

Conference Program, CAA Nordic 2020, 8-9th October

Guidelines for attendees: This fully digital conference will follow the format of 15 minute presentations, with five minutes for questions after each speaker. Questions can be posted at any time on the chat, or orally at the end of each paper by raising the hand function. Questions posted on chat will be read by the session chair. Please help the conference to keep to the time schedule. In breaks, there will be opportunity to discuss issues with fellow conference participants in an informal format.

Thursday 8th October, 2020.

**10.20-10.30**: Conference opening

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| Keynote Speaker | Nicoló Dell’Unto | |
| 10.30-11.00 | *Museum of Cultural History, University of Oslo & Lund University* | |
|  | **The 3D experience; Past, Present and Future Directions** | |
| Session 1. Big Data and Modelling. Chair Espen Uleberg | | |
| 11.00-11.20 | | Jacob Kile-Vesik & Espen Uleberg |
|  | | *Museum of Cultural History, University of Oslo* |
|  | | **Infrastrukturprosjektet ADED (Archaeological Digital Excavation Documentation)** |
| 11.20-11.40 | | Olle Sköld, Lisa Börjesson & Isto Huvila |
|  | | *Department of ALM, Uppsala University* |
|  | | **Is there Paradata? A CRMdig-Supported Mapping of Provenance and Process Information in Archaeological Datasets** |
| 11.40-12.00 | | Svein Vatsvåg Nielsen |
|  | | *Museum of Cultural History, University of Oslo.* |
|  | | **Perfect waves? Reflections on how to combine logical statements with probabilistic data in the archaeological study of paleo-tsunamis** |
| 12.00-12.20 | | Francesca Mazzilli |
|  | | *Department of Archaeology, History, Cultural Studies and Religion, University of Bergen* |
|  | | **Introducing RENE project: Regional Religious Networks in the Roman Empire.** |

**12.20- 1.20: Lunch, including digital spaces for discussion**

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| Session 2. GIS, Remote Sensing & Heritage Management. Chair Steinar Kristiansen | |
| 12.20-12.40 | Jane Jansen |
|  | *Arkeologerna, Stockholm University* |
|  | **Dokumentation av megalitgravar i sydvästra Skåne, med hjälp av Intrasis 3D, Intrasis symbolkoder och Intrasis ’GPS’** |
| 12.40-1.00 | Rebecca J S Cannell |
|  | *Norwegian Institute for Bio-economic Research (NIBIO)* |
|  | **Land Use, Archaeology and the Future. Where to?** |
| 1.00-1.20 | Letizia Bonelli & Giulio Poggi |
|  | *Faculty of the Humanities, University of Oslo & Department of Archaeology, University of Sienna* |
|  | **Elaboration of historical DTM using vertical aerial photography for the assessment of anthropic and environmental transformations on archaeological deposits** |
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| 1.20-1.40 | **Break with digital discussion rooms** |
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| 1.40-2.00 | Arne Anderson Stamnes |
|  | *NTNU Vitenskapsmuseet, Trondheim.* |
|  | **Towers, ponds, pits and shrubs – Geophysical Investigation of the Austrått Manor complex: remote sensing** |
| 2.00-2.20 | Peter Jensen |
|  | *School of Culture and Society (Archaeological IT), Aarhus University* |
|  | **Digitale Metaldetektorfund (DIME)** |
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| 2.20-2.30 | **Short break with digital discussion rooms** |
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| 2.30-3.30 | **National Chapter Meetings** |

Friday 9th October, 2020

09.00-9.20: Conference room opens

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| Session 3. Statistical Approaches and Modelling. Chair Justin Kimball | |
| 9.20-9.40 | Lars Goran Spång |
|  | *Umeå University* |
|  | **Stone Age Migration Patterns and Territoriality Using Simulation Studies** |
| 9.40-10.00 | Isak Roalkvam & Steinar Solheim |
|  | *Museum of Cultural History, University of Oslo.* |
|  | **Using residential data as proxy for population dynamics: Aoristic modelling of shoreline dated sites in coastal SE-Norway** |
| 10.00-10.20 | Vojtěch Kaše & Petra Heřmánková |
|  | *Department of Culture and Society, Aahus University* |
|  | **Modelling temporal uncertainty in archaeological & historical datasets: The case of ancient Greek inscriptions** |
| 10.20-10.40 | Tomas Glomb |
|  | *Department of Archaeology, History, Cultural Studies and Religion, University of Bergen* |
|  | **The role of Roman soldiers and plagues in the spread of the cult of Asclepius: A quantitative approach** |
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| 10.40-11.00 | **Break with digital discussion rooms** |
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| Session 4. Visual Solutions in Research & Public Engagement. Chair Rebecca J S Cannell | |
| 11.00-11.20 | *Ole Fredrik Unhammer* |
|  | *Sapian CE, Department of Archaeology, History, Cultural Studies and Religion, Universiy of Bergen* |
|  | **Comprehensive 3D reconstruction of an archaeological site based on archive images** |
| 11.20-11.40 | Magne Samdal |
|  | *Museum of Cultural History, University of Oslo* |
|  | **Presentere web-appen Arkeologiske undersøkelser** |
| 11.40-12.00 | Florian Thiery & Sophie Charlotte Schmidt |
|  | *Research Squirrel Engineers (Germany)* |
|  | **Linked Reindeers? A Linked Open Data approach for rock art in Alta.** |
| 12.00-12.40 | **Lunch with digital discussion rooms** |
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| 12.40-1.00 | *Malin Sahlstedt & Håkan Thorén* |
|  | *Statens Maritima och Transporthistoriska Museer* |
|  | **VASABAS – A 3D management tool for VASA** |
| 1.00-1.20 | Astrid Tvedte Kristoffersen |
|  | *Museum of Cultural History, University of Oslo* |
|  | **The Archaeologist’s Guide to the Desktop Scanner: 3D scanning** |
| 1.20-1.40 | Justin Kimball |
|  | *Museum of Cultural History, University of Oslo* |
|  | **Defining Quality: What do we mean by “quality”?** |
| 1.40-2.00 | Conference remains informally open for any final questions between participants. |

**Abstract List**

*Ole Fredrik Unhammer, Department of Archaeology, History, Cultural Studies and Religion, University of Bergen*

1. **Comprehensive 3D reconstruction of an archaeological site based on archive images**

The development of modern technology and the availability of increasingly powerful computers allows archaeological sites to be documented in high resolution, both visually and spatially, on various scales of investigation. This brings with it many advantages such as the ability to:

• Document the gradual excavation of a site, creating an accurate archive for the future.

• Contextualise recovered archaeological material and samples within their original field context.

• Preform multiscale, site wide 3D evaluation of morphology, stratigraphy, and the configuration of a site.

• Better explain and reach a common understanding of archaeological sites within modern multidisciplinary research teams.

New and currently excavated sites may benefit from these abilities, however sites that have been excavated over multiple field seasons over several decades represent a challenge. At such sites, the method and resolution of documentation has often changed over time, resulting in datasets that are difficult to combine.

The South African Middle Stone Age site of Blombos Cave (BBC) has been excavated since 1991. Over fourteen excavation seasons, the documentation method has gradually evolved. Blombos Cave is a key site for understanding the development of human behaviour between 70-100 ka, and is currently the focus of a major multidisciplinary research project.

In this paper we demonstrate how analogue and digital images taken during different excavation seasons at BBC are used to produce 3D reconstructions using photogrammetry. We discuss the challenges and evaluate the accuracy of these methods used. Finally, we demonstrate that the reconstructions allows us to: 1) produce a more complete site model; 2) link archaeological material and samples directly to their original field context and 3) facilitate site-wide evaluation of geomorphology, surface topography and archaeostratigraphy as well as providing an important tool for discussion between researchers from different disciplines.

*Florian Thiery & Sophie Charlotte Schmidt, Research Squirrel Engineers (Germany)*

**2.Linked Reindeers? A Linked Open Data approach for rock art in Alta**

The famous rock art in Alta was discovered in 1970 by Prof. Knut Helskrog, who also significantly contributed to the research of these sites. In one of the northernmost places of Europe, on the road to the North Cape, this prehistoric World Heritage Site bears carvings from 500 BC - 100 AD. The largest site at Jiepmaluokta is open to the public as a museum. The petroglyphs are very well conserved and documented by Structure from Motion (SfM) techniques and photography. The images of single carvings are described with keywords and openly accessible via a website at altarockart.no/fotoweb. In recent years, Linked Open Data (LOD) as Open Access Strategy has become more and more common in archaeology. The CAA SIG on Semantics and LOUD in Archaeology (SIG-DataDragon), the Nomisma Project for numismatics, Linked Ogham Stones and other archaeological information are available on Wikidata as a secondary database. From these developments the idea arose to bring rock art to LOD and Wikidata following the idea of Volunteered Archaeological Information and the SPARQL Unicorn principles [10.5281/zenodo.3742185]. It is therefore our objective to publish the Alta rock carvings as LOD using Wikidata as a semantic publishing tool. The overall idea is to build up a Linked rock art hub like nomisma for coins, starting with publishing data in Wikidata, like the Research Squirrel Engineers have done in the Ogi Ogham Project [http://ogham.link] for medieval stones. In this paper we want to focus on initial modelling ideas and first implementations for Alta rock art in Wikidata.

*Olle Sköld, Lisa Börjesson & Isto Huvila, Department of ALM, Uppsala University*

**3.Is there Paradata? A CRMdig-Supported Mapping of Provenance and Process Information in Archaeological Datasets**

It has become increasingly clear that repositories carrying archaeological data are not as used or useful as they could be (Kim and Yoon, 2017; Voss, 2012), and that these shortcomings cannot be addressed by infrastructural expansion and refinement (more content, features, interoperability) alone (Baker and Yarmey, 2009; Birnholtz and Bietz, 2003). Previous research shows that a ubiquitous barrier to efficient and purposeful (re)use of archaeological repository data stems from the episodic structure of the scholarly-data lifecycle; data is originally created in a certain setting of disciplinary, epistemic, methodological auspices and re-used in a setting that is almost inevitably different to a degree (Van House, 2004). The intellectual horizons of primary and secondary data usage can be to some extent merged if repository users are supplied with auxiliary provenance information about the processes and tools involved in creating the data (e.g., Faniel and Yakel, 2017; Yakel et al., 2013)—so-called 'paradata' (Couper, 2000). Much, however, remains to be investigated about how to efficiently and purposefully capture and disseminate paradata with the objective to support the reusability of archaeological data. The present paper contributes to this vein of work by addressing a question that has hitherto seen little research attention: what paradata is presently included in archaeological data repositories, and what are the principal characteristics of such paradata in terms of content and descriptive structure? The paper is empirically based on a pilot study of metadata pertaining to data papers published in the Journal of Open Archaeology Data (JOAD). The analysis of the metadata is conducted using a qualitative coding schema (Saldaña, 2015) based on CRMdig, a provenance-metadata ontology in the CIDOC CRM-family (http://www.cidoc-crm.org/crmdig). CRMdig sensitizes the analysis to the wide range of categories and relationships described by the ontology and allows for analyses of paradata expressions in the JOAD data that remain outside of the ontology’s scope. The results of the paper include a rendering of the paradata that was encountered in the pilot study, and reflections on how already-present paradata in archaeological data repositories feasibly can be used to create resources that support (re)use of archaeological data.

*References*

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*Malin Sahlstedt & Håkan Thorén, Statens Maritima och Transporthistoriska Museer*

**4.VASABAS – A 3D management tool for VASA**

Ever since the turn of the millennium, there have been plans at the Vasa Museum to gather all information about the Vasa Ship in a 3D-based management tool. The ship was laser scanned as early as 2003, but at that time it was difficult to find software where you could visualize database information together with a 3D model. Three years ago, the plans were updated again and the 3D-Vasa project was started. The project aimed to find suitable technology to digitize the entire ship to get a photorealistic 3D model. The project also aimed to find software where you could gather all the information about the ship, link it together and be able to visualize it together with the 3D model. The project has been completed for a year and it resulted in VASABAS, a 3D-GIS for all information and a 3D model of the ship is slowly emerging. This paper tells about the choices that have been made both in terms of digitization technology and choice of software as well as the problems that have arisen along the way and solutions to these.

*Svein Vatsvåg Nielsen, Museum of Cultural History, University of Oslo.*

**5.Perfect waves? Reflections on how to combine logical statements with probabilistic data in the archaeological study of paleo-tsunamis’.**

Lake basins surrounding the North Sea holds evidence of multiple paleo-tsunami events, but these have received surprisingly little archaeological attention. This paper suggests that the construction of time sensitive models, which contain a realistic combination of logical statements with probabilistic data, is a major challenge for the archaeological study of paleo-tsunamis’. The aim of the paper is to share some reflections on how to construct such models, using the Garth tsunami (3500 cal. BCE) as a case study. I present what could be called a statistically informed approach to the radiocarbon date record, where dates are measured against prior geological, stratigraphic and chronological knowledge. Such an approach decreases the gap between geology and archaeology, and enables an empirically based consideration of archaeological occupation phases and demographic variability on a supra regional scale.

*Francesca Mazzilli, Department of Archaeology, History, Cultural Studies and Religion, University of Bergen.*

**6.Introducing RENE project: Regional Religious Networks in the Roman Empire**

Based on the concept of religion as ‘continuously in the making’, discussed especially in recent studies, my Marie Skłodowska-Curie project (RENE) aims to re-evaluate cult sites as the product of a dynamic socio-political context as well as the product of movements of different agents and ideas through social network analysis (SNA). Whereas recent studies on religion using SNA, such as work by Anna Collar and GEHIR project, have focused on the diffusion of specific cults across the Empire associated with movements of people, my project is a multidisciplinary study of cult sites in two areas at the margins of the Roman Empire (roughly modern-day southern Syria and Portugal). This involves examining architecture of temples, gods worshipped in cult sites, their benefactors and landscape through SNA.

This paper will introduce future directions of the project, in particular, it will propose how SNA will offer a better understanding of the following research questions: how religious and cultural transmissions developed; how the movement of people affected religious and cultural transmissions; the role of cities in relation to the rural religious landscape and vice versa; the identification of religious and socio-cultural subgroups; and how the landscape affected or shaped religious cultural transmission and mobility of elite. The paper will show some preliminary results of the project, in particular, the link between soldiers and the diffusion of gods in southern Syria.

*Tomas Glomb, Department of Archaeology, History, Cultural Studies and Religion, University of Bergen.*

**7.The role of Roman soldiers and plagues in the spread of the cult of Asclepius: A quantitative approach.**

The paper introduces the two-year research project “Favorable Conditions of the Spread of the Cult of Asclepius across the Transportation Network of the Roman Mediterranean: A Quantitative Evaluation” (acronym AscNet; 2020-2022) affiliated with the University of Bergen, Norway. The paper will demonstrate how we can further explore the topic of factors of the spread of the cult of Asclepius, the god of medicine, in Roman-era by using formalized methods from the portfolio of Digital Humanities. More specifically, the paper will present the possibilities of these methods on two hypotheses produced by the academic debate: H1) Roman soldiers transported the cult of Asclepius; H2) Transmission of cultic practices related to the cult of Asclepius originated from an unexpected event such as an epidemy of infectious disease. These hypotheses are, so far, supported by generalizing interpretation of selected pieces of archaeological or literary evidence and potentially unable to reflect the complexities of this historical process of cultural transmission such as the role of the transportation network, differing regional/provincial dynamics combined for example with specific cultural preferences of Roman emperors changing from decade to decade. With respect to H1, the paper will present how spatial network analysis allows us to uncover spatial relationships and dependencies between the Roman military presence and the epigraphic evidence of the cult of Asclepius. With respect to H2, the paper will discuss what can quantitative textual or coin analysis combined with temporal modelling tell us about the inclinations of Roman elites and the common population to worship Asclepius in times of Antonine or Cyprian plagues.

*Letizia Bonelli & Giulio Poggi, Faculty of the Humanities, University of Oslo/ Department of Archaeology, University of Sienna.*

**8.Elaboration of historical DTM using vertical aerial photography for the assessment of anthropic and environmental transformations on archaeological deposits.**

Since the first decades of 20th century, vertical aerial photography has become an indispensable resource for land monitoring and for the realization of topographic maps. Regular flights over the years have produced a large number of pictures, which often reflect the conditions of the landscape before the introduction of modern agriculture management systems and industrialization. The goal of our work is to assess the capabilities of the earliest historical flight in central Italy to detect both erosion and accumulation landscape processes that have occurred over the last 80 years, and how these changes may have affected the archaeological deposits. In order to obtain geospatial information from archive pictures dated to 1938-1941, we enhance the picture quality and then process the set of images with digital photogrammetry tools. By the means of an accurate topographic survey to geo-reference the project, the elaboration produces a “historical” Digital Elevation Model (hDTM); a model which reflects the geomorphological condition of the landscape at that specific time in the past. The resulting dataset is then compared with a 2012 LiDAR-derived DTM to visually and quantitatively evaluate the altimetric and geomorphologic changes. By using a case study located within a coastal plain in Southern Tuscany, Italy, the presentation aims at pointing out how “historical” DTMs can be exploited to detect local changes in geomorphology and at which level of detail. The evaluation of pros and cons of the presented methodology will be also discussed in order to determine if archive photographs can be successfully used as a predictive tool for archaeology in recognising both anthropic and natural erosion and accumulation processes, influencing archaeological fieldwork activities and research.

*Astrid Tvedte Kristoffersen, Museum of Cultural History, University of Oslo.*

**9. The Archaeologist’s Guide to the Desktop Scanner**

For archaeologists, 3D scanning of objects can be essential and appreciated for a number of reasons:

•             Documentation. Measure and record precise data for digital archiving of archaeological artefacts.

•             Communication and education. Build visual illustrations and reconstructions for display and interaction with an audience; print 3D replicas.

•             Analysis. Study details, observe changes/deformations over time, compare objects, and reconstruct artefacts from fragments.

The necessary tools and instruments can be expensive, and require long-term training. However, for some purposes, (relatively) inexpensive, portable instruments, with user-friendly software, can be operated by a person with little or no experience with 3D scanning. In a case study from a PhD-project in progress, I will illustrate how a Matter and Form V2 3D Scanner with MFStudio software can be a useful assistant in illustrating and comparing near-similar objects. In the presentation, I will show how the instrument is operated, the possibilities and limitations of the tool and software, and in general consider the pros and cons with a quick-scan instrument for archaeological analysis.

Case study: A large number (50+) of typologically similar spindle whorls have been found in and around Oslo, Norway. These are small spherical lead weights used on spindles for making wool thread. A few of the whorls are dated contextually to around 1150-1250 AD and could potentially have been produced in the same workshop. In my project, I will attempt to confirm whether these objects can be traced to a single location specialising in serial production of lead whorls. As a first step, I will evaluate if a quick 3D scanning and modelling method is helpful in the analysis versus the traditional visual examination.

*Arne Anderson Stamnes, NTNU, Vitenskapsmuseet, Trondheim.*

**10. Towers, ponds, pits and shrubs – Geophysical Investigation of the Austrått Manor complex**

In 2018 and 2019 the NTNU University Museum undertook a geophysical investigation of the Manor of Austrått in Ørland Municipality. The project was a collaboration with Ørland municipality and Trøndelag County Council. The manor has been part of the highest aristocracy during the middle ages, but metal detecting finds and prior minor investigations reveal iron age settlement traces and the site is rich in history. The investigations involved both an investigation of the former baroque garden, as well as approximately 4.5 hectares of GPR in the fields surrounding the manor. The final results show a range of archaeological features, involving garden features such as paths and pathways, ponds and former shrubberies. In the surrounding fields, several stone-built buildings, large pits and trackways give a new and highly interesting view of the archaeology of the site over time.

*Isak Roalkvam & Steinar Solheim, University of Oslo*

**11. Using residential data as proxy for population dynamics: Aoristic modelling of shoreline dated sites in coastal SE-Norway**

The Mesolithic in Norway is represented by a vast archaeological material, where South-Eastern Norway alone holds sites numbering in the thousands. The concentration of settlements in coastal areas and a continuous land-rise in the Holocene means that Mesolithic sites in South-Eastern Norway can be dated with reference to their elevation above present day sea level. This offers an excellent possibility for elucidating general, long-term tendencies in societal variation.  
  
Modelling relative fluctuations in radiocarbon dates has proven a valuable proxy for prehistoric population dynamics. Shoreline dated sites can offer a large, independent source of temporal data that is not contingent on the preservation of organic material. While this data can be leveraged to model long-term societal fluctuations, it is, however, associated with its own set of underlying assumptions and uncertainties.  
  
Here we draw on works that have attempted to combine several, disparate sources of data for studying long-term population patterns. By applying a probabilistic approach, using aoristic modelling, we offer preliminary results and methodological considerations pertinent for the handling of both a material on this scale and the uncertainty associated with dating and summing site counts by means of shoreline displacement.

*Espen Uleberg & Jacob Kile-Vesik, Museum of Cultural History, University of Oslo*

**12. Infrastrukturprosjektet ADED (Archaeological Digital Excavation Documentation)**

ADED (Archaeological Digital Excavation Documentation) er et infrastrukturprosjekt som vil samle og tilgjengeliggjøre utgravingsdokumentasjon i Norge. Prosjektet startet høsten 2018 og skal gå fram til våren 2021. Prosjektet bygger på standarder for utgravningsdokumentasjon som er utviklet i MUSIT-samarbeidet siden 2011 da universitetsmuseene bestemte seg for å ta i bruk det svenske intrasis (https://www.intrasis.com/) til utgravningsdokumentasjon. Prosjektet skal ta vare på eksisterende utgravningsdata i et repositorium. I tillegg blir dataene samlet slik at de kan vises samlet. Datamodellen er utviklet i henhold til den hendelsesorienterte datamodellen CIDOC-CRM. Dette er gjort for å lette koblingen til internasjonale infrastrukturer for arkeologi, som ARIADNE. Data fra utgravningene fordeles mellom Riksantikvaren og hos ADED. Riksantikvaren tar ansvar for utgravd område og metadata om undersøkelsen mens ADED tar ansvar for den detaljerte utgravningsdokumentasjonen, Både Riksantikvaren og universitetsmuseene deltar i prosjektets styringsgruppe og referansegruppe. Universitetsmuseene er i gang med å vaske egne datasett. Fordelingen av midler i prosjektet er gjort på grunnlag av hvor mange utgravningsprosjekt med digital dokumentasjon hvert av museene har. Prosjektene skal lastes opp i ADED slik at det blir mulig å søke, vise og laste ned datasett på tvers av undersøkelser og museumsdistrikt. Det mest synlige resultatet av arbeidet er nettsiden som gjør dette mulig. Nettsiden vil også vise informasjon fra Askeladden, og MUSITs gjenstandsbase og fotobase.

*Magne Samdal, Museum of Cultural History, University of Oslo.*

**13. Vil presentere web-appen Arkeologiske undersøkelser**.

Her er det tilgjengelig over 4000 arkeologiske rapporter fra KHM, Gjenstandsbasen UNIMUS samt arkeologiske lokaliteter/miljøer fra Riksantikvarens base Askeladden/kulturminnesøk:  
  
https://humgis.uiocloud.no/arcgis/apps/webappviewer/index.html?id=491d095405234f5a994671a1346d076c  
  
Det er også lagt inn historiske bakgrunnskart (Amtskart) og Lidar (høydedata.no) i løsningen.

*Vojtěch Kaše & Petra Heřmánková, Department of Culture and Society, Aahus University.*

**14. Modelling temporal uncertainty in archaeological & historical datasets: The case of ancient Greek inscriptions.**

This paper discusses several approaches to deal with temporal uncertainty commonly appearing in archaeological and historical datasets. For the demonstration of our approach, we will employ a dataset of ancient Greek inscriptions. While objects in such a dataset can be in principle dated quite precisely to a singular year, they are commonly dated to a rather extensive temporal range (e.g. to a century or even to a historical period extending through several centuries). The question is how to employ such broadly dated objects while exploring temporal patterns in the data. In this paper, we will introduce several approaches to this issue. In our opinion, the most promising approach uses the ranges as defining probabilities, which are subsequently employed in simulations randomly assigning singular dates to each object in the dataset. The obtained simulations might then be used for standard hypothesis testing and statistical modelling concerning temporal patterns in the dataset.

*Jane Jansen, Arkeologerna, Stockholm Universty*

**15. Dokumentation av megalitgravar i Sydvästra Skåne. Dokumentation av megalitgravar i sydvästra Skåne, med hjälp av Intrasis 3D, Intrasis symbolkoder och Intrasis ’GPS’.**

Under vintern 2019/2020 dokumenterades 30 mer eller mindre bevarande megalitgravar i Sydvästra Skåne. Björn Wallebom som är doktorand vid Lunds Universitet hade upptäckt i samband med sitt avhandlingsarbete att de flesta planer och beskrivningar av megalitgravar var antingen föråldrade, bristfälliga eller felaktiga. Vissa har aldrig varit dokumenterade. Målet var att komplettera befintliga beskrivningar i det svenska nationella Kulturminnesregistret, -Fornreg/Fornsök. Kompletteringen skulle bestå av texter och planer.

Kraven från Björns sida var att megalitgravarna skulle mätas in i det svenska nationella koordinatsystemet Sweref 99 TM. Den digitala dokumentationen skulle vara lättillgänglig och systematisk. Dokumentationen skulle vara lagrad på ett säkert sätt. Inmätningarna skulle vara noggranna och planerna skulle vara traditionella 2D planer enligt Dr Märta Strömbergs mall som fungerar i de flesta typer av tryck. Det skulle även vara enkelt att reproducera planerna.

Föredraget handlar om hur jag använde Intrasis för nå målen och lite om megalitgravar.

*Justin Kimball, Museum of Cultural History, University of Oslo.*

**16. Defining Quality: What do we mean by “quality”?**

Modern 3D documentation methods, and their derived products, have reached fantastic levels of detail. We have the capacity to describe surfaces on scales ranging, for example, between kilometres and micrometres. The scope of this is truly staggering. Yet, how does one define the “quality” of documentation? In the lab today between technicians and researchers, one will often here some variation of the phrase “this is a <level + 'quality/resolution' + model>” (e.g. low-quality; high-resolution). This habit has even permeated down into the public's lexicon, which can be readily seen in various technological products and how they are promoted.

From a technician's perspective, it is easy to define a 3D model by its processing parametres, that are often named after these phrases within the software itself. A researcher on the other hand is concerned with working from and presenting the highest-quality data possible—and a consumer/client, will obviously be looking to get the best model for a reasonable price.

But what does it all mean? How do we define the phase “<level + 'quality/resolution' + model>”? Does this phrase actually convey an accurate and relatable meaning between technicians, researchers, and clients? Can the phrase even accomplish this between technicians? In my experience, the answer is no—it does not.

This problem can obviously have many repercussions and it behoves us to find a solution. This paper aims to identify the common pitfalls and suggest possible solutions—not as a cure-all strategy—but rather as a means to open a dialogue to help us explicitly define what we mean by quality in 3D documentation and how we can best communicate these definitions to others.

*Rebecca J. S. Cannell, Norwegian Institute for Bio-economic Research (NIBIO).*

**17. Land Use, Archaeology and the Future. Where to?**

There are more people than ever before, and people must be fed. Food comes from the land. This then requires more intense and efficient land-use, which in turn requires more complex and precise data on local and regional soils and climatic conditions. Simultaneously, we are seeing the consequences of climate change and intense land use, for example in the dramatic falls in native and migratory birds, pollenating insects and biodiversity due to the intensification of resource exploitation. Climate change is threatening our ability to produce food, and natural habitats are being lost. Intensive farming reduces and releases the carbon stores in soils, increasing the negative impact on the climate farming already has. But we must eat, and often the solutions pouted are technological, and linear in their goals.

Where does cultural heritage fit into this debate? Past and present, the majority of people live near the best land, meaning the greatest concentrations of cultural heritage lies under what is now intensely cultivated land. Eroding topsoils and the increasingly intense farming of these areas means that what remains under the topsoil are being eroded and truncated at a very rapid pace. We face the likelihood that in decades, if not sooner, the vast majority of these hidden remains of our past will be lost to the plough. The consequences of ploughing and truncating archaeology are everywhere, in the hundreds of objects delivered every year by metal detectorists and farmers. But the objects that survive in the topsoil are just the durable fraction of the past, and give a very one sided view of the past. Arguably the greatest information on past settlement types, land-use and those who were not afforded a wealthy burial come from the soil archives themselves, which are revealed to us via the increasing sophistication of scientific analysis and methods that are becoming increasingly integrated in archaeological practice. So what is the way forward?

Lars Goran Spång, Umeå University,

**18. Stone Age Migration Patterns and Territoriality Using Simulation Studies**

Villages consisting of semi-subterranean houses were common among hunter-gatherers throughout the circumpolar area during the Stone Age. Winter villages in northern Sweden show that territoriality was established by ca. 4500 BC (Lundberg 1997). Analysis suggests that each village consisted of a group of households and that each household utilized a territory ca. 500 square kilometers in size that was centered on a lake and its drainage system (Spĺng 2019). Archaeological data shows that moose and beaver were principal resources. Fishing, the hunting of birds and quarrying for lithic materials was carried out during the summer.

A simulation model was used to analyse the archaeological data from two territories in order to determine an optimal annual cycle and migration pattern for each household group within their respective river basins. A further simulation provided insight on how predation by both wolves and humans would affect the moose population. Moose almost went extinct during the Iron Age and the question arises whether the wolf was involved in this process.

The two simulations provide a benchmark for interpreting the archaeological data. GIS mapping of the migration patterns of moose has provided additional data used to estimate when and where moose moved in and between household territories.

The project has been carried out in collaboration with the Dept. of Wildlife, Fish and Environmental Studies at the Swedish University of Agricultural Sciences (SLU) in Umeå.

*Peter Jensen,**School of Culture and Society (Archaeological IT), Aarhus University*

**19. Digitale Metaldetektorfund (DIME)**

Digitale Metaldetektorfund (DIME) was launched two years ago, in September 2018, as a Citizen Science project to facilitate the user driven recording of metal detector finds produced by members of the public. The operational aim of DIME is to provide a portal for the registering and hence safeguarding of the increasing number of metal detector finds and to make them accessible for the general public and for research. The more overarching vision behind the DIME project is to realise the potential of recreational metal detecting as a medium to implement an inclusive and democratic approach to heritage management in Denmark and to advance the incorporation of principles of citizen science and crowdsourcing in museum practice.

This presentation will discuss the project background and its position as a link between amateur archaeologists, local museums, the National Museum and the Cultural Heritage Agency. Mainly, the presentation will focus on the status, outcome and experience gained over the course of the last two years; especially the lessons learned from an agile development process, in which we are continuously seeking to advance, improve and facilitate easy field recording and support efficient heritage management.