ARIADNE

D5.1: Report on Transnational access activities and training activities

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Table of Contents

Executive Summary

ARIADNE is a research infrastructure funded by the European Commission's FP7 programme to bring together existing archaeological research data infrastructures. The project offered a range of opportunities for transnational access to the infrastructure and training to archaeologists throughout the project.

This report is a deliverable (D5.1 *Report on transnational access and training activities)* of the ARIADNE project ("Advanced Research Infrastructure for Archaeological Dataset Networking in Europe") funded under the European Community's Seventh Framework Programme. It presents the results of the work carried out in work package 5 *Transnational access co-ordination* and *Training*.

Section two describes the activities carried out under Task 5.1 whose focus was promoting and coordinating opportunities for transnational access (TNA) by researchers to the ARIADNE infrastructure. The opportunities included both online access to data services and physical access visits to leading research laboratories at PIN, ATHENA RC and CNR.

The ARIADNE infrastructure also promoted four online services managed by the Archaeology Data Service (ARCHSEARCH), the International Association for Classical Archaeology (FASTI Online) and the Deutsches Archäologisches Institut (ARACHNE and ZENON), and following its launch, the online services developed by ARIADNE itself (ARIADNE portal, Visual Media Service and Landscape services). A range of dissemination activities were carried out to promote these services; the web statistics reveal the impact of ARIADNE's participation in conferences, events and training workshops on online access.

ARIADNE offered opportunities to researchers to apply for physical transnational access to the research laboratories at PIN, the Athena Research Centre and ISTI-CNR. Calls for applications for access visits were advertised in 2014, 2015 and 2016 offering opportunities for group visits (summer school format) and individual access visits. The TNA focussed on on: Legacy data and dataset design, Integration and interoperability of legacy datasets, 3D documentation of fieldwork and artefacts and Scientific datasets.

Between 2014 and 2016 ARIADNE received 136 applications from researchers wishing to participate in physical TNA programmes. The selection committee was comprised of experts from both outside the project consortium and the TNA providers. Following review by the selection committee, 97 travel bursaries were awarded to researchers. A small number of researchers also participated in the TNA without receiving bursaries. Researchers from institutions in 23 countries participated in physical TNA; 21 EU member states plus Serbia and Argentina were represented. Thirty different nationalities were represented amongst the ninety researchers who participated in ARIADNE; 20 EU member states plus American, Argentinian, Australian, Brazilian, Canadian, Chinese, Iceland, Norway, Serbia and Turkey. 50% of the researchers who participated were female. 27% were aged under thirty at the time of the training. The majority of participants were postgraduate students (52%) and postdoctoral researchers (20%); 15% were expert researchers (professors and other senior researchers), 12% were technicians and 2% were undergraduate students.

The participants brought projects and research challenges to work on during their physical TNA access visits. These included the use of specific digital methods (such as spatial analysis, 3D models, GIS and digital maps) and challenges relating to the lifecycle of archaeological data (data capture, dataset design and data modelling, semantics and interoperability of legacy datasets, data management, digital preservation, data access, etc.). The feedback given by participants following their TNA visits made it clear that they valued the opportunity to learn, to network and collaborate with other researchers, and receiving practical help and advice on their research projects. The hands-on experience (working with tools and with data) was particularly valued. The feedback was in general positive, the main suggestions for improvement related to disseminating the opportunities more widely, extending the programme to provide more TNA (summer schools and training workshops) throughout the year and continuing the programme after the end of project funding in 2017.

Section three describes the activities carried out under Task 5.2 whose focus was the organisation of two training events highlighting the online services during the first year of the project. This was meant to be followed by four training events per year for the remaining three years, focussed on promoting the physical TNA opportunities discussed in section two.

Alongside preparation for the physical TNA opportunities set to begin in the second year of the project, two TNA events were organised to encourage use of the open access resources held by the ARIANDE online TNA providers: UoY ADS, DAI and AIAC. The two first-year workshops were held at EAA in Pilsen, Czech Republic and the second at CAA in Paris, France. The four, year-two TNA training events meant to advertise the physical TNA opportunities were held at EVA London, UK, EAA Istanbul, Turkey, MEAT in Paestum, Italy and CAA in Siena, Italy. At the end of year-two, this approach was assessed and deemed to be (largely) ineffective however, and alongside greater understanding as to which types of training activities were useful, the format was changed in favour of events meeting specific needs, or formats more likely to reach greater numbers of users and create stronger dialogue around the project.

Years three and four were much more successful, and included expert fora taking place in Athens, Greece both years, a focussed workshop on 3DHOP at Digital Heritage in Granada, Spain, bespoke data management workshops hosted for a national audience by ARIADNE partners in Vienna, Austria and Ljubljana, Slovenia, a sponsored session at CAA, Oslo, Norway, a half-day workshop at The European Summer University in Digital Humanities, Leipzig, Germany and finally a sponsored session at EAA, Vilnius, Lithuania. The TNA training events fostered interest and dialogue around the ARIADNE project throughout its four years, allowing the partners to garner feedback from the domain and work in a way that was transparent and inclusive. It also brought the domain together to address ongoing issues which informed the sustainability planning for the infrastructure, and were a key aspect of the project as a whole.

In conclusion, the TNA and training activities delivered by ARIADNE fulfilled their objectives of engaging participants with the research infrastructure and delivering on important learning outcomes with regards to the creation, management, access and preservation of archaeological datasets.

1 Introduction

This report is a deliverable (D5.1 *Report on transnational access and training activities)* of the ARIADNE project ("Advanced Research Infrastructure for Archaeological Dataset Networking in Europe") funded under the European Community's Seventh Framework Programme. It presents the results of the work carried out in work package 5 *Transnational access co-ordination* and *Training*.

The focus of Task 5.1 was promoting and coordinating opportunities for transnational access (TNA) by researchers to the ARIADNE infrastructure. The opportunities included both online access to data services (reported in detail in D5.2 *Initial report on the assessment of online access* and D5.3 *Final report on the assessment of online access)* and physical access visits to leading research laboratories at PIN, ATHENA RC and CNR. The programme was developed by the ARIADNE TNA providers and then advertised to researchers through regular calls for applications. A panel of experts was established to review applications and to recommend users to be offered ARIADNE TNA bursaries. The panel comprised of international experts from outside the projects and internal experts nominated by the TNA providers. Selection was based on merit, with priority being given to young researchers and those working in countries where similar facilities are not currently available. After discussion, TNA providers CNR and ATHENA RC chose to offer week-long group visits to enable individual researchers from different facilities to come together and exchange experiences as they worked on their projects (a 'summer school' format). PIN chose to offer individual TNA visits to offer researchers/research teams maximum flexibility over the timing of their visits. The access provided is reported in detail in D6.2, D7.1, D8.1, D9.1 and D10.1, and is summarised in this report.

The focus of Task 5.2 was to create training opportunities for researchers to understand the project and infrastructure. This included the creation of appropriate support materials for using the project portal (reported in D12.5) as well as training workshops and tutorials. This training was organised to take place alongside existing conferences and events, in order to optimise attendance and lower costs. Two training events were organised in the first year to promote the project and use of the online TNA services offered by ARIADNE partners UoY ADS, DAI and AIAC. After the first year, four training events were to be organised each year in order to promote the physical TNA opportunities. The physical TNA providers listed above were meant to support this activity. This approach was deemed problematic however, and alongside greater understanding as to which types of training activities were useful, this format was changed in favour of events meeting specific needs, or formats more likely to reach greater numbers of users and create stronger dialogue around the project.

As WP5 is highly interrelated with other work packages, and as the results of certain points within the tasks for the reported in other deliverables, the focus of this deliverable is on the selection process for the physical TNA set out in Task 5.1 and the training events set out in Task 5.2.

2 Transnational access co-ordination

The focus of Task 5.1 was promoting and coordinating opportunities for transnational access (TNA) by researchers to the ARIADNE infrastructure. The opportunities included both online access to data services and physical access visits to leading research laboratories at PIN, ATHENA RC and CNR.

The programme was developed by the ARIADNE TNA providers and then advertised to researchers through regular calls for applications. A panel of experts was established to review applications and to recommend users to be offered ARIADNE TNA bursaries. The panel comprised of international experts from outside the projects and internal experts nominated by the TNA providers. Selection was based on merit, with priority being given to young researchers and those working in countries where similar facilities are not currently available. After discussion, TNA providers CNR and ATHENA RC chose to offer week-long group visits to enable individual researchers from different facilities to come together and exchange experiences as they worked on their projects (a 'summer school' format). PIN chose to offer individual TNA visits to offer researchers/research teams maximum flexibility over the timing of their visits. The access provided is reported in detail in D6.2, D7.1, D8.1 and D10.1, and is summarised in this report.

2.1 Online access

The ARIADNE Infrastructure promoted four online services managed by three partners from the first year of the project:

1. The **Archaeology Data Service** (ADS) is based in the UK and provides online access to federated queries for archaeological data from a variety of data providers via ARCHSEARCH, and direct access to archaeological datasets through the ARCHIVES sections of the ADS website. The ADS also provides extensive resources for working with archaeological data via its Guides to Good Practice, and access to over 30,000 unpublished archaeological reports from its Grey Literature Library.
2. The **International Association for Classical Archaeology** (AIAC) based in Rome, provides FastiOnline, an online database of archaeological excavations undertaken across the Classical World.
3. The **Deutsches Archäologisches Institut** (DAI), which with the Institute of Classical Archaeology in Cologne provides:
    a. ARACHNE, which is a free object database of more than one million images of finds, architecture and excavations with meta information as well as digitised historical literature.
    b. ZENON is the basic online card index of all institutions of DAI, providing information about all books available in the DAI libraries worldwide and access to several digitized and digital monographs and journals.

In addition, following their launch, ARIADNE has promoted its own own online services:

1. The ARIADNE portal: http://portal.ariadne-infrastructure.eu, which brings together archaeological datasets from ARIADNE partners.
2. The Visual Media services: http://visual.ariadne-infrastructure.eu, which provides tools for the management of visual media.
3. The Landscape services: http://landscape.ariadne-infrastructure.eu, which provides tools for the processing, management and publication of terrain datasets.

2.1.1 Promoting the online services

The online services have been promoted by ARIADNE via:

- Content on the ARIADNE project website including dedicated pages providing links to the online services offered by ARIADNE partners, the ARIADNE portal and ARIADNE services
- Regular news items disseminated via the ARIADNE project website, newsletter and the social media.
- Training events to promote the services (see section 3 below).
- Presentations and demonstrations at leading conferences including the Computer Applications in Archaeology Conference, the annual meetings of the European Association of Archaeologists, the Cultural Heritage and New Technologies conference, etc.
- Tweeting about searches of the day, newly published content, etc.

Analysis of the web statistics (reported in D5.2 and D5.3) shows the impact of the promotional activities on access to the various online services.

2.2 Physical access

ARIADNE offered opportunities to researchers to apply for physical access to visit one of the ARIADNE TNA providers from summer 2014 to winter 2016. The TNA focussed on on:

- Legacy data and dataset design
- Integration and interoperability of legacy datasets
- 3D documentation of fieldwork and artefacts.
- Scientific datasets

Physical access was offered by:

PIN – the Prato branch of the University of Florence is also a research agency operating in many fields. Since 2001 it has developed significant expertise in the field of archaeological applications and has advised institutions in Italy and abroad on the recovery of legacy data and conversion to updated data formats, inclusion in data portals, and the creation of archaeological datasets.

ISTI-CNR Networked Multimedia Information Lab (NeMIS) - is part of the institute of the Italian National Research Centre devoted to ICT research and based in Pisa. NeMIS lab develops

technologies for modelling access and handling of information, digital library services and services for information retrieval. MeMIScurrently offers services within formal education or education projects and digital library activities within the framework of Europeana related projects.

ISTI-CNR Visual Computing Lab (VCLab) - **-** is part of the institute of the Italian National Research Centre devoted to ICT research and based in Pisa. VCLab has a long track record in the use of 3D graphics for Cultural Heritage applications, with important collaborations with CH institutions at national and international level (museums, restoration labs, governing bodies).

DCU – the Digital Curation unit of the IMIS Institute of the Athena Research Centre in Athens is active in the field of digital curation. The Unit has expertise in the design of archaeological datasets and thesauri, conversion of legacy datasets, definition of metadata standards, international metadata standards, metadata mapping and in the use of OWL, SKOS and other standard languages.

CETI – the Cultural and Educational Technology Institute of the Athena Research Centre in Xanthi is a multi-disciplinary research organisation. Its Archaeometry Department focuses on the application of advance analytical physicochemical methods for the extraction of information from raw materials, archaeological artefacts, works of art, monuments and sites. The department's state-of-the-art laboratory covers archaeological dating and authentication, X-ray and radiation applications in cuture, chemical analysis (organic and inorganic) and electron microscopy. The Cultural Heritage Department has developed significant expertise in the study of ceramics, the scientific documentation of artefacts and interpretation of archaeological data.

According to the project work plan, physical access was due to commence in 2015. However, PIN, ISTI-CNR NeMIS and ISTI-CNR VCLab chose to commence offering opportunities for access visits in 2014, offering access again in 2015 and 2016. Athena RC DCU and CETI offered opportunities for access visits in 2015 and 2016.

2.2.1 Promoting the calls for applications

Calls inviting researchers to apply for physical access to the ARIADNE infrastructure were advertised regularly via:

- The ARIADNE project website
- News items on the project website and those of partners,
- The project newsletter and those of partners
- Social media
- Training events to promote opportunities for physical access (see section 3 below)
- Distribution of flyers at conferences and events

The first call for applications was opened in December 2013 with an initial deadline of March 2014, the call was then re-opened with a deadline of June 2014. In the following years calls were opened with rolling deadlines with the aim of maximising the opportunities for promoting the calls and offering flexibility to researchers.

A section was established on the project website to provide information about opportunities for transanational access, the application and selection procedure, and the programmes offered by the TNA providers (http://www.ariadne-infrastructure.eu/Transnational-Access).

The 2014 call for applications is included below for information.

The 2014 call for applications

As part of its Transnational Access (TNA) activities, the ARIADNE project is offering researchers the opportunity to apply to participate in summer schools to carry forwards their own research. Researchers are invited to apply to participate in Summer Schools hosted by PIN and Consiglio Nazionale Delle Ricerche. Individual work will form part of the summer school programme through case studies or research projects to be proposed by participants in advance and developed by them under expert supervision. Each summer school is one week in duration, Monday to Friday.

We welcome applications from individuals with a scientific interest and ability to benefit from training in archaeological research data management.

The fee for students at the Summer Schools is 500 euros. **Sponsorship** is available for participation. The ARIADNE TNA sponsorships include a tuition fee waiver for the Summer Schools plus a bursary, the latter worth up to 800 euros per participant, to cover the cost of travel and accommodation. These will be awarded on a competitive basis, according to the procedure described in the application pack, on based upon the quality of the applicant, their proposed project, and their personal statement.

ARIADNE Summer Schools are open to all researchers according to the advertised tuition fee. A maximum of 20 participants is planned for each summer school with 5-10 TNA students receiving funding from ARIADNE for each course.

2014 access is offered at:

1. Summer school: Mapping existing datasets to CIDOC-CRM

Organizer: PIN; Venue: Prato; Period: 26-30 May 2014
Content: the school goal is to enable researchers and professionals to map their datasets to the CIDOC CRM standard, an exercise required to integrate them in a wider framework such as the ARIADNE one. The school will provide a summary background of CIDOC CRM (2-3 days) showing some case studies and some frequently used templates (e.g. for chronology, authorship, locations, etc.). The remaining days will be dedicated to developing the mappings of students' case studies, which they will carry out under the supervision of specialists.
Pre-requisites: general knowledge of CIDOC CRM.

2. Summer school: 2D/3D documentation for archaeology

Organizer: ISTI-CNR; Venue: Pisa; Period: 23-27 June 2014

Content: The school aims at providing training and hands-on experience on the tools for producing and managing 2D and 3D documentation for archaeological purposes, both for objects and for monuments/sites, including the related visualization tools. The school will provide an introduction to the technologies and tools in the first 2-3 days and a hands-on activity in the remaining ones, organizing the students in small groups. It is expected that each student will bring her/his own research project, so that practice can be made on case studies of direct interest for the students. **Pre-requisites**: Basic knowledge on the digitization process (3D/2D) and on sampled data processing.

3. Summer school: Design of archaeological datasets

Organizer: ISTI-CNR; Venue: Pisa; Period: 14-18 July
Content: the course aims at providing students with an introduction to metadata design for archaeological datasets, with perspective content provided as case studies by the students. The school will consist of some introductive lectures followed by hands-on seminars in which the design is developed by the students with the supervision of ISTI experts and then collectively discussed.
Pre-requisites: Basic knowledge of mark-up languages.

2.2.2 Selection process and evaluation criteria

Researchers applied for TNA access by completing the application form and returning it to ARIADNE by email. Researchers were asked to describe their background in archaeology, the proposed project and its expected results, highlighting the impact to archaeological research.

After the proposals are submitted, ARIADNE verified compliance with the eligibility criteria (see below) and then sent all applications to the User Selection Panel for evaluation.

User Selection panel

The members of the panel were all experts in archaeological research data and included experts who are independent of the ARIADNE infrastructure. The members included:

- Peter Biehl, SUNY Buffalo, and European Association of Archaeologists (2014-15)
- Gary Lock, University of Oxford and President, Computer Applications in Archaeology (2014-15)
- Laurent Romary, INRIA & HUB-IDSL and DARIAH (2014-15)
- Felipe Criado-Boado, CSIC and EAA (2016)
- Philip Verhagen, V U Amsterdam and CAA (2016)
- Jeremy Huggett, University of Glasgow (2016)
- Franco Niccolucci, PIN, Project Coordinator
- Julian Richards, ADS, Deputy Project Coordinator
- Achille Felicetti, PIN
- Nestor Tsirliganis, Athena Research Centre
- Carlo Meghini, CNR

The selection panel was responsible for:

- Assessing proposals for transnational access received in response to open calls based on the selection criteria:
    - Quality of the applicant
    - Scientific merit of the case study or individual research project proposed by the applicant
    - Potential to benefit from the training on offer
- Applying the principles of transparency, fairness and impartiality to the selection process
- Recommending a short-list of users who should benefit from access
- Recommending a short-list of users for a TNA scholarship from the project

Selection and sponsorship were primarily based on the quality of the applicant, the scientific merit of the case study or individual research project proposed and the potential of the applicant to benefit from the training on offer. Applicants were suggested to aim to increase their research output (qualitatively and quantitatively), optimize the use of the ARIADNE infrastructure, develop local expertise and ongoing research activities and facilities, and foster lasting international cooperation. Researchers were asked to bring projects or case studies with focussed goals that are technically feasible within the framework of the TNA and the host facility.

Priority was given to:

- Users who have not previously used the ARIADNE resources,
- Young researchers
- Researchers working in countries where no such research facilities exist,

Eligibility criteria

To be eligible for sponsorship from ARIADNE for TNA, researchers needed to comply with the following criteria:

- Work or be registered as a student in an institution in one of the EU Member States and Associated States; researchers from institutions in the home country of the school were not eligible to receive an ARIADNE TNA bursary.
- Provide feedback on the access visit or summer school by:
    - Completing ARIADNE's user report and returning it to TNAcontact@ariadne-infrastructure.eu
    - Completing the European Commission's User group questionnaire using the online form.
- Agree to their names being included in a list of ARIADNE TNA users provided to the European Commission and published in various medium, including the Internet.
- Disseminate results obtained as a result of TNA access as widely as possible and provide ARIADNE with the details. Publications should include the following acknowledgement: *[...] The research leading to these results has received funding from the European Commission Seventh Framework Programme under grant agreement FP7-INFRASTRUCTURES-2012-1-313193 (ARIADNE).*

2.2.3 Transnational Access in 2014

Figure 1: Participants at the first design of archaeological datasets TNA, Pisa. Photo: ISTI-CNR

The ARIADNE project advertised a call for researchers to apply to participate in three TNA group access visits (summer school format):

- Mapping existing datasets to the CIDOC CRM; PIN, 26-30 May 2014
- 2D/3D documentation for archaeology, ISTI-CNR, 23-7 June, 2014
- Design of archaeological datasets, IST-CNR 14-18 July, 2014

The call for applications was advertised widely in Europe and internationally and closed on 13th March 2014. The call for applications for the Archaeological datasets was later extended to 16th June 2014

Thirty-five researchers submitted applications to participate in the three summer schools; 34 in the first round of applications (13th March deadline). The applications were reviewed by an international selection panel whose members included:

Peter Biehl, SUNY Buffalo, and European Association of Archaeologists
Gary Lock, University of Oxford and President, Computer Applications in Archaeology
Laurent Romary, INRIA & HUB-IDSL and DARIAH
Franco Niccolucci, PIN, Project Coordinator
Julian Richards, ADS, Deputy Project Coordinator
Achille Felicetti, PIN
Carlo Meghini, CNR
Roberto Scopignio, CNR

Eighteen researchers were selected by the panel and were offered ARIADNE fellowships, two further researchers were offered bursaries but were unable to participate in 2014 owing to other commitments. The users were as follows:

Mapping archaeological datasets to the CIDOC CRM

Name	Institution	Country of Institution	Nationality
Patrick Marko	University of Graz	Austria	Austrian
Roberta Ferrito	University of Reading	Great Britain	Italian
Emmanuelle Morlock	CNRS HiSoMa Laboratory, Lyons	France	Italian

2D/3D documentation for archaeology

Name	Institution	Country of Institution	Nationality
Mercedes Morita	Centro de Investigaciones Opticas and Universidad Nacional de La Plata	Argentina	Argentinian
Andres Uueni	State conservation centre, Kanut	Estonia	Estonian
Laura Stelson	University of Bonn	Germany	German
Erika Cappelletto	Heidelberg University	Germany	Italian
Georgios Ionnakis	Democritus University of Thrace	Greece	Greek
Tom Trienen	Groningen Archaeological Institute	Netherlands	Dutch
Yuan Yuan	Gothenburg University	Sweden	Chinese
Freya Horsfield	University of Birmingham	Great Britain	British
Dries Nollet	Visual Dimension bvba	Belguim	Belgian

Design of Archaeological datasets

Name	Institution	Country	Nationality
Carlotta Capurro	Visual Dimension bvba	Belgium	Italian
Darío Peña Pascual	Universidade Santiago de Compostela	Spain	Spanish
Michelle Pfeiffer	University of Heidleberg	Germany	Belgian

Two researchers were offered bursaries to participate in the CIDOC CRM summer school as a research team. They were unable to participate as the dates of the school coincided with the dates for the defence of one of the researcher's PhD. They went on to participate in 2015.

In addition, places were offered to and accepted by three young researchers from Italian institutions who were not eligible to receive TNA bursaries for school in Italy.

2.2.4 Transnational Access in 2015

As part of its Transnational Access (TNA) activities, the ARIADNE project advertised a call for researchers to apply to participate in summer schools or individual training to carry forwards their own research:

- Mapping existing datasets to the CIDOC CRM; individual training at PIN
- 2D/3D documentation for archaeology, 22-26 June, 2015, CNR-ISTI
- Design of archaeological datasets, 6-10 July, 2015, CNR-ISTI
- Scientific datasets; individual training at Athena-RC, Xanthi
- Design of archaeological datasets, 28 June-3 July, 2015, Athena-RC Athens

There were three calls for applications, which were advertised widely in Europe and internationally; the first call closed on 15th March 2015; the second call closed on 15th June 2015; and the third call on 31st October 2015.

Figure 2: Training in progress – 3D documentationof archaeology objects, Pisa. Photo: ISTI-CNR

10 researchers submitted applications in response to the first call, 19 researchers to the second call and 8 to the third call. The applications were reviewed by an international selection panel whose members included:

Gary Lock, University of Oxford and President, Computer Applications in Archaeology
Laurent Romary, INRIA & HUB-IDSL and DARIAH
Peter Biehl, SUNY Buffalo, and European Association of Archaeologists
Franco Niccolucci, PIN, Project Coordinator
Julian Richards, ADS, Deputy Project Coordinator
Achille Felicetti, PIN
Carlo Meghini and Roberto Scopignio, CNR
Nestor Tsirliganis, Athena RC
Costis Dallas, Athena RC

28 researchers took up offers of fellowships in 2015.

Mapping existing datasets to the CIDOC CRM, PIN

Name	Institution	Country of Inst	Nationality
Anja Masur	OEAW	Austria	German
Christophe Tuffery	INRAP	France	French
Roberta Zeni	King's College London	UK	Italian
Amanda Karn	Uppsala University	Sweden	Swedish
Daniel Löwenborg	Uppsala University	Sweden	Swedish

Mapping scientific datasets to the CIDOC CRM, PIN

Name	Institution	Country of Inst	Nationality
Aybuke Ozturk	Lumière University Lyon 2	France	Turkish

2D/3D documentation for archaeology, 22-26 June, 2015, CNR-ISTI

Name	Institution	Country of Inst	Nationality
Orla-Peach Power	University College Cork	Ireland	Irish
Adela Kovaks	National Museum of Eastern Carpathians	Romania	Romanian
Michael Ann Bevivino	Discovery Programme	Ireland	USA
Martin Duffy	University College Dublin	Ireland	Irish
Rens de Hond	Spatial Information Laboratory, VU University Amsterdam	Netherlands	Dutch
Oscar Martinez Rubi	Netherlands eScience Center	Netherlands	Spanish
Stefan Verhoeven	Netherlands eScience Center	Netherlands	Dutch
Ian Moffat	Institute for Mediterranean Studies	Greece	Australian

Design of archaeological datasets, 6-10 July, 2015, CNR-ISTI

Name	Institution	Country of Inst	Nationality
Christina Roditou	The Cyprus Institute	Cyprus	Cypriot

Name	Institution	Country of Inst	Nationality
Edeltraud Aspock	OEAW	Austria	Austrian
Seta Stuhec	OEAW	Austria	Slovenian
Laura Stelson	University of Bonn	Germany	German
Ana Cláudia Silveira	Universidade Nova de Lisboa	Portugal	Portuguese

Design of archaeological datasets, 28 June-3 July, 2015, Athena-RC Athens

Name	Institution	Country of Inst	Nationality
Erika Cappelletto	Heidelberg University	Germany	Italian
Ingrida Vosyliute	Vilnius University	Lithuania	Lithuanian
Martin Duffy	University College Dublin	Ireland	Irish
Isto Huvela	Abo Akademi University	Finland	Finish
Giovanni Fuso	University of Salento	Italy	Italian
Laura Stelson	University of Bonn	Germany	German

Scientific datasets, Athena-RC, Xanthi

There was limited response to the call for applications for TNA on scientific datasets at Xanthi. A single application was received in response to the first call but was rejected as the research project was peripheral to the TNA on offer. Feedback gathered from the scientific community in ARIADNE workshops identified a lack of awareness among researchers dealing with archaeological science about the importance of storing, curating and preserving the digital outcomes of their work. Researchers focus more on the technologies used and the conclusions and there is limited data re-use (with the notable exception of dendrochronology and C14 dating). There is no common standard for acquiring or storing scientific data but some interest is emerging in use of the CIDOC CRM. These factors, coupled a feeling that researchers were reluctant to travel to a little known venue in Xanthi, lead to PIN offering to deliver TNA in Prato extending its offer to include legacy scientific datasets.

General

Martin Duffy was accepted to participate in three TNA opportunities (CIDOC CRM, 2D/3D documentation and design of archaeological datasets) and accepted places at the 2D/3D school in Pisa and the Datasets school in Athens. Laura Stelson was accepted to participate in two TNA opportunities, the design of archaeological datasets schools in Pisa and Athens. Seta Stuhec was also accepted to participate in two TNA opportunities, the design of archaeological datasets school in Athens and individual training in the CIDOC CRM in Prato.

Two researchers, Daniel Löwenborg and Amanda Karn, were offered bursaries under the 2014 call for applications taking up the offer in autumn 2015.

Six researchers were offered TNA bursaries under the 2015 call but were unable to take up their places in 2014. Three gave personal or health reasons, one was unable to take up his place this year owing to an urgent archaeological investigation of a normally submerged site. Five went on to participate in 2016.

2.2.5 Transnational Access in 2016

Figure 3: Filming the presentations – designing archaeological datasets, Athens. Photo: K. Fernie

The ARIADNE project advertised a call for researchers to apply to participate in summer schools or individual training to carry forwards their own research:

- Mapping existing datasets to the CIDOC CRM; individual training at PIN
- Mapping scientific datasets to the CIDOC CRM; individual training at PIN
- 2D/3D documentation for archaeology, 20-24 June, 2015, CNR-ISTI
- Design of archaeological datasets, 4-8 July, 2016, CNR-ISTI
- Design of archaeological datasets, 12-17 June, 2015, Athena-RC Athens
- Winter school: Legacy datasets and their inclusion in the ARIADNE Registry, 12-16 December, PIN

There were three calls for applications which were advertised widely in Europe and internationally; the first call opened in February and the original May deadline was extended to 4th June 2015; the call was then re-opened for applications for individual training at PIN until October 2016; the third and final call for applications to the "winter school" opened in October and closed at the end of November 2016. 64 researchers submitted applications in response to the calls. The applications were reviewed by an international selection panel whose members included:

Philip Verhagen, V U Amsterdam and CAA
Jeremy Huggett, University of Glasgow

Laurent Romary, INRIA & HUB-IDSL and DARIAH
Felipe Criado-Boado, CSIC and EAA
Franco Niccolucci, PIN, Project Coordinator
Julian Richards, ADS, Deputy Project Coordinator
Achille Felicetti, PIN
Carlo Meghini and Roberto Scopignio, CNR
Nestor Tsirliganis, Athena RC
Costis Dallas, Athena RC

44 researchers took up offers of fellowships in 2016.

Mapping existing datasets to the CIDOC CRM; individual training at PIN

Name	Institution	Country of Inst	Nationality
Valentina Vassallo	The Cyprus Institute	Cyprus	Italian
Anaïs Guillem	University of Ljubljana	Slovenia	French
George Bruseker	ICS Forth	Greece	Dutch
Irene Petschko	OEAW	Austria	Austrian
James Chartrand	Oxford University	UK	Canadian
Edeltraud Aspöck	OEAW	Austria	Austrian
Seta Stuhec	OEAW	Austria	Slovenian
Anaïs Guillem	University of Ljubljana	Slovenia	French
George Bruseker	ICS Forth	Greece	Dutch
Eleni Christaki	National and Kapodistrian University of Athens	Greece	Greek
Peter McKeague	Historic Scotland	UK	British
Carsten Meinertz Risager	University of Aarhus	DK	Danish
Peter Jensen	University of Aarhus	DK	Danish
David Stott	University of Aarhus	DK	British
Johan Finn	Swedish National Data Service	SW	Swedish
Ulf Jakobsson	Swedish National Data Service	SW	Swedish
Avgoustinos Avgousti	Cyprus Institute	CY	Cypriot

Mapping scientific datasets to the CIDOC CRM, PIN

Name	Institution	Country of Inst	Nationality
Giusi Sorrentino	The Cyprus Institute	Cyprus	Italian
Sarah Mallet	Oxford University	UK	French
Laura Perucchetti	Oxford University	UK	Italian

Name	Institution	Country of Inst	Nationality
Ivona Posedi	University of Evora	PT	Croatian
Vanessa Cheel	University of Oxford	UK	British
Peter Bray	University of Oxford	UK	British

2D/3D documentation for archaeology, 20-24 June, 2015, CNR-ISTI

Name	Institution	Country of Inst	Nationality
Jugoslav Pendic	University of Belgrade	Serbia	Serbia
Ricardo Dias	University of Porto - Empatia Arqueologia	Portugal	Portuguese
Miguel Carrero-Pazos	University of Santiago de Compostela	Spain	Spanish
David Herisson	INRAP	France	French
Stephen Kehoe	Discovery Programme	Ireland	Irish
Sophie C. Schmidt	University of Cologne	Germany	German
Myrsini Samaroudi	University of Brighton	UK	Greek
Despina Papacharalambous	Cyprus Institute	CY	Cypriot
Eleni Moustaka	Ionian University	GR	Greek

Design of archaeological datasets, 4-8 July, 2016, CNR-ISTI

Name	Institution	Country of Inst	Nationality
Ken Hanley	Transport infrastructure Ireland	Ireland	Irish
Nikolaos Kapellas	Ionian University	GR	Greek
Ioannis Aliprantis	University of the Aegean	GR	Greek

Design of archaeological datasets, 12-17 June, 2015, Athena-RC Athens

Name	Institution	Country of Inst	Nationality
Rimvydas Laužika	Vilnius University	Lithuania	Lithuania
Ilenia Galluccio	PIN scrl	Italy	Italian
Lorna-Jane Richardson	Umeå University Sweden	SW	British
Priscilla Ferreira Ulguim	Teeside University	UK	Brazilian
Federico Nurra	INRAP	FR	Italian
Amara Thornton	UCL	UK	American
Vladimir Stissi	University of Amsterdam	NL	Italian

Winter school: Legacy datasets and their inclusion in the ARIADNE Registry, 12-16 December, PIN

Name	Institution	Country of Inst	Nationality
Claudia Marinica	University of Cergy-Pontoise	FR	Romanian
Beatrice Markhoff	Universite Francois Rabelais de Tours	R	French
Natalia Botica	Universidade de Minho	PT	Portuguese
Javier Valladolid Aguinaga	CENIEH	ES	Spanish
Maria Jose De Miguel del Barrio	CENIEH	ES	Spanish
M-Victoria Madrid	Instituto Andaluz del Patrimonio Histórico (Andalusian Institute of Historical Heritage), IAPH	ES	Spanish
Pilar Mondejar	Instituto Andaluz del Patrimonio Histórico (Andalusian Institute of Historical Heritage), IAPH	ES	Spanish
Alberto Sanchez	University Research Institute for Iberian Archaeology, University of Jaén	ES	Spanish
Carsten Risager	University of Aarhus	DK	Danish
Peter Jensen	University of Aarhus	DK	Danish
Gisli Paisson	Fornleifastofnun Íslands	IS	Icelandic
Espen Uleberg	University of Oslo	NO	Norwegian
Natasia Vanderperren	PACKED vzw	BE	Belgian
Pieterjan Deckers	Vrije Universiteit Brussel	BE	Belgian

Five researchers (Avgoustinos Avgousti, Jugoslav Pendic, Ulf Jakobsson, Irene Petshoko and Seta Stuhec) were offered bursaries under the 2015 call for applications but took up the offer in 2016.

Four researchers were offered TNA bursaries under the 2016 call but were unable to take up their places for various reasons:

- Clara Annarita Giannitrapani was offered a place at the Athens datasets school, no reason given.
- Leanne McCafferty and Alex Adamson were offered places for the CIDOC TNA, internal administrative reasons prevented them from participating.
- Usama Gad was offered a place for the Pisa datasets school, academic commitments prevented him from participating
- Neven Pintaric was offered a place for the Pisa datasets school, ill health prevented him from attending.

Five researchers participated in the 2016 TNA with their own funding as they were not eligible to receive bursaries:

- Emanuele Taccola, Università di Pisa, 3D
- Mariela Quartararo, Area Archeologica 'Massaciuccoli Romana', 3D

- Pavla Gkantzios Drapelova, National and Kapodistrian University of Athens, Athens datasets
- George Caridakis, University of the Aegian, Athens datasets
- Eleni Gadolou, National Hellenistic Research Foundation, Athens datasets

2.2.6 Evaluation

Between 2014 and 2016 ARIADNE received 136 applications from researchers wishing to participate in physical TNA programmes. In total, 97 travel bursaries were awarded to researchers.

	Applications	Bursaries
2014	35	15
2015	37	29
2016	64	53
	136	97

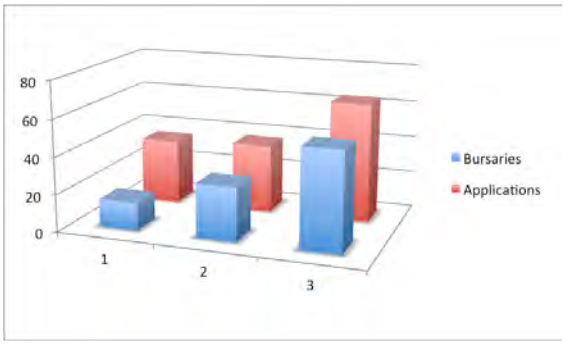

Figure 4: Applications for TNA and bursaries awarded

Some applications were received from researchers who were not eligible to receive TNA bursaries, largely because the applicants were based at an institution in the country of the TNA provider. This was more common in 2014, in the following years this eligibility criterion was made more explicit in the call text.

Geographic spread

Bursaries were awarded to researchers from institutions in 23 countries – 21 EU member states plus Serbia and Argentina. The top countries were: the UK, Austria, France, Germany, Greece, Sweden, Ireland, Cyprus, Denmark, Spain and the Netherlands. Participation by country of home institution is illustrated in the graph below.

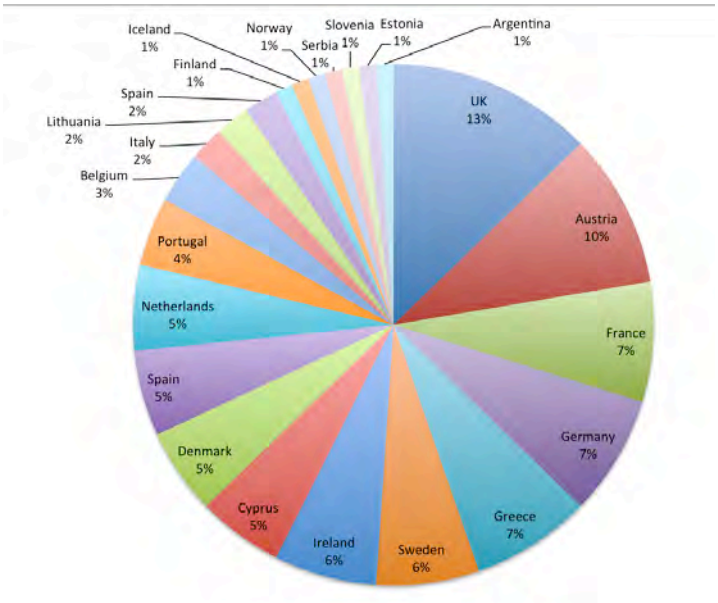

Figure 5: Participation in ARIADNE physical TNA by country of home institution

Thirty different nationalities were represented amongst the 97 researchers who participated in ARIADNE physical TNA – 20 EU member states plus American, Argentinian, Australian, Brazilian, Canadian, Chinese, Iceland, Norway, Serbia and Turkey. The top nationalities were Italian, Spanish, British, Greek, Austrian, French, German, Irish.

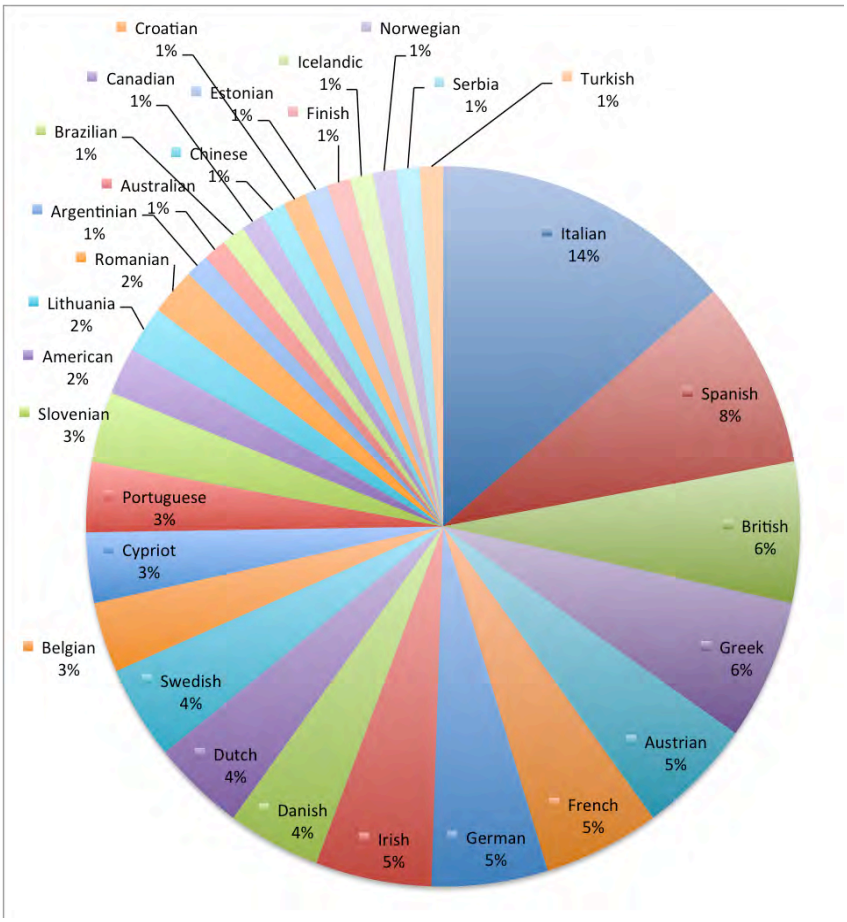

Figure 6: Participation in ARIADNE physical TNA by nationality

Most of the participants in the TNA came from academic institutions (including universities and research centres), six were attached to industry (three from SMEs, two from state conservation bodies and one archaeologist from a state infrastructure body).

In terms of the gender and age profile of the participants, 50% of the participants were male and 50% were female. 27% of the participants were young researchers (under thirty years of age at the time of the training) and 73% were older researchers.

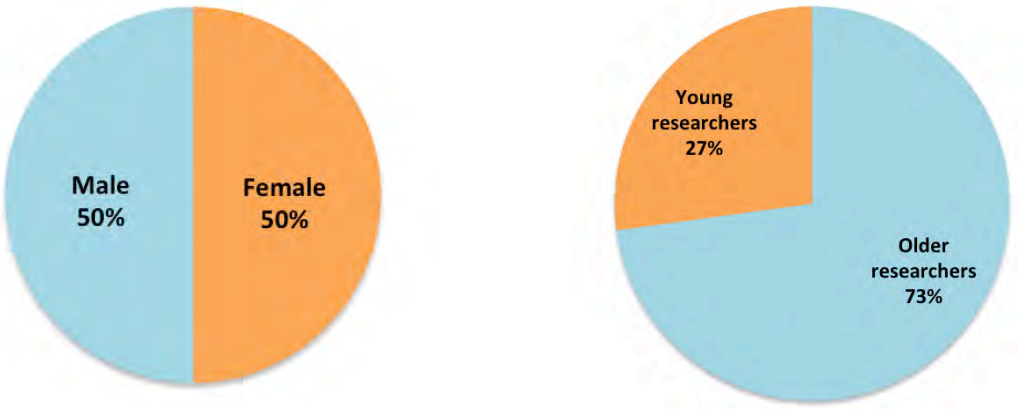

Figure 7: Participation in ARIADNE physical TNA by gender and age profile

The majority of participants were postgraduate students (52% PGR includes both PhD and Masters degree students) and postdoctoral researchers (20% PDOC). 15% were expert researchers (professors and other senior researchers), 12% were technicians and 2% were undergraduate students.

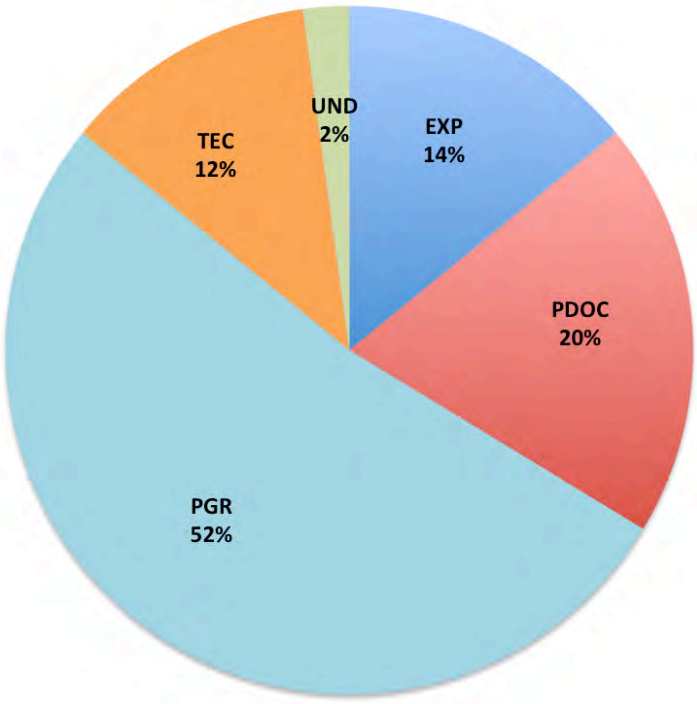

Figure 8: Participation in ARIADNE physical TNA by academic profile

The participants brought projects and research challenges to work on during their physical TNA access visits. These included the use of specific digital methods (such as spatial analysis, 3D models, GIS and digital maps) and challenges relating to the lifecycle of archaeological data (data capture, dataset design and data modelling, semantics and interoperability of legacy datasets, data management, digital preservation, data access, etc.).

2.2.7 User feedback

The feedback given by participants following their TNA visits made it clear that they valued the opportunity to learn, to network and collaborate with other researchers, and receiving practical help and advice on their research projects. The hands-on experience (working with tools and with data) was particularly valued. A few comments made by participants on the user feedback reports collected by ARIADNE follow:

- "*My session with Achille Felicetti at PIN was superb. It could only have been made better if made longer, or if subsequent follow up sessions were possible".*
- *"I deepened my personal knowledge and I enriched my personal skills in order to comprehend better the structure of archaeological datasets".*
- *"I was able to clarify my thoughts on how to proceed with my archives and understand better the design, linking and merging of these. I confirmed the importance of a standardised form such as CIDOC-CRM, and I was able to arrange my database as a register this system".*
- *"I have gained valuable experience and knowledge about technologies/ methods/ software/ relevant advice on 2d/3d documentation of archaeological sites/artefacts*".
- *"During this course I manage to understand laser scanning, its applications and limitations, photogrammetry, RTI and 3D Printing. I had a lot of questions that I wanted to clarify before going home and it was possible".*
- *"Finalization of the RA mapping, study on the problems relating to the use of standards, the drafting of a new project and how to communicate it properly to stakeholders".*

Participants were asked to make suggestions for potential improvements to the TNA on their feedback reports and their comments concerned:

- More publicity to disseminate the TNA opportunities more widely.
- Strengthening the hands-on aspects of the workshops.
- Opportunities for a longer training period and/or repeat access visits to deepen the training.
- The expansion of the programme with requests for more schools throughout the year and the inclusion of additional topics.

The people involved in delivering the TNA for ARIADNE also gave feedback, which highlighted that they valued the experience they gained through collaborating with TNA participants on their research projects and case studies.

3 Training

The focus of Task 5.2 was to create training opportunities for researchers to understand the project and infrastructure. This included the creation of appropriate support materials for using the project portal (reported in D12.5) as well as training workshops and tutorials. Two training events were organised in the first year to promote the project and use of the online TNA services offered by ARIADNE partners UoY ADS, DAI and AIAC. After the first year, four training events were to be organised each year in order to promote the physical TNA opportunities. The physical TNA providers PIN, ATHENA RC and CNR were meant to support this activity. This approach was deemed problematic however, and alongside greater understanding as to which types of training activities were useful, this format was changed in favour of events meeting specific needs, or formats more likely to reach greater numbers of users and create stronger dialogue around the project.

3.1 First Year Training Events

Alongside preparation for the physical TNA opportunities set to begin in the second year of the project, two TNA events were organised to encourage use of the open access resources held by the ARIANDE online TNA providers: UoY ADS, DAI and AIAC. As these events were meant to be carried out in a cost effective way and maximise attendance, the first was held in the form of a workshop at the European Association of Archaeologists (EAA) annual conference held in Pilsen, Czech Republic on 4 September, 2013. The second workshop was held as part of the Computer Applications and Quantitative Methods in Archaeology (CAA) annual conference held in Paris, France on 22 April, 2014.

3.1.1 Training Event at EAA Pilsen

Figure 9: Participants at the Ariadne training workshop held in Pilsen. Photo: K. Fernie

The following account of the first training workshop was written by Kate Fernie.

The ARIADNE project organised a workshop on Data Management Planning and Online Resources for Archaeology which was held just prior to the start of the European Association of Archaeologists (EAA) annual conference in Pilsen, Czech Republic on Wednesday 4 September.

This workshop was attended by around 25 participants and project partners. Its main aim was to introduce strategies for effective data management and planning, and to present some of the online data resources available to researchers through ARIADNE.

The workshop began with a welcome from Julian Richards of the Archaeology Data Service who also gave a brief introduction to the ARIADNE project.

Guntam Geser of SFRG then gave a presentation on “Open Data Publication” talking about the drivers, criteria, behaviours and benefits to researchers of publishing their data online in a way which is accessible (not necessarily without registration), reusable (in open formats) and openly licenced. Guntram spoke about open data publication as a progression from self-archiving linked to an open access journal publication and the impact of data intensive research. High level policy drivers are also important: “Taxpayers should not have to pay twice for scientific research and they need seamless access to raw data". Neelie Kroes, EC Vice President.

Figure 10: Guntram Geser presenting at the Ariadne workshop: Photo: K. Fernie

A 2012 EC survey found that half of respondents had a problem in accessing research data - reasons for this include the behaviour of researchers, who for example store data is on personal computers or other inaccessible places (a 2011 Science journal survey suggested that only 7% of research data

was stored on accessible community repositories). The barriers to providing open access to reusable data mentioned included giving priority to published papers, the lack of academic reward for sharing datasets, copyright issues and sensitive data.

The benefits of open data publication need to be made clear to researchers. “Keeping Research Data Safe”, a report produced by Charles Beagrie Ltd., identifies around 30 benefits for researchers, institutions and society including scholarly communication, verification, increased visibility etc. Guntram Geser suggested that the core benefit for authors should be recognition and academic reward for data providers. Open data has a longer shelf life and that as it is used and enriched by the research community it gains in value.

The key take away points for researchers were: publish open data to reap benefits individually and as a part of the research community, and recognize colleagues who share data by citing their datasets properly; for research institutions reward researchers who publish datasets openly, change mindsets by talking about the benefits and convincing researchers; for archives/repositories to demonstrate the usage and impact of the datasets.

Ulf Jakobsson, Swedish National Data Service followed by giving a presentation on Data Management Planning at SND. Data management and considerations for data creators include taking into account when or how to publish their data, considering whether there any reasons for delaying the publication or for making a selection from the dataset or whether there are any technical complications. Ulf recommended that researchers should identify the archive where they will deposit their data early – this means that it is possible to check their requirements (formats, etc.) and to plan for the costs of archiving the data ahead of time so that it can be added into data management plans and applications for funding.

Hella Hollander, KNAW-DANS, went on to describe data management and the online eDeposit at DANS. She explained that researchers can deposit all kinds of data at DANS. So far around 20,000 archaeological datasets have been deposited with around half being open access. Part of the presentation focussed on the data life cycle – planning, data collection, data analysis, data archiving, distribution and data discovery reuse. Data depositors at DANS describe their deposits using EASY DANS, which allows them to define their access rights – the principle for DANS is open if possible, protected if necessary - but it is the researchers who set the condiions on deposit. Hella concluded by mentioning the advantages for organisations in having a unified approach to data management in terms of procedures, activities, and clarity about rights and costs.

Next Julian Richards introduced some tools and online resources. In the UK, funding bodies require grant holders to produce data management plans and the DCC has developed tools to help – DMP Online takes authors through the steps to help them to create a data management plan. There are resources available in other languages such as the tool from DANS. Julian mentioned Databib - a useful online resource which lists all the research data repositories.

The next session presented a series of online services through which partners in the Ariadne network are making archaeological archives accessible to researchers.

Holly Wright presented the ADS archives which are available through a conventional search interface (ArchSearch) and in some cases are also available as Linked Open Data. The ADS holdings include 18 journals and series, 20,000 grey literature reports, 400+ project archives, 6 specialist bibliographies, 19 doctoral theses and two specialist websites for England's Rock Art and Image Bank.

Holly explained that "Grey literature" consist of unpublished field work reports – often excavation work carried out by archaeological contractors and others. ADS web statistics reveal that the grey literature archive has turned out to be an incredibly useful resource for researchers – showing a dramatic uptake in the number of reports being downloaded over the last 12 months. A recent consultation by ADS suggests that researchers are now relying on the availability of the Grey Literature archive; it seems to have had a real impact on archaeological practice in the UK. Other benefits of publication via ADS include instances of sharing data across borders such as the Early Tana tradition and Swahili coast archive, history of archaeological practice such as the archive holdings of the Society of Antiquaries of Scotland, access to specialist bibliographies, to unpublished PhD theses, etc.

Marlene Scholz of the University of Cologne presented the ARACHNE database, which is the central database of DAI managed by the Archaeological Institute of the University of Cologne. ARACHNE originally started as a database for ancient sculpture but has now covers more categories of objects. The system is based on the CIDOC-CRM. Marlene presented three examples of projects: the first was Emagines – which provides access to a series of glass negatives of excavations of the DAI from the 19th century onwards; the collection of 92,000 negatives has been digitized and catalogued; IDA bookbrowser – provides acces to a series of 16-19th century prints/engravings via a TEI-viewer which offers metadata, OCR and links to alternate materials; the third example was the Berlin Sculpture Network, a cooperation between the Antiquities Collection of the Berlin State Museums and the Institute of Classical Archaeology at the Free University of Berlin, to contextualise ancient sculptures. Altogether ARACHNE holds about 1.7 million images (1.4 visible) and has about 11,000 registered users. Marlene Scholz went on to demonstrate the ARACHNE interface and also how content from ARACHNE is made available in the CLAROS explorer.

Figure 11: Jessica Ogden presenting FASTI Online. Photo: K. Fernie

Jessica Ogden presented AIAC and FASTI online (www.fastionline.org). Jessica explained that FASTI Archeologici was set up in 1946 to bring together the Rome archaeological institutions and published a series of annual journals up to 1998. Costs lead to AIAC looking into alternate methods of publication and FASTI Online was launched, originally with the same objective of enabling organisations across the Mediterranean to share news of their excavations. An open access journal was launched in 2004 - FOLD&R is a peer-reviewed scientific journal which publishes both preliminary and final results of excavations. FASTI Online itself is built on ARK (an open source archaeological recording kit) and has been in continuous development since 2004. It is multi-lingual, spatial, temporal, and it's a database. All the sites are based on coordinates with a lot of locational information being generated automatically using Geonames. People who were involved in an excavation are named on the excavation summary which can also include videos, images, maps etc. There's a map-based search, simple date/period based search, or typological search based on the monuments thesauri. Jessica described FASTI online as a gazetteer of ancient places and related materials, which uses the Pleiades resource to identify related content from other sites such as Google Ancient Places, ARACHNE and others. Future plans include expanding spatial and language coverage for sites (Spain is coming) to promote transnational access, with work underway to understand how people are using FASTI and to explore the need for help, how-to documentation, greater download capabilities and linking to other related sites.

There was lively discussion throughout the day with questions from the floor about data management planning, tools, resources, vocabularies, gazetteer, and much more.

3.1.2 Training Event at CAA Paris

The following account of the training workshop was written by Catherine Hardman.

Partners from the ARIADNE project hosted a workshop at CAA in Paris to introduce archaeological researchers to a variety of on-line data resources, including those held by the three partners providing on-line access to their data as part of the EC Infrastructures funded Advanced Research Infrastructure for Archaeological Dataset Networking (ARIADNE) project.

The three partners were the Archaeology Data Service (ADS), ARACHNE at the German Archaeological Institute (DAI), and Fasti Online at the International Association of Classical Archaeology (AIAC). In addition to the ARIADNE partners, the workshop featured a presentation on data and data integration in the Digital Archaeological Record (tDAR), an international digital repository based in America for the digital records of archaeological investigations.

A slight hiccup in room allocation made the first challenge one of getting the speakers and attendees together in the same room in the same building at the same time, although we chose to find the lack of AV equipment a situation full of Parisian charm! Michael Charno started the workshop with an overview of the work of the ADS with a special focus on the work they undertake to make the data they host freely and openly available for reuse, not only by individual researchers and users but other data providers. This really helps in the reach of the data that the ADS holds. The workshop found the approaches taken by the ADS to be interesting and effective.

Keith Kintigh from the Digital Archaeological Record (tDAR) gave an interesting presentation on the work of this digital archive based in the USA. Keith gave an overview of the types of data that they accept and the organisations with whom they work. Of particular interest to the workshop attendees was the innovative approach to deposition and charging that tDAR have implemented.

This was followed by a presentation about Fasti On-line by Jess Ogden about the work her organisation undertakes and the bringing together of a wide range of the excavation information from across the 'Roman' world. Fasti on-line provides a database of excavations since 2000, providing a record in English and in the local language for each season. Each participating country is responsible for uploading the data it gathers and jess was able to provide a great illustration of what can be achieved when researchers use a common platform.

Marcel Riedel and Fabian Scheler from ARACHNE showed the workshop participants a resource based in Germany which provides archaeologists and Classicists with a free internet research tool for quickly searching hundreds of thousands of records on objects and their attributes, in both English and German. The number of images available is vast and the discussion among participants surrounded the challenges that were presented by delivering such large data sets in a useful fashion.

3.2 Second Year Training Events

Starting in second year of the project, recruitment began for participation for the physical TNA opportunities. The year two TNA training events were meant to advertise these opportunities and at relevant venues, linked to relevant conferences or meetings, in order to remain cost effective and maximise attendance. Four such events were meant to be organised in the second, third and final year of the project. During the second year events were organised at Electronic Visualisation and the Arts (EVA) annual conference in London, UK on 9 July, 2014, European Association of Archaeology (EAA) in Istanbul, Turkey on 11 September, 2014, Mediterranean Exchange of Archaeological Tourism (MEAT) in Paestum, Italy on 30 October, 2014 and Computer Applications and Quantitative Methods in Archaeology (CAA) in Siena, Italy on 2 April 2015.

3.2.1 Training Event at EVA London

The following workshop, titled *Learning Opportunities for Sharing Data in the ARIADNE Project* was presented at EVA London by Franco Niccolucci and Paola Ronzino (PIN). Unfortunately, the workshop was very poorly attended (fewer than 10 people), so the decision was made not to present again at this venue and to try to involve more of the physical TNA providers to promote the opportunities.

Advanced Research Infrastructure for Archaeological Dataset Networking (ARIADNE) is a four-year EU FP7 Infrastructures funded project, made up of 24 partners across 16 European countries. ARIADNE has the goal of "bringing together and integrating existing archaeological research data infrastructures, so researchers can use the various distributed datasets and new and powerful technologies as an integral component of the archaeological research methodology". A fundamental component in meeting this goal is the provision of transnational access (TNA) to a wide variety of people involved in visualising data. To accomplish this, online access opportunities are being developed, but funding will also be provided for on-site training with our technical partners. This will be a rare opportunity to work directly with the staff designing the infrastructure, including PIN-University of Florence at Prato, Consiglio Nazionale delle Ricerche (CNR) in Pisa, Athena RC – Digital Curation Unit (DCU) in Maroussi, and Athena RC – Cultural and Technology Institute (CETI) in Xanthi. Technical staff will be on hand to present information about the training (including logistical details and application procedures), to discuss the goals of the project, and answer questions.

ARIADNE PHYSICAL TNA – SUMMER SCHOOLS

ARIADNE is offering three summer schools, for the year 2014, addressing researchers that will benefit from training in archaeological research data management to carry forward their own research. Individual work, indeed, will form part of the summer school programme through case studies or research projects, which will be proposed by participants in advance and developed by them under the experts' supervision.

Mapping existing datasets to CIDOC CRM

The "Mapping existing databases to CIDOC CRM" summer school is organized by VAST-LAB of PIN, the Prato branch of the University of Florence. Since 2001 VAST-LAB has developed significant

expertise in the field of archaeological applications and has advised institutions in Italy and abroad on the recovery of legacy data and conversion to updated data formats, inclusion in data portals, and the creation of archaeological datasets. The summer school aims at enabling researchers and professionals to map their datasets to the CIDOC CRM standard. This process is necessary to integrate them in a wider framework such as ARIADNE. The school will provide a summary background of CIDOC CRM showing some case studies and some frequently used templates. The final days will be dedicated to developing the mappings of students' case studies, which they will carry out under the supervision of the specialists.

2D/3D documentation for archaeology

The Visual Computing Lab (VCLab), one of the research departments of the Istituto di Scienza e Tecnologie dell'Informazione (CNR-ISTI) is the organizer of the school on "2D/3D documentation for archaeology". The school aims at providing training and hands-on experience on the tools for producing and managing 2D and 3D documentation for archaeological purposes, both for objects and for monuments/sites, including the related visualisation tools. The school will provide an introduction to the technologies and tools and a hands-on activity, organizing the students in small groups. Students will bring their own research project, so that they can practise on case studies of direct interest for them.

Design of archaeological datasets

The NeMIS Laboratory of CRN-ISTI develops technologies for modelling access and handling of information, digital library services and services for information retrieval. NeMIS Lab is organizing the summer school on "Design of archaeological datasets" with the aim to provide students with an introduction to metadata design for archaeological datasets, with perspective content provided as case studies by the students. The school will consist of some introductive lectures followed by hands-on seminars in which the design is developed by the students with the supervision of ISTI experts and then collectively discussed.

FUTURE OPPORTUNITIES

The three summer schools organized for year 2014 are not the sole opportunities offered by ARIADNE. Until October 2016, ARIADNE will advertise calls for proposals for researchers and professionals to apply for either individual access visits or for summer schools at one of three research centres: PIN, ISTI-CNR and Athena Research Centre.

In particular, opportunities to learn about legacy dataset design and implementation of archaeological datasets and thesauri, conversion of legacy datasets and data formats, CIDOC CRM compliance, definition of metadata schemas, metadata mapping, semantic annotation, and the use of standard languages such as OWL, SKOS will be provided by PIN, ISTI-CNR and the Data Curation Unit of the Athena Research Centre.

Moreover the Cultural and Educational Technology Institute (CETI) will provide scientific assistance and guidance to researchers on the development of scientific datasets: dating techniques for archaeological artefacts (TL and/or OSL), composition, structure and organic residues.

3.2.2 Training Event at EAA Istanbul

A workshop titled *Opportunities within the ARIADNE Network* was presented at EAA Istanbul by Achille Felicetti (PIN), Carlo Meghini (CNR) and Nestor Tsirliganis (ATHENA RC-CETI) promoting the opportunities set out at EVA London. Unfortunately, even with representation by more of the TNA providers, the workshop was also very poorly attended (fewer than 10 people). In contrast, the session Open Access and Open Data in Archaeology, which featured many ARIADNE partners had over 30 participants.

Abstract

Advanced Research Infrastructure for Archaeological Dataset Networking (ARIADNE) is a four-year EU FP7 Infrastructures-funded project, made up of 24 partners across 16 European countries. ARIADNE has the ambitious goal of "bringing together and integrating existing archaeological research data infrastructures, so researchers can use the various distributed datasets and new and powerful technologies as an integral component of the archaeological research methodology". A fundamental component in meeting this goal is the provision of transnational access to a wide variety of European archaeologists. To realise this, online access opportunities are being developed, but funding will also be provided for on-site training with our technical partners. Please join us for presentations and discussion about the ARIADNE project, including details about our upcoming training programmes. This will be a rare opportunity to work directly with the staff designing the infrastructure, including PIN at the University of Florence at Prato, Consiglio Nazionale delle Ricerche (CNR) in Pisa, Athena RC – Digital Curation Unit (DCU) in Maroussi, and Athena RC – Cultural and Technology Institute (CETI) in Xanthi. Technical staff will be on hand to present information about the training (including logistical details and application procedures), to discuss the goals of the project and answer questions.

3.2.3 Training Event at MEAT Paestum

A workshop titled *Presentation of the ARIANDE Project: Learning Opportunities in the ARIADNE Network* was presented at MEAT Paestum moderated by Franco Niccolucci (PIN) and presented by Achille Felicetti (PIN), Roberto Scopigno (CNR), Carlo Meghini (CNR) and Nestor Tsirliganis (ATHENA RC-CETI). The workshop followed a similar format to the workshop at EAA Istanbul. Unfortunately, the workshop was also very poorly attended (fewer than 10 people). As these events required both partner staff time and travel funds, and given the disappointing number of participants at the two previous events, discussions began between ADS and PIN to find a more effective approach for the training events.

3.2.4 Training Event at CAA Siena

After the low turnout in the first three training events meant to promote the physical TNA opportunities, and the relative success of the session at EAA Istanbul, it was decided to try a new format for CAA Siena. Work was now well underway within the ARIADNE project, so a session was proposed that combined both presentations about work done by ARIANDE partners, and related papers by non-partners. This approach would not only help make the work in progress within the project more transparent, but also provide an opportunity for dialogue as the project progressed.

This turned out to be a very successful approach. It generated excitement about the project, and a good atmosphere to promote the TNA opportunities. Flyers about the TNA opportunities were also distributed.

The following account of the session was written by Kate Fernie.

Figure 12 : Keith May at the ARIADNE Workshop, CAA Siena. Photo: K. Fernie

ARIADNE hosted a very successful workshop at CAA 2015 in Siena on 2nd April entitled “Supporting researchers in the use and reuse of archaeological data”. Following an open call for papers, a selection of related topics were presented by both ARIADNE partners and external speakers to an audience of around 80 people.

The first paper by Nikolaos Kazakis and Nestor Tsirliganis from CETI covered archaeological datasets and Gisli Palsson then talked about how the Institute of Archaeology, Iceland, bridged the gaps between fieldwork, laboratory analysis and online archiving.

Keith May who acts as Information Strategy Advisor to Historic England and English Heritage, gave a paper entitled “Paths through the Labyrinth: Finding ways to express data from differing search and reuse”, a central theme underlying the aims of the ARIADNE Infrastructure. Another external experience with Linked Open Data was contributed by Angela Trentacoste, Sarah Whitcher Kansa, Eric C. Kansa, Anthony Tuck who presented a case study on Etruscans and animal remains (zooarchaeology).

After the coffee break, the workshop continued with Stephen Stead, Dominic Oldman and Jonathan Whitson Cloud who presented their annotation work on the Sloane catalogues and the topic of representing time and space in the annotation of museum catalogues. Project partners Maria Theodoridou and Martin Doerr from FORTH and Edeltraud Aspöck and Anja Masur from OEAW covered archaeological databases to CIDOC-CRM. The Presentations continued with Ceri Binding and Douglas Tudhope (UoG) on the subject of connecting ARIADNE vocabularies for data integration and cross search and the progress the project has made with this. Finally, the workshop concluded with two demonstrations of services available through the project, the Ariadne Media Service (Matteo Dellepiane, Federico Ponchio, Marco Callieri and Roberto Scopigno) and 3D-HOP (Fabrizio Galeazzi, Marco Callieri, Matteo Dellepiane, Roberto Scopigno and Julian Richards ADS), which CNRS has developed for the streamed display of 3D models and is also useful for looking at archived 3D data.

The four Chairs, Julian Richards and Holly Wright (ADS), Franco Niccolucci and Kate Fernie (PIN) were delighted with the good reception and packed audience at the workshop now that ARIADNE is starting to make a significant impact on the archaeological community.

3.3 Third Year Training Events

Based on the success of the new format tested in Siena, it was decided to continue to weave information about the physical TNA opportunities into events that promoted and created excitement around the project. At the same time, it was becoming more apparent that there was an imbalance between the internal resources and experience of the archaeological partners participating within ARIADNE. When PIN and UoY ADS decided to re-visit the format of the training events, they also proposed focussing training within the project between partners and their national colleagues to try to address this imbalance. The first two training events for the year took the form of workshops to create dialogue around technologies and ideas within the ARIADNE project, but the second two took the form of focussed data management training workshops. The first event was an expert forum that took place in Athens on 2-3 July, 2015 to complement the physical TNA summer school for ATHANS RC. The second event was a workshop by CNR on 3DHOP on 28 September, 2015 at Digital Heritage Granada. The final two events for the year were data management workshops. PIN and UoY ADS approached partners who had shown interest in hosting such a workshop within their country. Austria and Slovenia were both very supportive of the need for this type of workshop, so representatives from PIN and UoY ADS travelled to OEAW in Vienna on 19 January, 2016 and then on to ZRC-SAZU in Ljublana on 21 January, 2016 to run these workshops. As training events, the workshops were freely accessible to anyone, and due to hard work by the local ARIADNE organisers, were a great success. Both were well attended with over 40 participants at each venue (partners from Hungary also attended the Vienna workshop) including key decision-makers in the stewardship of archaeological data in each country.

3.3.1 Training Event at the ATHENA RC summer school Athens

The year-three training events began with an expert forum scheduled into coincide with the ATHENA RC TNA summer school. The title of the forum was *The future of digital archaeological practice 2020-2025* and featured a wide variety of presentations by leaders in the field of digital archaeology with

opportunities for discussion. The expert forum took place over two days and featured the following presentations:

Thursday, July 2
9:00-10:30 *Introduction*
Pondering the future of digital archaeology: a practice view
Professor Costis Dallas
Challenging digital archaeology: a framework for action
Dr Jeremy Huggett, Department of Archaeology
Grand challenges for digital archaeology: a panorama and synthesis
Professor Gary Lock

11:00-12:45 *Virtual archaeology and 3D/immersive technologies*
Moderator: Dr Paul Reilly
13:45-15.30 *The digital future of archaeological field recording*
Moderator: Professor Gary Lock
16:00-17:30 *Digital research infrastructures and archaeology: present value, future promise*
Roundtable discussion
Moderator: Professor Seamus Ross
Dr Agiatis Benardou
Professor Robin Boast
Dr Guntram Geser
Professor Julian Richards

Friday, July 3
9:00-10.45 *Curating legacy archaeological data, collections and knowledge*
Moderator: Professor Panos Constantopoulos
11:15-13:00 *Open, community and participatory digital archaeology*
Moderator: Dr Colleen Morgan
14:00-16:45 *Open discussion: digital archaeology 2020-2025*
Moderator: Dr Jeremy Huggett
16:45-17.00 *Final remarks*
Professor Costis Dallas

The training event was very successful with over 20 participants over the two days.

3.3.2 Training Event at Digital Heritage Granada

Figure 13: Participants in the 3DHOP training event in Granada, Spain

The second year-three training event was held on 28 September at the Digital Heritage Conference in Granada, Spain, and featured a workshop on 3DHOP. 3DHOP is a key technology taught by CNR at the TNA summer schools described in WP10. The following account of the session was written by Kate Fernie.

ARIADNE partner, CNR-ISTI, contributed extensively to the organization and to the scientific program of the IEEE/EG Digital Heritage 2015 conference, held from 28th September to 2nd October 2015, where Roberto Scopigno served as the International Programme Committee Co-Chair.

CNR-ISTI organized a tutorial on 3DHOP, which got a very good audience (more than 40 people) and allowed the presentation in detail of both the 3DHOP platform and the ARIADNE Visual Media Service. The workshop was entitled "3DHOP - Presenting Online High-Res 3D Models: a Crash Course" and a brief description is at: http://www.ariadne-infrastructure.eu/Events/3D-HOP-Digital-Heritage-2015.

CNR-ISTI has also presented three technical papers, two of them developed using ARIADNE technology:

- Alchemy in 3D – A Digitization for a Journey Through Matter - Marco Callieri, Paolo Pingi, Marco Potenziani, Matteo Dellepiane, Gaia Pavoni, Aurelia Lureau, Roberto Scopigno. 2015 Digital Heritage International Congress - Vol. 1 (Proc. of), Volume 1, page 223-231 - 2015 (the Alchemy paper was among the selected best papers)

- Digital Study and Web - based Documentation of the Colour and Gilding on Ancient Marble Artworks - Eliana Siotto, Gianpaolo Palma, Marco Potenziani, Roberto Scopigno, 2015 Digital Heritage International Congress - Vol. 1 (Proc. of), Volume 1, page 239-246 - 2015

Both these are using the 3DHOP platform, that is a component of the services shared with the ARIADNE community and addressed in the TNA summer school on 3D Documentation.

Figure 14: Great turnout for the 3DHOP workshop in Granada

In addition, ARIADNE partners OEAW were also presenting on one of their research topics with a paper entitled "Digitizing Early Farming Cultures: Customizing the Arches Heritage Inventory & Management System". The Arches initiative was featured in the ARIADNE Newsletter No. 3.

All in all, Digital Heritage 2015 saw the participation of many ARIADNE members and to meet with many researcher and professionals working on Archaeology. It was an ideal vehicle for dissemination and for contacting our community.

3.3.3 Training Event at OEAW Vienna and ZRC-SAZU in Ljubljana

Figure 15: Archaeologists from across Austrian institutions discussing questions of archaeological data management at the ARIADNE training workshop on 19th January 2016 in Vienna. The event was hosted by OREA/ÖAW and took place at the Sitzungszimmer of the Austrian Academy of Sciences, Dr. Ignaz Seipel-Platz 2, 1010 Vienna. Photo: K. Fernie

The following is single account of both workshops was written by Benjamin Štular of ZRC-SAZU and Edeltraud Aspöck of OREA OEAW, with addenda by Holly Wright of UoY ADS and Kate Fernie of PIN, who ran the workshops.

ARIADNE delivered data management workshops in Vienna and Ljubljana in January of this year.

How it came about:

Benjamin:

Firstly, this was not one of those things that are set in stone by being a part of a project's DOW. My colleague Mateja Belak and the Institute for Archaeology at ZRC SAZU had to make an effort, and especially Kate Fernie and Holly Wright went (quite literally so) out of their way to make this happen.

It all began at the Research Infrastructures and e-Infrastructures for Cultural Heritage event in Rome event back in late 2014. Anthony Corns from Discovery Programme Ireland and I were asked by

ARIADNE coordinator Franco Niccolucci to prepare the "Impressions from the ARIADNE community" presentation for an ARIADNE event. We decided to make a comparison between Slovenia and Ireland with regard to digital data archives. Three conclusions emerged from this. Firstly, there are two kinds of countries in Europe; on the one hand there are countries–UK, Holland, Sweden and Germany–that have a digital data archive, and on the other hand there are the majority that do not have it. Secondly, in order to prevent a disastrous loss of digital born data, the have-nots must do something and be quick about it. Thirdly, the latter can only happen by the have-nots learning fast from the haves; and ARIADNE currently presents the best possible opportunity for this to happen. Surely, it took a year of scheduling, but the data archive workshop is in my view a key event in this process.

In preparation for the event, we did our usual publicising. In a few days it was obvious that there is quite a lot of interest in the archaeological community. Mind you, on the surface there are few things in archaeology with less boredom appeal than digital data archiving. This means that the community has already been aware of the existing problem. It was therefore no surprise then that the turnout was excellent, with representatives from the Ministry of Culture, National Museum of Slovenia, National Archive of Slovenia, Institute for the Protection of Cultural Heritage of Slovenia, several local museums and, obviously, several of my colleagues from ZRC SAZU. People even stayed after office hours.

Edeltraud:

When I started working on the ARIADNE project for OREA/OEAW Austrian Academy of Sciences, it became obvious to me very quickly that all the work we were doing in the project only makes sense if there are mechanisms in place that will preserve the data in the long-term. Otherwise this is all just window dressing. The extent to which data is actually threatened–even in the short-term–through technical and conceptual problems was part of many early workshops within ARIADNE. It was eye-opening to me to learn how fragile the basis of most of our research actually is. In the case of archaeology, data loss also means loss of information about our cultural heritage.

Like Slovenia, Austria belongs to the have-not countries. However, the ARIADNE project provides the opportunity to work with partners from archaeological data archives which have a lot of professional experience, as well as partners who are just starting with archaeological data archiving, or are in the process to do so. It was interesting to see what the 'first steps' may look like. The diversity across Europe is also reflected by the papers of the ARIADNE session on *What is an archaeological research infrastructure and why do we need it?* organised by Guntram Geser of Salzburg Research and myself at the CHNT 2014 Conference in Vienna. It was actually after this session, when I first exchanged ideas with other partners from have-not countries, and started to think that it would really make sense to start a movement for data archives in our countries.

Luckily, early in 2015, the new Austrian Centre for Digital Humanities (ACDH) kicked off at the ÖAW (Austrian Academy of Sciences) and together we organised a workshop on digital repositories later in the year called Save the data! I was happy to welcome representatives from archaeological archives–ADS and DANS–as well as Felix Schäfer, from the IANUS project, currently in the process of setting up a data archive for archaeology for the DAI in Germany. In our presentation, Anja Masur

and I tried to find a repository where it would be possible to archive the data of my post-doc project. We looked at policies and costs of international archaeological data archives.

As Benjamin already said, the ARIADNE data management workshop was the logical next step: the response to the workshop among my Austrian colleagues was great and the workshop was well attended by archaeologists across all institutions–Universities of Vienna and Graz, the Austrian Archaeological Institute (ÖAI), from the Austrian Federal Monuments Office (BDA) –and of course from my colleagues at the OEAW. We also had ARIADNE partners from Hungary in attendance. The many questions raised during the workshop showed that data management is a pressing issue! Many thanks to Holly Wright and Kate Fernie for answering our questions and for making the workshop such a satisfying experience.

Figure 16: Work shop participants at the training event in Slovenia; listening closely. Photo: K. Fernie

The event

Benjamin:

I can only speak for myself, but the workshop really made a difference for me. I knew a lot of the data beforehand, and obviously, the missing information is always just a touch (well, several and then some, but the point stands) of a keyboard away. However, no amount of information can replace an excellently structured workshop that is, in words of W. S. Churchill, 'long enough to cover the subject and short enough to create interest'.

Everything I knew suddenly fell into a place. Doing archaeology that produces vast amounts of digital-born data, and not having a systematically maintained digital data repository is, it struck me, similar to harvesting a field of wheat with a combine harvester and not providing a silo to store the grain. The field will never be the same after it is harvested. The driver cannot go back and re-harvest after a wrong turn. There is only one chance to get it right and all of the spoils are perishable goods!

To get the excitement down a notch, it is not that I know how to build the digital data archive from scratch just by attending the workshop. That was never the intention. But I have gained the necessary tools: a critical overview, direct links to most important data and, most importantly, direct links to knowledgeable people that are willing to help.

Edeltraud:

Well said Benjamin. There is nothing to add–the comparison with the harvester really makes the point!

Aftermath

Benjamin:

It's been a week or two since the event so I can be a bit reflective. As I said, the realisation that things are in desperate need of attention both at the level of my institution and at the national level happened more than a year ago. So one might say we came well prepared to the workshop: highly motivated and hungry for the how-tos.

Since the workshop things at my institution are moving fast. We created a workgroup, made the plan of action, created the top-level archive structure and collected the information on types and size of the data each individual has in the span of two weeks. This means that everybody is already involved! We expect to create the lower-level archive structure tailored to the existing data in a week's time.

How did we decide to go about it? As most institutions in Europe we are in the position where archiving the data is an additional workload to the already overstretched resources. Therefore, we decided to be pragmatic about it: it is better to have a digital data archive with a loose, low-level structure (thus sacrificing some of the searchability) populated with data, than to have an excellent archive structure, period. We fear that the workload for archiving a decade and more worth of existing data in a strictly structured manner is just not feasible. That being said, during the next stage, and after populating the data and doing some in-depth analyses, we will be able to create best possible structure for future data and all will be well again.

Edeltraud:

At the OEAW we have started to take the case study approach to this. Research data policies in Austria are in the process of changing, and the funding body Austrian Science Fund (FWF) has started to push towards open research data and data preservation, although at the moment, it is all still recommendations, and nothing is compulsory. Calls for funding of digitisation and long-term data preservation projects were published last year, and we secured funding for A Puzzle in 4D. The aim of the project is the long-term preservation of legacy data from excavations at Tell el Daba, Egypt. The Puzzle in 4D project will be the case study for us to start developing a data archive for archaeological excavation–and research data at the ÖAW ACDH. It is early days, but we are compiling test data and working on the data model–the process has begun!

I have been skyping with Benjamin about our data models, and it was interesting to see that we share some basic ideas about how to order our archaeological data. We have to keep talking, Benjamin–and with other partners, and exchange our ideas and experiences.

Epilogue

Holly:

It was an absolute privilege to be invited to participate in these workshops, represent the Archaeology Data Service, and meet so many people who are motivated to help save archaeological knowledge in Austria, Hungary and Slovenia from the so-called 'digital dark age'. As ADS was the first archive to be established for archaeological data (we are celebrating our 20th anniversary this year) one of the primary things we have learned over the years is that there is no one, correct solution. Rather, there are standards to help implement informed, pragmatic solutions; that archaeologists need to be at the heart of determining what is best for their data; and that we need to work together. ADS has always had close working relationships with our sister archives, both in Europe and America, and building those ties have comprised an important component of our success. Implementing good archiving practice at a national or international level is extremely challenging, even in the most conducive environments, and it has been invigorating to meet and work with so many new people who can help build this critical collaboration further!

Kate:

Well said Holly! It was a privilege for me also to be invited to participate in these workshops, representing PIN and 2Culture Associates and to meet so many new colleagues and archaeologists.

The workshops have also sparked interest within ARIADNE and beyond in current practice with regard to preserving digital archaeological data across Europe and internationally, and in the re-use of archaeological datasets. There will surely be archivists or archaeologists in other countries wanting to be part of the conversation! We will be at CAA 2016 in Oslo where we are organising a session Supporting researchers in the use and re-use of archaeological data: continuing the ARIADNE thread and at CHNT in Vienna, 16-18 November 2016 where we helped organise the session Preservation and Re-Use of Digital Archaeological Research Data with Open Archival Information Systems.

3.4 Fourth Year Training Events

The final year of training events continued with successful formats of the previous years, with two sessions at major conferences and two events which were extensions of wider summer training events. The first session was held at CAA in Oslo on 31 March, 2016 (which included the official launch of the ARIADNE portal, the second was a repeat of the successful expert forum as part of the physical TNA summer school run by ATHENA RC in Athens on 16-17 June, 2016, the third was part of The European Summer University in Digital Humanities in Leipzig on 22 July and the final event was at EAA in Vilnius on 1 September, 2016.

3.4.1 Training Event at CAA Oslo

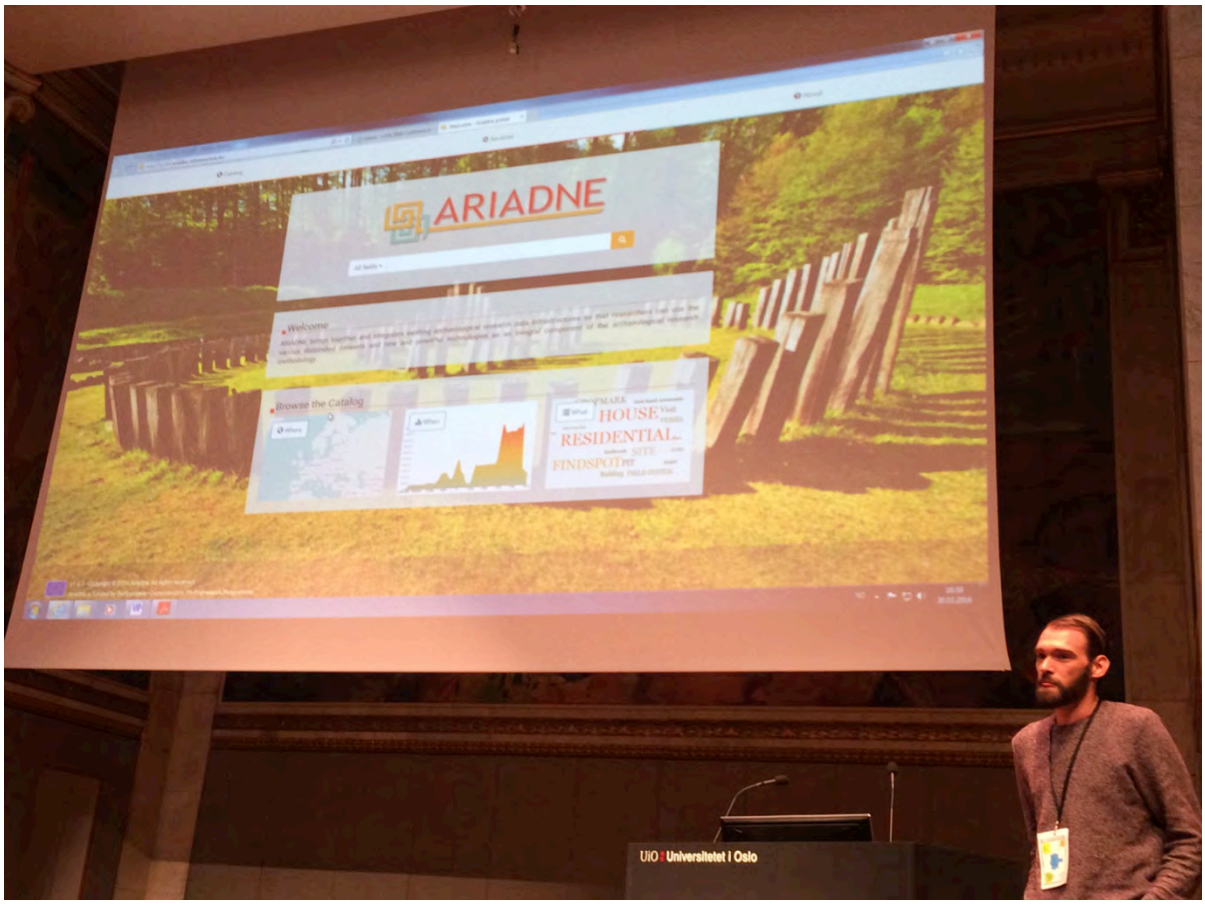

Figure 2 Sebastian Cuy presenting the ARIANE portal at the CAA Oslo training event. Photo: K. Fernie

Returning to the same format as the successful session at CAA Siena, the ARIADNE themed session at CAA Oslo was equally successful with over 60 attendees, and a mix of papers by ARIADNE partners about the progress of their work, and papers about related projects. It also served as the official launch of the ARIADNE portal. The session was titled *Supporting researchers in the use and re-use of archaeological data: Continuing the ARIADNE thread*.

Abstract

This session seeks to further expand dialogue in a critical area. Ever-increasing amounts of data are available within data repositories in individual institutions, national infrastructures and international services.

The EC Infrastructures funded ARIADNE project is working to bring together archaeological research data from across Europe, for use and re-use in new research. There are challenges, such as raising awareness about the available data, integrating datasets produced by very different projects using differing methodologies and various technologies. There are GIS, databases, 3D data, scientific datasets and more, all produced in a variety of languages. ARIADNE is building vital infrastructure to bring together, manage and provide access to these datasets. The project is embracing Linked Open Data, Natural Language Processing, deploying Web Services and new tools to provide enhanced

access to researchers. ARIADNE is also offering training and opportunities for archaeologists to access the research infrastructure, and to share knowledge and expertise.

The aim of this session is to stimulate discussion between researchers and data specialists, and to:

- Showcase best practices and relevant work supporting access and use of digital archaeology from ARIADNE and other services
- Present case studies demonstrating innovative re-use of archaeological datasets
- Develop an understanding of the challenges in providing access to research data and the opportunities offered by ARIADNE and other services
- Discuss how these challenges can be addressed and how the opportunities can be maximized
- Generate ideas for future training, access and research

Papers

- Introduction by Julian Richards
- Methodological tips for mappings to CIDOC CRM: Maria Theodoridou, George Bruseker, Maria Daskalaki, Martin Doerr
- An essay of mapping archaeological land-record system used by Inrap with CIDOC-CRM and CIDOC-CRMarchaeo extension using 3M on-line tool: Christophe Tuffery, Achille Felicetti, Patrick Jard, Nicolas Holzem, Thomas Guillemard
- Formalisation and reuse of methodological knowledge on archaeology across European organisations: Cesar Gonzalez-Perez, Patricia Martín-Rodilla, Elena Epure
- Semantic database applications at the Samtavro Cemetery, Georgia: David Bader, Aleksandra Michalewicz, Oded Green, Jessie Birkett-Rees, Jason Riedy, James Fairbanks, Anita Zakrzewska
- A catalog for archaelogical resources: Franca Debole, Nicola Aloia, Christos Papatheodorou, Dimitris Gavrilis, Carlo Meghini
- Using semantic technologies for the deep integration of research items in ARIADNE: Philipp Gerth, Wolfgang Schmidle, Sebastian Cuy
- Fasti surveys: Elizabeth Fentress, Michael Johnson, Florence Laino, Stuart Eve
- Best practices to re-use remote sensing data coming from marine geophysical surveys for the 3D reconstruction of underwater archaeological deep-sites: Manuela Ritondale, Gaia Pavoni, Roberto Scopigno, Marco Callieri, Matteo Dellepiane
- Digging into and re-using image data for archaeology: Christopher Power, Andrew Lewis, Helen Petrie, Julian Richards, Katie Green, Mark Eramian, Ekta Bhullar, Brittany Chan, Isaac Sijaranamual, Maarten de Rijke
- A data integration infrastructure for archaeology: Dimitris Gavrilis, Eleni Afiontzi, Johan Fihn, Olof Olsson, Sebastian Cuy, Achille Felicetti, Franco Niccolucci

3.4.2 Training Event at the ATHENA RC summer school Athens

Figure 18: Professor Alexandra Bounia of the University of the Aegean opening the discussion at the expert forum, Athens. Photo: K. Fernie

After the success of the expert forum the previous year ATHENA RC choose to coincide with the TNA summer school. The title of the forum was *The Future of Archaeological Knowledge Curation 2021-2026*. This training event was also very successful with over 25 participants.

Abstract

Expert Forum on *The future of archaeological knowledge curation 2021-2026* aims to unite an international community of researchers in a constructive debate on the use of digital technology to ensure the future value of pre-existing archaeological knowledge through further curation, access and reuse. In tandem with organized archaeological databases, corpora and repositories it will reflect on the future of past excavation data and archives, commercial archaeology reports, archaeological museum collections, corpora and gazetteers, historical and ethnographic testimonies, grey literature, and visualizations of archaeological entities. It will seek to synthesize the experiences, know-how and insights of participants on how to address the growing curation crisis in archaeology in an increasingly pervasive networked digital environment, and on the challenges faced and opportunities offered by digital infrastructures in the next 5-10 years. The viewpoints invited are multi-disciplinary and diverse, ranging from academic researchers to practitioners, and from archaeologists to specialists in information, archival science, computer science, and science and

technology studies. We are looking for informed and thoughtful contributions to an interactive process, rather than for a pre-prepared formal talk or conference paper. The active participation of the ARIADNE community will be valuable in shaping this emerging picture.

Thursday, 16 June
13:15 – 13:30 *Envisioning the future of archaeological digital curation*
Professor Costis Dallas
13:30 – 14.30 *Challenges and advances in knowledge representation and understanding*
Chair: Dr Elizabeth Fentress
Position statement: Professor Panos Constantopoulos
Counterpoint: Professor Seamus Ross
Interventions: Alexandra Bounia, Costis Dallas, Rimvydas Lauzikas, Vladimir Stissi, Amara Thornton, Giorgos Vavouranakis, et al.
14:30 – 15.30 *Challenges and advances in communication and visualization*
Chair: Nephelie Chatzidiakou
Position statement: Professor George Papaioannou
Counterpoints: Dr Agiatis Benardou, Michael Carter
Interventions: Despina Catapoti, Nephelie Chatzidiakou, Elisabeth Fentress, Isto Huvila, Despoina Tsiafaki, Delia Tzortzaki, et al.
16:00 – 17.00 *Challenges and strategies for sustainability and openness*
Dr Jeremy Huggett, Professor Neal Ferris, Dr Lorna-Jane Richardson
Interventions: Kate Fernie, Dimitris Gavrilis, Hella Hollander, Helen Katsiadakis, Ioannis Poulios, et al.
17:00-18:00 *Scenarios for digital archaeological infrastructure and research planning: introduction and team formation*
Professor Costis Dallas, Professor Vladimir Stissi, Pavla Drapelova, Dr Amara Thornton, Priscilla Ulguim, Ilenia Galluccio, Dr Federico Nurra, Professor Rimvydas Laužikas, Dr Lorna-Jane Richardson

A visioning and scenario building method will be presented, based on the identification of a future research infrastructure to serve the research needs of projects of individual TNA scholars, and the successive specification of: a) sub-disciplines / approaches, research problems, aspects or phases of the research process, and kinds of users to be served by the infrastructure, b) information objects, formats, and domain knowledge entities (e.g. concepts, classifications, theories) covered c) methods, procedures and digital tool and service functionalities needed; and; d) a narrative or schematic presentation of one or two speculative scenarios illustrating how the infrastructure will serve future work. Four imaginary archaeological digital infrastructures, named after characters from Greek and Etruscan mythology, will be envisioned by forum participants divided into four groups, each taking into account use cases related to individual research projects, which will be presented through lightning talks.

Scenario A: AREATHA infrastructure
Rapporteur: Seamus Ross
Facilitator: Leonidas Papachristopoulos
Members: Vladimir Stissi, Pavla Drapelova, et al.

Scenario B: MINOS infrastructure
Rapporteur: Amara Thornton
Facilitator: Eliza Papaki
Members: Priscilla Ulguim, et al.

Scenario C: PASIPHAE infrastructure
Rapporteur: Jeremy Huggett
Facilitator: Nephelie Chatzidiakou
Members: Ilenia Galluccio, Federico Nurra, et al.

Scenario D: THESEUS infrastructure
Rapporteur: Despina Catapoti
Facilitator: Costis Dallas
Members: Rimvydas Lauzikas, Lorna-Jane Richardson, et al.

Friday, 17 June
9:00 – 11.00 *Scenario building sprint I: using archaeological digital curation infrastructures in 2021-2026*
Scenario building groups will work in parallel, using the approach introduced and taking into account the technological futures viewpoints presented in the previous sessions, to identify the "value proposition", objectives, scope and functionalities of a future digital infrastructure, mapping these parameters in a five and ten year horizon in the future.

11:30 – 13.00 *Scenario building sprint II: using archaeological digital curation infrastructures in 2021-2026*
Scenario building groups will work in parallel, using the "value proposition", objectives, scope and functionalities of a future digital infrastructure defined in the previous session, to develop a narrative or schematic scenario illustrating the fruitful use of the infrastructure for archaeological work, five and ten years from now.

14:30 – 16:30 *Archaeological digital curation infrastructures in 2021-2026: vision, affordances and scenarios of use*
Professor Seamus Ross, Dr Amara Thornton, Dr Jeremy Huggett, Dr Despina Catapoti

Rapporteurs of scenario building groups will present briefly the "value proposition", objectives, scope and functionalities of the digital infrastructures they defined, and a narrative or schematic scenario they developed to illustrate its future usefulness.
Discussion chair: Professor Vladimir Stissi

16:30 – 17.00 Final remarks: Professor Costis Dallas

3.4.1 Training Event at the European Summer University in Digital Humanities Leipzig 25-29 July 2016

On 29 July 2016, under the theme 'Digital Research Infrastructures in the Humanities: How to Use, Build and Maintain Them', Franco Niccolucci gave a half day training event concerning Research Infrastructure access, based on the ARIADNE experience: what ARAIDNE offers, what is well or badly received.

The training event was attended by five students of European Summer School "Culture and Technology". The students had a background in Humanities, Engineering and Information Sciences, coming mainly from the US.

3.4.2 Training Event at EAA Vilnius

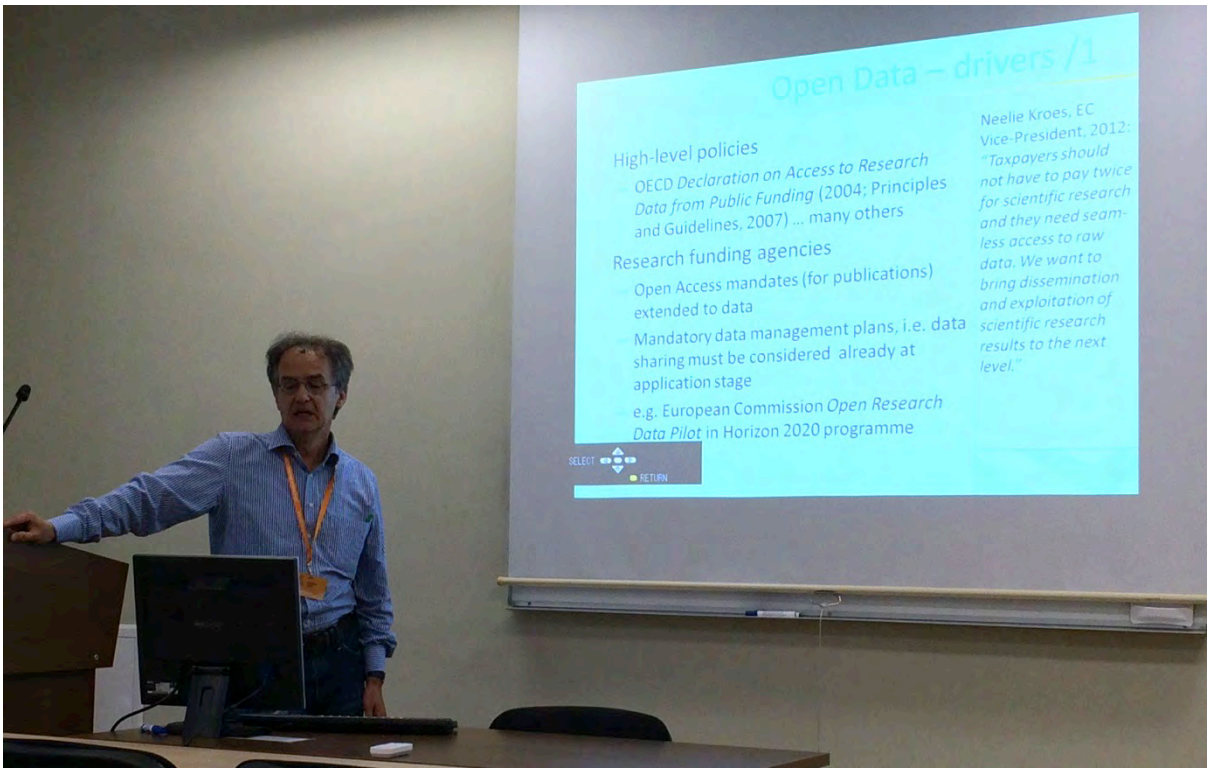

Figure 19: Guntram Geser presenting on open data and archaeology. Photo: K. Fernie

The final training event returned to the same format as the successful open access session in which many ARIADNE partners participated at EAA in Istanbul; an ARIADNE themed session was proposed as a follow at EAA Vilnius. The session was very successful with over 30 attendees and encouraged significant dialogue about the project.

The following account of the session was written by Kate Fernie.

EAA 2016 was the venue for a session on Open Access and Open Data in Archaeology, which explored whether the availability of open data is changing the nature of archaeological research and publication.

The session, which was organised by Julian Richards and Holly Wright of ADS with Frank Siegmund of Universität Düsseldorf and Guntram Geser of Salzburg Research, was well attended.

Guntram Geser opened with a paper on the requirements for open data in archaeology and – importantly how researchers can reap the benefits. Geser called for the barriers to depositing open data to be lowered suggesting that improved academic recognition for data providers is an important first step. Equally important is looking at ways of encouraging researchers, who currently store the majority of data on their computers, to deposit data in repositories. Geser noted that this can help satisfy research funders who want to see re-use of data through data citations.

The take away point was that opening access is about making published data part of the record – persistent, citable and rewarded. But we still need to do more. Researchers still lack information

about repositories that are able to take open data publications. We need to demonstrate the tangible benefits and provide answers to questions such as whether open data leads to better research and more informed decision-making.

Next Erin Osborne-Martin spoke about the Society of Antiquaries of Scotland's project to open up their data. The Society makes the Scottish Archaeological Internet Reports (SAIR) available as an open access publication through the ADS (http://archaeologydataservice.ac.uk/archives/view/sair/) since 2000. Osborne-Martin reported that the download figures have shown that the online audience is much bigger than SAIR's print audience. This has encouraged the Society to look at moving to a digital only version of its proceedings. This involves convincing members of the benefits, which include the savings that will be made on digital only publications that can be invested in original research. In addition to making new editions of the proceedings available digitally, the Society has a project underway to digitise previous editions of the Proceedings, Archaeologia Scotica and the Society's out-of-print monographs.

"The great thing about open access publication is that there are lots of different services for people to see your material."

Tim Evans gave a very interesting paper on grey literature reports and their potential for open access approaches. The large number of archaeological interventions each year has led to a publication crisis, with smaller excavations and evaluations rarely having the resources for full publication. Over time so-called "grey literature" reports have increasingly been made available online – and have become less grey with the inclusion of more detailed images, plans and other material. Online reporting forms and facilities to upload reports (such as OASIS/Herald by ADS) has increased the accessibility of archaeological grey literature – and its use, which can be demonstrated in web statistics. Evans concluded with the final thought that grey literature is the tip of the data iceberg.

Lisa Fentress followed with a paper on legacy archives and what we do with them in Europe and North Africa. Fasti online is a well-established service with a network that is actively engaged in

Figure 20: Lisa Fentress discussing legacy archives

reporting excavations and survey activities in the Classical World. The North African Heritage Archives network is a new venture, in which 22 organisations working in the Maghreb region have agreed to work together to unite their information in a single platform. This network is currently exploring the easiest and simplest ways for archaeologists to use to report their activities.

Costis Dallas gave an overview of the approach adopted by ARIADNE to integrating archaeological datasets. Partners map their datasets to the ARIADNE Catalogue model, which provides the framework for integration of collections, bibliographic reports, databases and datasets. Dallas described a series of microservices that have been made available to enable provided data to be enriched with subjects and time concepts, and spatial coordinates.

Holly Wright concluded the session by explaining the linked data approaches that are being used within ARIADNE and how these approaches can help to make archaeological data more open. Two main approaches were described – mapping of subject concepts to the Getty's Art & Architecture Thesaurus (AAT) and contributing period concepts to PeriodO. A thesaurus mapping tool developed by the University of South Wales was made available to enable ARIADNE partners (and others) to map their subject concepts to the AAT. The mappings created were then made available for use in the ARIADNE portal – in this way supporting multilingual query expansion. The second approach involved ARIADNE partners supplying period terms and their definitions for inclusion in the PeriodO gazetteer where they are made available as Linked Open Data.

One of the lessons learned from ARIADNE's experience is that Linked Data resources such as AAT provide tools for making archaeological data more open, but working together is key to supporting open practices.

Figure 21: Good discussions at the EAA Vilnius ARIADNE session. Photo: G. Geser.

The session concluded in a discussion about success stories to demonstrate to people that open data really works. A participant from Nomisma commented that coin data is a perfect example of the need to be able to search across country borders and the value of Linked Open Data in supporting this. Another participant commented that zoo-archaeology lends itself to Linked Open Data because species taxonomies are available; but also demonstrates the intricacies of zoo-archaeological work and the need to add terms such as “sheep/goat” that are outside the formal taxonomy.

The session was sponsored by the ARIADNE project, follows on from Barriers and opportunities: Open Access and Open Data in Archaeology at EAA 2014 in Istanbul.

4 Conclusions

ARIADNE has offered a range of opportunities for transnational access to the infrastructure and training to archaeologists throughout the project. This has included opportunities for online access to datasets and services, training events, summer schools, group and individual access visits to the physical laboratories of ARIADNE partners.

The feedback that the project has received from participants in these activities has been overwhelmingly positive. Participants highlighted how they valued the opportunities to learn, to network and collaborate with other researchers, and to receive practical help and advice on their research projects.

In conclusion, the trans national access and training activities delivered by ARIADNE fulfilled their objectives of engaging participants with the research infrastructure and delivering on important learning outcomes with regards to the creation, management, access and preservation of archaeological datasets.

5 References

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