020. It builds upon the success of ARIADNE, extending its scope and improving the technology to embed the ARIADNE infrastructure in the European Open Science Cloud (EOSC). Whereas ARIADNE comprised 23 partners across 16 European countries, ARIADNEplus has expanded to 41 partners across 24 European countries, along with three international partners in Japan, the United States and Argentina. The disciplinary scope of ARIADNE has also been extended, with an emphasis on archaeological science, palaeo-anthropology, and buildings archaeology. It is again coordinated by PIN at the

University of Florence, with ADS as Deputy Coordinators. ADS is leading three strands and will play a key role across the project. Our work will focus particularly on bridging the work of the technical partners who will deliver the enhanced ARIADNE portal and Linked Open Data Cloud, with that of the archaeological data providers, assisting them to map their data to the ARIADNE ontology. We will also support data stewardship, and provide internships for those wishing to learn more about the work of ADS, via the Transnational Access Scheme.

In March 2019, the COST Action SEADDA was launched, with ADS taking the leadership role and with Julian Richards as Chair of the Action. SEADDA is a four-year networking project funded by the COST Association, and is meant to help build an international community of archaeologists and digital specialists, working together to secure the future of archaeological data across Europe and beyond. It is comprised of four working groups focussed on understanding the current state-of-the-art, and developing common understandings around international best practice for the preservation, dissemination and re-use of archaeological data. It also seeks to establish the field as a priority area for research.

SEADDA has over 100 members representing 31 COST countries and four International Partner Countries. SEADDA activities will include Short Term Scientific Missions, Working Group meetings, Exploratory Workshops and other networking and dissemination opportunities. The working groups met for the first time in June in Zagreb, hosted by the National Archaeological Museum, and planned their work for the first year of the Action. The Action Management Committee reconvenes at the annual conference European Archaeological Association in Bern in September 2019.

Above: SEADDA project team on a tour of the National Archaeological Museum. © University of York.

Top Left: Franco Niccolucci coordinator of ARIANDEplus at the kick off project meeting. © ARIADNEplus.

Bottom Left: ARIADNEplus project team. © ARIADNEplus.

E-RIHS brochure.
© ERIHS EU

E-RIHS
EUROPEAN RESEARCH INFRASTRUCTURE FOR HERITAGE SCIENCE

The ADS is now in its final year of participation in the three-year preparatory phase of E-RIHS. The E-RIHS partners are working to support research on heritage science interpretation, preservation, documentation and management through the creation of a European infrastructure. E-RIHS will comprise of headquarters based in Italy and national nodes throughout Europe, along with fixed and mobile heritage science facilities, physically accessible collections and archives, and virtually accessible heritage data.

The ADS is one of several partners within the UK node, and has created a deliverable on the financial aspects of data policy and management, and will submit a further deliverable on the management of archaeological science data at the end of 2019. The ADS has also been an active partner within the UK national hub.

The ADS is also currently participating in SSHOC - the Social Sciences and Humanities Open Cloud - another EU-funded Research Infrastructure project.

SSHOC brings together the existing research e-infrastructures: CESSDA, CLARIN, and DARIAH, as well as E-RIHS, to work together to help research data from the social sciences and humanities converge towards a coherent set of services provided by the European Open Science Cloud (EOSC). The EOSC portal aims to gather data, tools and training resources made accessible through a simplified methodology for the benefit of the wider community.

Within SSHOC the ADS is working with the National Gallery to investigate issues relating to providing Open Data from heritage science and archaeology. Different European countries have varying approaches to open data access, reflecting different legal protection systems, sensitivities surrounding site location, and different attitudes to data collection (e.g. metal-detecting) by members of the public (Citizen Science). The ADS is one of only two archaeological partners in SSHOC - the other being the German Archaeological Institute. The ADS will draw upon our experience in the UK and in a range of European projects to provide perspectives from a specific user community.

WORKED IN STONE

Worked in Stone (WIST) is a 3-year AHRC-funded project led by Durham University which aims to complete publication of the Corpus of Anglo-Saxon Stone Sculpture. The role of the ADS is to make the entire data set freely available to all, comprising detailed entries on over 4000 items from c. 1300 sites accompanied by over 9000 high quality images. The searchable database will include provision for map-based display, and the catalogue entries will also be aggregated in ArchSearch, to facilitate cross-searching with other monuments. Work was delayed whilst the geological metadata terms were finalised but ADS has now received data for the first three volumes, which will provide test data for the database and interface design. The project is now expected to conclude in February 2022.

Top: Buckland Newton 1A Plate: 52 from the WIST archive.
Bottom: Rothwell 1A Plate: 680 from the WIST archive.
© Corpus of Anglo-Saxon Stone Sculpture, University of Durham.

A Selection Toolkit for Archaeological Archives

This year the ADS has been part of a cross-sector working party, funded by Historic England, that has developed a Selection Toolkit to aid in the creation of project specific selection strategies. This project is one of several related projects being undertaken across the sector intended to inform the debate around the creation and collection of archaeological archives, both physical and digital, and address the issues raised in the 21st Century Challenges report and the Mendoza Review.

The Toolkit that has been developed is composed of a selection strategy template and checklist, case study examples, videos, and learning resources which are hosted on the CIfA website. Across the summer the ADS has been a key participant in the training of over 140 heritage professionals from Museums, Local and National authorities and commercial enterprises as part of a series of workshops about the Toolkit. The workshops have been extremely popular and well received by the sector and have also lead to the development of new collaborative relationships for the ADS.

Going forward the implementation of selection strategies for, digital and physical archives, will now be part of the CIfA Standards and guidance on archaeological archiving. The implementation of project specific selection strategies will be assessed during Registered Organisation applications and inspections.


Images from the Toolkit Workshops. © University of York.

Discovering England's Burial Spaces

The DEBS project is working to develop new resources for the community recording of burial spaces. The project responds to a heritage management issue whereby memorials are increasingly threatened by weathering, erosion and the need to make safe and repurpose burial spaces. It is important to document monuments before they are lost, but existing approaches to burial space recording are fragmented and diverse. DEBS aims to standardise the process, leading to more interrogable results. The ADS is at the forefront of this, working with community groups to co-design and pilot a new national database for burial space research, and developing a new OASIS+ module for reporting.

Over the past year, the DEBS team has made significant progress on the project. In particular, an important milestone was passed when, building on feedback from community groups, we finalised the structure of the pilot database. As part of the project, Harold Mytum (University of Liverpool) has revised his 2000 Council for British Archaeology guidance on burial space research, and the database has been designed with his recording system in mind. In addition, software developers at the Digital Creativity Labs (University of York) have been working on a new mobile app, which will help guide people through parts of the recording process.

We are now entering the final few months of the project. In that time, the app will be completed, the database will gain a new search interface, and we will also develop a new desk based data entry system that will help community groups prepare their survey data for archiving. Much of the autumn will be devoted to testing these new resources with our partners and community groups, and reporting on the findings. Looking to the future, we will be bidding for money that will fund a further phase of the project. This will focus on a full launch of the new resources and database, using exciting examples of research to encourage uptake across the country.
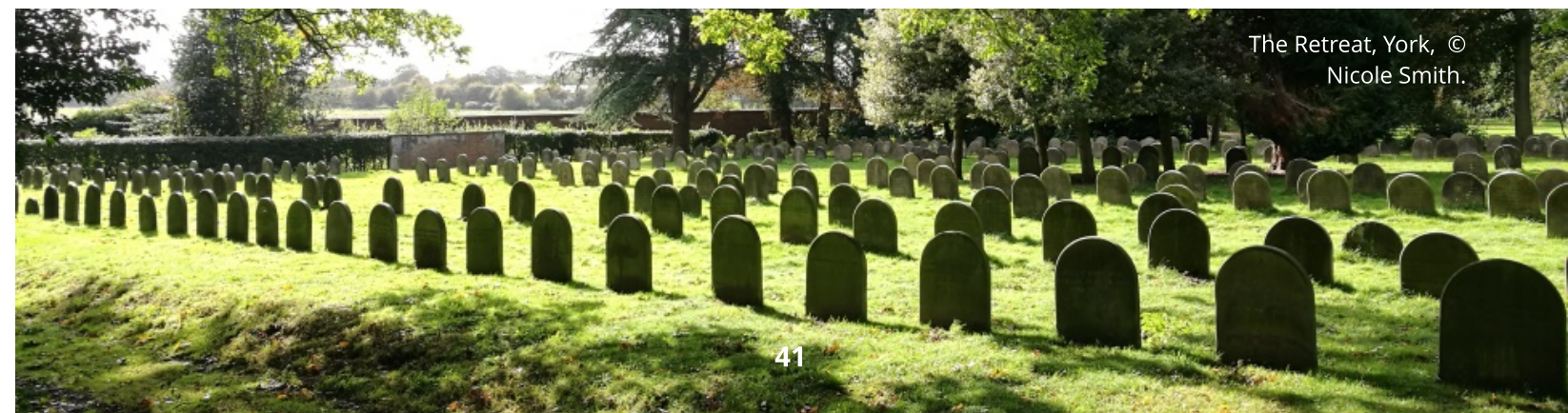
The Retreat, York, © Nicole Smith.

SERVICE MANAGEMENT

10 To maintain effective **service management** and administration in pursuit of all the above aims, and to maintain financial sustainability.

FINANCE REVIEW

During the financial year 1 August 2018 - 31 July 2019 the ADS and Internet Archaeology had total income of £553,875 and total expenditure of £641,709. Although this is a substantial in-year deficit, approximately half will be covered by delayed payments on projects. It also reflects the hiatus in funding for ARIADNE, now resumed as ARIADNEplus, as well as a slow growth in Internet Archaeology income from Author Processing Charges (APCs). We have also reduced the deficit carried forward to £60,000 by transferring £30,000 from our reserves, so that the balance held in the ADS reserves account now stands at


Gold pommel from the Staffordshire Hoard archive. © Barbican Research Associates.

£170,711. Whilst 2018-19 has therefore been a difficult financial year, there are reasons for optimism in the medium to longer term, based on the upturn in commercial archaeology and the extent to which ADS deposit is now being mandated by curators.

Income by Type
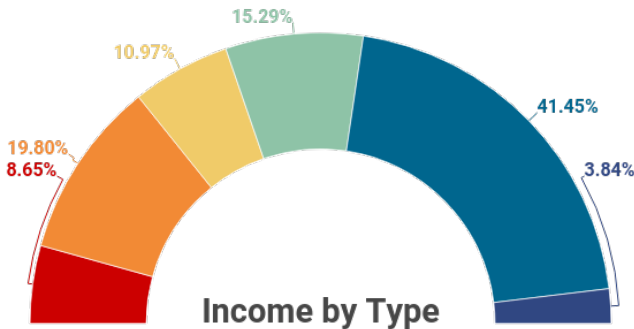
- Research Councils
- Historic England
- Historic Environment Scotland
- Commercial Archaeology
- European Funding
- Internet Archaeology

15.29% 10.97% 19.80% 8.65% 41.45% 3.84%

Expenditure by Type
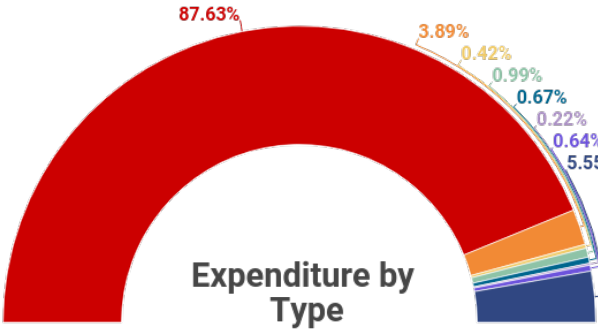
- Staffing
- Travel
- Printing, Postage, & Publicity
- Publicity (EU Projects)
- Events & Training
- Office Supplies
- Professional Fees
- Estates and Indirect

87.63% 3.89% 0.42% 0.99% 0.67% 0.22% 0.64% 5.55%

SYSTEMS MANAGEMENT

Efficient systems management of the 31 Virtual Machines, and numerous applications that we maintain is integral to the smooth running and continuity of the ADS and *Internet Archaeology.*

During the last year, our eight remaining Ubuntu 14.04 virtual machines were migrated to Ubuntu 16.04, or Ubuntu 18.04 where possible. These migrations were essential because support was dropped for Ubuntu 14.04 in April 2019. Support for Ubuntu 16.04 will finish in April 2021, before which, all our remaining Ubuntu 16.04 machines will be migrated to Ubuntu 18.04. Also all our Glassfish web servers have been updated to Glassfish 4.1 and have been installed using a non 'root' user for improved security, and all of our VMs now use OpenJDK Java, following the introduction of software charges for the use of Oracle Java.

In other developments, all our VMs can now be accessed by ADS staff using their University of York user credentials, which means additional usernames/passwords do not have to be allocated improving efficiency and security.

There were no security incidents in the last year.

31 Virtual Machines managed by ADS.
★★★★★

8 VM migrations from Ubuntu 14.04 to Ubuntu 16.04 or Ubuntu 18.04 carried out in 2018-19.
★★★★★

2 live databases.
★★★★★

2 development databases.
★★★★★

0 major events in 2018-19.

STAFFING

Over the course of 2018-19 we have been able to implement the recommendations of the ADS Business Process Review. Dr Tim Evans is now ADS Deputy Director, with responsibility for the day-to-day operational management of ADS, whilst Dr Katie Green is Collections Development Manager and Dr Ray Moore is Archives Manager. We have also been able to appoint two Trainee Digital Archivists: Olivia Foster and Teagan Zoldoske.

From the Museum....The ADS Director, Julian Richards, and Administrator, Donna Page, with Minerva2, the 8Gb server which was used as the backbone of ADS systems from 2006-2013. © University of York.