

CAA 2017 sessions

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- Women in CAA

3D Digitization of Sculpture

This session is devoted to the issues arising from the digitization of a particular class of 3D object—works of sculpture. Improvements in recent years in photogrammetric modeling have made it possible for the first time to undertake wholesale 3D digitization of large collections of sculpture. For example, the session organizers are currently leading an effort to create 3D models of all the ancient sculpture in the Uffizi Galleries in Florence, Italy (ca. 1,250 objects). This session will present new work in this area of application covering topics arising at every stage in the workflow, including 3D data capture (whether using laser or structured light scanners, photogrammetry, or some combination of technologies), 3D modeling, 3D restoration (including the restoration of polychromy), optimization of 3D models, best practice for metadata and paradata, WebGL solutions for publishing 3D models online as well as AR and VR applications. We welcome submissions concerning any of these topics. Equally welcome are submissions concerning the use of 3D models of sculpture for museum education and outreach or the utility of the digital model for purposes of scholarly analysis, experimentation, and interpretation.

Bernard Frischer

Gabriele Guidi

3D Technologies Applied to Music and Sound

This session will discuss the application of new 3D technologies to the study of ancient music and acoustics. From 3D scanning and printing ancient musical instruments to using 3D models of architectural features to digitally map the acoustics of an area, archaeologists can now utilize a range of methodologies that help them to better understand how past cultures exploited sound. Despite the presence of music and the intentional manipulation of sound in nearly all ancient cultures, these topics remain understudied. Ancient music and acoustics are important beyond the scope of academic inquiry; because music appeals to our sense of hearing and to our intuition, the study of music has the potential to increase student and public interest in archaeology and ancient cultures. For example, museums can use playable 3D printed musical instruments to encourage people to learn about and interact with the past in a tactile way. Bringing sound back into the discussion of the past incorporates hearing into a field that typically relies solely upon sight. Engaging multiple senses when learning about ancient cultures helps to recreate the sensorial experience that the individuals living at these sites would have experienced in their lives, which helps to bring the past to life for people today. There are numerous applications for 3D technologies when engaging with a broader audience that have great potential. Equally important is the way in which incorporating sound into virtual reconstructions of ancient spaces can facilitate new scholarly discoveries or help scholars to test the validity of existing theories. This session will focus on new work incorporating sound and music into virtual environments and/or using 3D modeling to physically reproduce ancient instruments.

Bernard Frischer

Jared Katz

3DVR Caveats and Accomplishments

This session invites participants who are willing to share not only what works in their 3D VR reconstructions, but also the lessons learned. The organizers are interested to hear how the 3D models do, or do not answer research questions; enable or fail to make arguments; solve or provide theoretical problems; whether the model succeeds or does not succeed to connect to the underlying data; whether the model stands on its own, or can be linked to others. The form of the session is a series of short presentations followed by discussion of the main themes. This leads to suggestions on how to improve workflow, software use and communication around 3DVR models. The participants will demonstrate their models and the way they are made accessible in a parallel presentation to show the audience in detail what the issues and solutions are. This has the form of a mini digital poster session, focused on discussing the caveats and accomplishments.

Willeke Wendrich

Archaeological Networks: Uncertainty, Missing Data, and Statistical Inference

Empirical studies of networks based on archaeological data are on a rapid rise. So far, the adoption of network methods from other fields has outpaced the development of new techniques and heuristics for dealing with the sometimes peculiar qualities of archaeological network data. Key among the issues faced by archaeologists interested in using networks are the impact of uncertainty and missing data on the properties of the networks we generate. We often must build networks based on an incomplete universe of nodes (because our units of analysis lack current archaeological information or have been destroyed) as well as incomplete information about the nodes we do have (due to sampling issues, different recording conventions, etc.). Further, we often have no consistent way to estimate how much information we are missing. The prevalence of such known unknowns and unknown unknowns suggest that we must carefully temper inferences drawn from networks defined using archaeological data. Importantly, all hope is not lost and these challenges are not unique to archaeology or network data alone. In this session, we ask contributors to explore the potential impact of missing data on empirical archaeological networks and/or test tools and approaches for identifying robust patterns in archaeological networks despite such challenges. Approaches may include, for example, the use of probabilistic estimates and sensitivity analysis already popular in many other areas of archaeological statistical analysis such as seriation or methods specific to network data drawing on the large body of research focused on estimating the shape and properties of so called “dark” networks (common in studies of covert organizations, epidemiology, and infectious disease). In addition, this session welcomes archaeological applications of network methods in general.

Tom Brughmans

Matt Peeples

Archaeology In and Out of the Classroom: Digital Approaches to Archaeological Instruction

The continuous development and adoption digital methods, tools, and technologies is having an impact on virtually every field. In archaeology, these developments affect the way we carry out excavations, conservation, publication, and all of the steps in between. Similarly, technology has become such an ingrained part of teaching and learning that what used to be referred to separately as “teaching with technology” has now simply become a part of teaching writ large. The convergence between technologically-informed teaching and the practice of archaeology takes place on multiple levels, from introductory instruction to higher-order skills needed for fieldwork and data analysis. Similarly, it is realized through multiple modalities, including in person – in the field and in the classroom – and online, as well as in a hybrid form consisting of classroom/field and classroom/online combinations. The goal of this session is to convene practitioners in a dialogue that is focused on examples of digitally-informed approaches to archaeological instruction in any setting, from seminars to massive open online courses (MOOCs) to field workshops, etc. To that end, we invite contributions that speak to the application of digital methods to the teaching of archaeology as a subject and as a practice. These contributions can consist of successful approaches to integrating digital methods into the instruction of archaeology and cultural heritage, either in the classroom, online, or via hybrid methods, as well as lessons learned from less successful approaches. We envision this as an interactive session: paper presentations may be supplemented by demonstrations of digital tools and approaches, and projects that are in the planning or pilot stage, or that are in need of reworking to improve results, can be discussed or ‘workshopped’ by session participants, with the ultimate goal of gaining a better understanding of, and becoming better equipped to intelligently apply, digital methods and tools to the teaching of archaeology.

Jeffrey P. Emanuel

Automation is here to stay! The hitch-hiker's guide to automated object

detection and image processing in remote sensing

Automation is here to stay! Building on the 2016 CAA session in Oslo on Computer vision for automated object identification, this session aims to develop further the automation agenda for remote sensing image processing. We can see a willingness to engage with such approaches, often through applying techniques borrowed from other disciplines (such as medical imaging, face recognition, surveillance and security, social media) and the increasing power of computer vision techniques and machine learning approaches. Amongst the many available methods that include tools based on (to name a few) deep convolutional networks (CNN), object-based image analysis, cognitive reasoning, self-learning algorithms and adaptive template matching there are convincing applications that overcome the earlier limitations of spectral and object-based methods and that they can enable the recognition of landscape patterns/objects produced by the near-unlimited assortment of forms, dimensions and spectral properties that mark soil-concealed anthropogenic remains. This session offers a forum for practitioners of these new techniques, welcoming presentations on theory, experiences, and projects related to the theme of automatic object identification in archaeological remote sensing. We aim to highlight prospects and opportunities of the discipline, and discuss challenges ahead, regardless of the employed image datasets. Ideally, it also meant to bring together archaeologists and experts from other disciplines presenting methods that can be applied to the archaeological domain. Themes of interests include, but are not restricted to: • pattern recognition and pattern matching • object-based image analysis • deep convolutional networks (CNN) • mathematical morphology • emerging methods from other disciplines

Arianna Traviglia

Dave Cowley

Close range 3D data acquisition, processing, querying and presentation in cultural heritage

This session collects contributions concerned with 3D data and how they are employed to tackle research questions or for proficient presentation. While much attention has been paid in recent years to evaluate different methodologies of data acquisition, compare algorithms for data processing or querying of 3D data, much less attention has been given to provide information on data quality required to solve research questions. What resolution is required or useful to display data in a 3D viewer? What precision is needed for comparative study of gypsum casts? What do we learn from comparative studies with regards to required data quality? How can we analyse 3D data to answer specific archaeological questions? How to acquire color and 3D information from the same object? This session particularly invites presenters working with 3D data that can provide feedback towards the process of acquisition to optimize data collection and to identify best data collection procedure for a given project. At the same time we welcome contributions that are focused on performing analysis of 3D data to solve archaeological questions and are predominantly application based or based on acquisition methodology.

Dirk Rieke-Zapp

Vera Moitinho de Almeida

Diego Jiménez-Badillo

Computer Applications in Archaeological Pedagogy: Best Practices for Teaching and Learning

The papers in this session include the teaching and learning of computer applications in archaeology as well as the use of such tools to support teaching and learning about the human past. We wish that participants in our session ask themselves only one question: whether the goal is to teach about archaeological discoveries or archaeological methods, how can we best use computer applications? Following up on previous CAA pedagogy sessions, we invite authors to contribute papers in which the learners may be archaeologists, pupils from primary and secondary schools, or the general public. We aim to encourage a dialogue not only about successful projects and teaching workflows, but those which didn't work out as well, in order to avoid them in the future. We anticipate that sharing these pedagogical experiences may better advance both

archaeological knowledge and archaeological methods.

Anna S Agbe-Davies

Julia Chyla

CONTRIBUTIONS TO SETTLEMENT THEORY? ARCHAEOLOGICAL LOCATION ANALYSIS AND MODELLING

Location analyses of archaeological site and settlement distributions at the regional level have been undertaken for at least a half century. In regions throughout the globe archaeologists have analysed these distributions for relationships, associations or correlations with aspects of the physical, and sometimes social, environments of regions. A host of approaches and methods have been employed ranging from goodness of fit tests for categorical and quantitative data, two-sample tests between groups indicating site presence and absence, regressions between aggregated site counts and regional variables, and many other techniques. Much related are archaeological location modelling (ALM) studies that frequently combine findings from location analyses using multivariate discriminant functions, logistic regressions and other methods to model the empirical pattern of settlement distributions. Such studies often suggest the significance of predictor variables related to positive archaeological responses. Moreover, through GIS the resultant functions may be mapped region-wide to portray graphically the “essence” of a spatial pattern of land use or settlement through a region in the form of archaeological likelihood. Recently, agent-based modelling approaches have also generated new insights into site and settlement distributions across landscapes. If we accept that a goal of archaeology is building theory that helps explain the past (as well as present and future), then the development of theories of location choice or “settlement theory” must surely form a central one. Many significant relationships with environment (whether physical or social) have been demonstrated in countless archaeological location analysis and modelling projects. The dictum “theory begins with facts” implies that findings from these studies should yield necessary information from which theory might be generated, assuming pattern and replicability. Yet, a frequent complaint about ALM in particular is the general lack of theoretical insights it has offered. With the volume of results in settlement location analysis and modelling through the decades surely the time is ripe to consider whether such efforts are warranted with respect to theory and the nature of theoretical insights that might be possible? This session includes papers that (1) describe methods that demonstrate linkages or associations between sites, settlements, or other uses of landscapes and features of a region, and (2) are able to form generalizations describing regularities in location or other behaviours that offer theoretical insights or lead to outright development of theories of location.

Kenneth L Kvamme

Corpus of Analysis in the Research on Ancient Eastern Mediterranean and Western Asia: Encoding, Information Collection, Digital Collaboration, and Investigating Strategies

Eastern Mediterranean and Western Asia are areas that have been affected in the past by intense movements and contacts among a number of different cultures, a large part of which still deserves to be properly outlined and identified. The methods that scholars can utilize to face such a challenge include very fruitful and promising support in quantitative approaches which, however, often remain experimental. The main problematic issue seems to be the lack of a debate in which the different approaches can be compared and coordinated, of course, taking into account the peculiarities of the research fields related to these regions, languages and cultures. The object of this session, therefore, is to provide just such an occasion for an actual debate on the strategies that consider how to organise and analyse the corpora of data, potentially with digital collaboration i.e. crowd-sourcing. Any kind of applications of old and new models and the logics involved in the study of cultural features can be included; the basic aim is to compare and share experiments in the fields of E-Philology, semantic annotation, data mining, open archives, digitization of information, automated integration of missing, incomplete or corrupted data, and the like. Philological works and any types of archaeological perspectives on written documents are warmly

welcome. In any case, it is of course recommended that the adopted methodology be clearly described. The chronological range goes from the Prehistory to the Middle Ages, geographically covering all regions from the Iranian plateau to the Hellenic peninsula, and from the Black Sea to North Eastern Africa and to the Red Sea area. Besides concrete applications with results, purely theoretical proposals - as well projects still in progress - are also welcome.

Vanessa Juloux

Alessandro di Ludovico

Data, Theory, Methods, and Models. Approaching Anthropology and Archaeology through Computational Modeling

Abstract: Quantitative model-based approaches to archaeology have been rapidly gaining popularity. Their utility in providing an experimental test-bed for examining how individual actions and decisions could influence the emergence of complex social and socio-environmental systems has fueled a spectacular increase in adoption of computational modeling techniques to traditional archaeological studies. However, computational models are restricted by the limitations of the technique used, and are not a "silver bullet" solution for understanding the archaeological and anthropological record. Rather, simulation and other types of formal modeling methods provide a way to interdigitate between archaeology/anthropology and computational approaches and between the data and theory, with each providing a feedback to the other. In this session we seek well-developed models that use data and theory from the anthropological and archaeological records to demonstrate the utility of computational modeling for understanding various aspects of human behavior. Equally, we invite case studies showcasing innovative new approaches to archaeological models and new techniques expanding the use of computational modeling techniques.

Stefani A Crabtree

Iza Romanowska

Decolonising Digital Archaeology

In a world where the daily destruction of heritage by the so-called Islamic State often makes international headlines, digital tools have emerged as a key way to record and reproduce the archaeological past. Satellite imagery is used to track the rate of destruction of archaeological sites. Three-dimensional data capture of objects and architecture by local populations, provided with 3D cameras or basic photogrammetry skills, helps us to create detailed models of heritage in conflict zones. New online data initiatives collect and disseminate information on areas currently off-limits to academics. Yet many of these digital initiatives are also unintentionally reinforcing some of the earlier colonial practices of archaeology's long history. Data is held largely by elite and well-funded universities, often primarily for the benefit of western researchers; military technologies play a central role in surveillance or mapping of heritage sites and, by extension, local populations; reconstructed objects are presented overseas, outside of their original context and alongside similarly displaced antiquities. Although attempts to fight back against the destruction of global heritage are undoubtedly well intentioned an essential question remains—are these latest digital mechanisms for recording and preserving inadvertently reproducing a culture of collecting already discredited in broader archaeological practice? This session addresses the role of digital archaeology in heritage preservation from a postcolonial perspective. It invites contributions offering critical assessment of the latest digital initiatives and the oft-unspoken colonial undertones of the widespread use of digital technologies. The resulting discussion will serve both as a valuable opportunity to take stock of lessons learned from the many projects already underway, and as an early step toward establishing guidelines for best practices for digital responses to heritage at risk.

Andrew Duffon

Jessica Ogden

Differing Perspectives: The wide world of geophysical prospection

The last 15 years of technical and methodological advancements in archaeological prospection have led to the development of ever larger, motorised arrays and an increasing capacity for ever smaller transect

spacing. As a result, greater areas of high-resolution data are now collected with unprecedented speed. The availability of large-scale surveys yielding high-resolution prospection data has unquestionably had and still has immense impact on the application of geophysical prospection and its future development. However, as a result of these advancements, many small-scale, low budget geophysical surveys carried out today are overshadowed by those surveys covering square-kilometres. Notwithstanding, archaeological geophysical prospection is carried out from different perspectives in all regions of the world and applied to various site types in diverse environmental settings. Naturally, factors such as individual aims and objectives, geographical settings, vegetation cover, available geophysical systems and not least access, timing restrictions or budgets issues can prevent the use of large-scale survey equipment or the possibility of covering large areas. But are such smaller-scaled surveys perceived as inferior in quality, or as a step back in the sequence of a linear development? In other words, Can we determine the quality of a survey by its size? If not size, what does constitute a modern, progressive and excellent geophysical study? Ultimately, the world of geophysical prospection is much wider than is sometimes appreciated by the research community these days. Broad backgrounds of geophysical surveys exist that have taken care to incorporate the necessary expertise and technologies effectively, where the methods and techniques used were ideal for answering the research questions at hand. Mindful practices during data acquisition, processing and interpretation have been considered and more importantly, respected. These measures, on any scale, can result in outstanding geophysical prospection work and represent high-quality and successful geophysical surveys. This session aims to highlight the wide ranges and diverse scopes present today in geophysical prospection and to point out the differing perspectives with which surveys are undertaken. We encourage both large and small-scale surveys, differences in tools, survey design and approaches but also techniques used more rarely or methods applied in an unusual way or in an unusual situation. We would like to hear from all regions of the globe with differing perspectives of what constitutes a successful survey to them. Relevant questions to consider for submission include: How have you addressed the scope and answered the research questions effectively? Why was your method more suitable than another? What made your survey uniquely successful? Which obstacles have you encountered and how did you overcome them? Which new developments are needed? And where is archaeological prospection heading in the future?

Christine Markussen

Petra Schneidhofer

Digital Archaeology - Where are we and how do we fit in?

Digital technologies are integral to many facets of current practice in archaeology (universities, field units, museums, archives, CRM etc). However, we see little evidence of disciplinary-wide coordinated programmes but clear indications of fractures and silos. For example, spatial data collected in the field is typically held separate from what we might call the rest of the archive. The result is a kludge of technologies and applications with no clear overview of what is available (let alone best of breed or best value) and, equally important, what is needed. The premise of this multi-format/session thread is that we need to bring clarity to the CAA membership and the wider archaeological community regarding where, how and what archaeological computing and digital technologies are available to benefit the discipline, and where there are gaps or opportunities to add most value. As far as we are aware there is no high-level enterprise, business, process or functional model of the discipline of archaeology showing how it fits together together and functions. Consequently, there are no maps elucidating where archaeological computing or digital archaeology plays a significant role. The aim of this thread is to catalyse a dialogue which will produce a high level model of our discipline, allowing us to start the process of identifying and mapping our assets and resources. To this end we are proposing a three-stage community effort at CAA Atlanta with three session formats to start the dialogue between practitioners: Stage/Session 1. We invite individuals and groups to send a single page diagrammatic description of the discipline (block diagram, flow chart, Value chain etc). Each model will be displayed as part of a "poster" session, and CAA members are encouraged to leave comments/questions using post-its; Stage/Session 2. A moderated forum where, following a position paper, each poster contributor briefly presents their model (max 5 mins each) leading to a moderated, minuted discussion; Stage/Session 3. A facilitated 'birds of a feather' session in which small groups each develop

selected parts of a consensus model and begin mapping assets and resources, and document issues.

John Pouncett

Paul Reilly

Stephen Stead

Everything wrong with...

This is a different kind of session. Instead of the normal celebration of our success this session will be looking at our challenges. But, not degrading into self-pity and negativity, as it will be about critical reflection and possible solutions. The goal of this session is to raise the issues we should be tackling. To break the mold of the typical conference session, in which we review what we have solved, and instead explore what needs to be solved. Each participant will give a short (max 10 minutes but preference will be for 5 mins.) presentation in which they take one topic and critically analysis the problems surrounding it, both new and old. Ideally, at the end each participant would have laid out a map of the challenges facing their topic. The floor will then be opened up to the audience to add more issues, refute the problems raised, or propose solutions. This is open to any topic- GIS, 3D modelling, public engagement, databases, linked data, simulations, networks, etc. It can be about a very narrow topic or broad ranging e.g. everything that is wrong with C14 dating, everything wrong with least cost path analysis in ArchGIS, everything wrong with post-prossussalism, etc. However, this is an evaluation of our methods and theories and not meant to be as high level as past CAA sessions that have looked at grand challenges e.g. the beginning of agriculture. Anyone interested in presenting are asked to submit a topic (1-2 sentences) and your estimated time to summarize it (5 or 10 minutes). Full abstracts are not necessary.

Doug Rocks-Macqueen

Stefani Crabtree

Philip Riris

Exploring the Symbiotic Relationships of Archaeology and Digital Humanities

Some institutions place the discipline of archaeology within the Social Sciences, others in the Humanities. On-the-ground reality is that archaeology is inherently interdisciplinary cross-cutting also the natural and computer sciences. The rapid growth of Digital Humanities (DH)--intersection of computing and humanities--in the past decade has led to a two-way relationship between archaeology and digital humanities. Given that archaeology is inherently spatial and temporal, archaeology is particularly contributing to the spatial humanities--a sub-field of digital humanities turning to space and time as a means to (re)contextualize old questions and formulate new ones. However, this relationship is not one-way! In this session, participants explore the impact of archaeology on Digital Humanities and vice versa, the impact of digital humanities on archaeology remembering that the two are not mutually-exclusive. As for the digital, archaeologists were early adopters of computing technologies with the first CAA conference in 1973. In the 1980s, Geographic Information Systems (GIS) became an archaeological mainstay, and for the past ten years GIS has infused momentum into the spatial humanities, taking center stage as the spatio-temporal tool to create new methods and interpretations. Recently, 3D technologies and 3D content seem to be explicitly bridging archaeology and spatial humanities with an intertwined emphasis on digital cultural heritage. In this session, participants explore methodological, technical, and theoretical issues related to space and time that cross-cut archaeology and digital humanities with particular emphasis on the impacts of:

- computing technologies on exchange and development of cross-disciplinary methods
- affordances of web-based and desktop technologies for research
- linked data and digital narratives, e.g., network analysis or digital editions of excavations reports
- open spatial data challenges
- technology on theoretical paradigms

Access to digital collections enriches investigations in the field of cultural heritage by opening boundaries to enable big data analysis and foster cross-disciplinary collaboration. To exemplify the roles these impacts and persistent challenges have on potential revolutionary change across archaeology and digital humanities, participants present use studies and archaeological information systems. Archaeologists have been using GIS for several decades, and digital humanists, substantially influenced by archaeology, have recently

begun to experiment with the potential of GIS. As the hallmark of digital humanities, and yet not typically used in archaeology, text-annotation, semi-automated named-entity recognition (NER), and other text-encoding techniques can be used to map place-information out of large corpora or databases to enrich archaeological studies. Archaeological travelogues exemplify the intersection of archaeology and digital humanities--spatial information can be visualized and analysed in geo-browser or web-GIS creating digital narratives, and if these narratives are linked to archaeological data that could be parsed and data mined, they would augment existing archaeological methods. Use cases will clarify the state of the art based on heterogeneous datasets with spatial context such as text, images, maps, etc. Both archaeology and digital humanities have key competencies that have often overlooked by each other; however, recently, as the participants in this session illustrate, scholars are becoming explicitly aware that the symbiotic relationships between the two is opening innovative research avenues for both.

Heather Richards-Rissetto

Armin Volkmann

From Physical to Digital, from Interactive to Immersive: Uses of Three-Dimensional Representation, Mixed Reality, and More in the Sharing and Exploration of Archaeological Data

Innovations in digital recording have caused the amount of data collected during modern archaeological excavations to dwarf that collected only a few years ago – let alone in the excavations of the previous century. The thoughtful integration of digital methods into the process (from excavation to publication) can assist in more complete recording and, just as importantly, meaningful presentation and dissemination of these data. The integration into the digital picture of data from prior excavations and campaign seasons, which may have been recorded in different formats and following different methodologies, is also important. Digital publications, geospatial datasets, and 3D printed objects are examples of interactive approaches to this problem. This can be taken a step further with immersion, as modern approaches like Augmented, Virtual, and Mixed Reality allow us to create truly immersive experiences around the reconstruction, visualization, and presentation of data. In archaeology, interaction and immersion can serve at least two purposes: (1) exhibition and display, which can include the digital supplements to publications and exhibits, physical reconstruction and replication, and virtual reconstruction of sites and artifacts, including those that no longer physically exist; and (2) the close examination of live datasets, which can run the gamut from database queries to the 3D rendering of archaeological data in situ for the purpose of discovery, analysis, and information sharing. Archaeological data in particular are well-suited to Augmented and Virtual Reality for both presentation and dataset exploration, as GIS points and associated finds, which are inherently three-dimensional, connote possible shapes, models, and textures. This session is intended to foster discussion about the uses of interactive and immersive technologies both in the field, and in the presentation and analysis of objects and datasets. Its format will be a combination of interactive presentation and discussion, with a specific emphasis on demonstrations of 3D reconstruction, Virtual/Augmented and Mixed Reality experiences, online presentation, and other interactive and immersive approaches to excavation, recording, and dissemination. Our goal is to cultivate the community of practice and shared knowledge around these techniques and approaches, while working together to support the highest quality of research and dissemination of archaeological data in this digital age.

Jeffrey P. Emanuel

Geographic relations in Databases on cultural heritage

As a follow up of the last CAA in Oslo in this session we would like to bring together scientists working on different issues of geographic relations of cultural heritage and archeological data stored in Databases. This comprises the technical prerequisites of DB-systems such as interface solutions that pass geographic, geodetic, and 3D data to visualization tools (e.g. Postgis) as well as tools and interfaces that allow the visualization of these data like web based portrayal services, GIS systems, etc.. On the other hand we want to discuss tools allowing for the spatial assessment of data in terms of spatial descriptive statistics and

modelling. Moreover, we will focus on open source solutions and would like to show some application examples in order to give an overview on state of the art solutions. Finally we will also discuss how user requirements can be already considered in the design of these systems to guarantee sustainability and acceptability of the targeted user. Here questions of visualization versus interaction might be focused.

Volker Hochschild

Michael Märker

Espen Uleberg

Mieko Matsumoto

Ground-penetrating radar advancements in the Americas

This session focuses on recent archaeological contributions of ground-penetrating radar in the Americas. Specific topics will include the implementation of new acquisition technology, new and innovative field methods, post-processing techniques, case study discussions, and integration of GPR data into geospatial and other digital datasets. The overarching goals are to assemble active researchers for a discussion of current trends, demonstration of new methods for acquiring, processing, and displaying data, and identification of future research directions.

Peter Leach

Machine Learning for Applications in Archaeology

After the success of the session "Machine Learning and Pattern Recognition for Archaeological Research" held during the CAA 2015, we are delighted to hold the session "Machine Learning for Applications in Archaeology". This session will bring together multidisciplinary research groups to create a common dialogue on progress of Machine Learning (ML) accessible to archaeologists, and the challenges that Archeology may propose to modern ML. You are invited to submit your original work presenting contributions to ML research, and highlighting the benefits of well-known techniques in the context of archaeological research. The submission should contain both a formal presentation of the mathematical principles driving the application, and an intuitive description that non-experts can assess. This session will be organized in two parts, one presenting novel applications of well known ML methods to archaeological problems, and one introducing recent machine learning developments driven by needs in Archaeology. Topics of interest include, but are not limited to, computer vision, image and document classification, deep learning, information retrieval, visualization, manifold learning, automatic translation, statistical analysis of archaeological corpus.

Edgar Roman-Rangel

Diego Jiemenz-Badillo

Stephane Marchand-Maillet

Mechanics, Mods and Mashups: Games of the Past for the Future Designed by Archaeologists

Are you a fan of Assassin's Creed but upset over how it could have made history exciting without having to employ and manipulate central historical characters? Love Lara Croft: Tomb Raider if only the tomb-raiding (stealing) mechanics could be replaced by something more meaningful? Wish that the Total War Series allowed you to employ agent modeling to test competing archaeological theories of migration, colonization and invasion or just to improve its historical accuracy? Dream you could use the language, graphic vision and immersion of Far Cry Primal in the classroom to explain (through engaging interaction) the Mesolithic rather than primarily use it as a backstage to fight semi-believable creatures? Then this workshop is for you. Correction. This workshop is BY you. Archaeologists and people of a historical persuasion:

- Either take a game with an inspiring concept, technique or mechanic:
- OR extrapolate a current or past game to a game or simulation of the future
- OR they share their vision of a game or simulation that reveals, expresses or augments their own research.

At the workshop the writers will either:

- Bring their own designs, video cut-scenes, and illustrations and media depicting what this new vision would look like
- OR have some form of play-testing demonstration, cards, or illustrations or physical play-throughs

(preferably involving the CAA workshop audience) revealing how this new level, mod or gameplay episode COULD be experienced or how it could be revealed. The writers will: • Ask the audience to play through or role-play the actions that would be in the creative piece. • The audience will: • Give the writers feedback ideas and nominate the best presentation in terms of fun and engagement, imaginative ideas, and archaeological relevance (in promoting archaeology, teaching archaeology or extending archaeological scholarship). Potential tools: Gameplay cards, game prototyping tools, scenes or videos from a 3D editor or game editor (Unity, Unreal, Blender), board games as prototypes, playing cards, physical artifacts that are role-played by the presenter, illustrations, slideshows, game editors (like the SIMS:

https://www.thesims.com/en_GB) used to make films (Machinima), roleplaying videos, flowcharts, interactive fiction (like <https://twinery.org/>). We will provide a fuller list of tools and examples to potential attendees before the workshop. Equipment: PC with sound and display, some floor space to move around in for physical re-enactments. Tables or some form of desk to provide written or graphical feedback. Length: Participants: 26 maximum (ideally) where 6 present. We require half an hour a presenter so three hours for 6 presenters, 6 hours a whole day if we want to go to 12 presenters. Ideally the non-presenting audience is not too large, preferably up to 20. Outcome: We will approach a creative publisher (Liquid Books, University of Michigan Press or other) to provide an online or printable output of the demonstrations and the audience feedback. We would also like to invite presenters - if they can make it - to a workshop at DIGRA2017 Melbourne Australia to test out their demonstrations and play-throughs to game academics. References Champion, E. (Ed.) (2012). Game Mods: Design, Theory and Criticism. Entertainment Technology Centre Press. Lowood, H. and Nitsche, M. (Eds.) (2011). The machinima reader. MIT Press.

Erik Malcolm Champion

Methods, tools, disruption ... : from information delivery to interaction

This 'Other' format session is organised with the explicit aim of maximising discussion and networking opportunities for presentations which have a strong methodological or practical focus. The thematic content of the session is intentionally broad to encourage a wide range of contributors. Papers might be presenting methods of data collection, analysis or visualisation, new devices or digital tools, web sites, social media, web applications or portals, digitised content or information directories, issues of repositories, archiving or sustainability, projects in progress, field methods etc. Format: Papers will be grouped thematically and organised as an hour of 5 minute lightning talks followed by an hour of break-out discussion, in which the presenters will form nodes and participants are free to move between nodes. Presenter nodes may be organised around a poster, a demonstration or other device to promote discussion. Nodes might coalesce. This format intentionally breaks from the traditional monologue talk followed (or not) by questions. It allows the audience to identify presenters and topics of interest and then interact together, as well as with the presenter, in a focused discussion space (with refreshments if that proves to be possible). This format has proved very effective in other contexts because it promotes small group interactions and in-depth discussion along the lines of a 'coffee-break on steroids'. Unlike monolithic poster sessions, this format does not pin down all presenters at once so that they are unable to participate by visiting other posters. It also accommodates equipment or software demonstrations within the program at a specific time slot in the presence of a likely interest group. And finally, it can reduce parallel sessions by accommodating 48 papers/session/day. Note: Presentations in this 'Other' session will count as full papers <recommended - TBD by scientific committee>.

Ian Johnson

Mobile GIS and field survey - current possibilities, future needs

Field survey became an important method in researching ancient communities since A. Pitt Rivers. Ever since, we are dealing with the constant increase of theoretical and technical aspects of the discipline. With time, field surveys were gradually augmented with technological innovations - aerial photography, remote sensing and non-invasive prospection. The direction of development in archaeological prospection techniques depended on environment, types of sites, ways of landscape modifications and the focus of research. However, significant progress occurred through 1970s and 1980s, when scholars noticed that the

pace of investigation was too slow to catch up with the destruction. Rapid urban sprawl and intensified agriculture production lead to increasing destruction of sites and entire archaeological landscapes, which could be observed throughout the globe, with some cases more pronounced than others: Malta, Athens (Greece), Tunis (Tunisia), Paphos (Cyprus), the Nile Delta and Valley in Egypt, Iraq, Syria, Peru and China. In many countries, archaeological heritage is constantly losing to economic growth in the competition for terrain and funding. Whereas in others, where heritage is a part of the economy, sites are looted for treasures. Another problem is the inaccessibility of the archaeological landscapes in Syria, Iraq and Afghanistan, because they became areas of conflict. In fact, it is not possible to list all the issues, which disturb or damage the field research today. Thus we need adequate low budget strategies, which could facilitate catching up with the destruction in order to preserve, study and manage what is left. The introduction of Geographic Information System and GNSS mobile applications available on gadgets of everyday use opened a new chapter in field survey techniques. It is possible nowadays to remotely manage and to track changes in a site from behind a desk. As a result, destruction prevention, management of preservation and reconstruction of sites and their regional contexts are accessible not only to specialist but also to general public, which, of course, raises a lot of new questions. The session invites papers discussing case studies from around the world, using different work-flows, and managing different problems. We hope that sharing our field survey experience will help to exchange ideas and standardize survey strategies.

Nazarij Buławka

Julia Maria Chyla

NEH Roundtable on Advanced Challenges in Theory and Practice in 3D Modeling

In the 2015-16, the NEH Advanced Topics in the Digital Humanities Summer Institute Advanced Challenges in Theory and Practice in 3D Modeling of Cultural Heritage Sites was held jointly at the University of Massachusetts, Amherst and University of California, Los Angeles. A group of 35 national and international scholars came together to discuss what they saw as key issues facing those working with 3D content in the digital humanities (<http://advancedchallenges.com>.) This roundtable seeks to bring together faculty from that NEH Institute and join them to the larger CAA community to encourage a robust discussion of the key issues facing scholars working in 3D. We seek short (5 minute) papers from the CAA community on one of the following topics: (1) Metadata, (2) Publishing in 3D, Sustainability, Preservation, and Forward Migration or (3) Technology Learning Curve/Infrastructure Collaboration. A roundtable discussion with audience and panel members will follow each discussion topic. Papers could address the following questions or others...

- Metadata-- What information needs to be associated with 3D content to make it usable by secondary scholars? How does the standard for data collection about a research object differ across disciplines? How could metadata for one discipline be made nimble enough to be useful for others? Considering the speed at which technology changes are operating principles more feasible than standards?
- Publishing 3D Work-- What does it actually mean to publish 3D work? Are we giving primacy to 3D models? What kinds of annotations do we need to support? What kinds of interactions would we want to support? How to support visual/spatial/kinetic/sequential argumentation within 3D space? How to track and support different versions of a published model or database? How to track use statistics? How does one peer review digital work that challenges the prevailing print traditions? How does the user experience impact peer review?
- Sustainability, Preservation, and Forward Migration- How does 3D content stand in terms of library collection development? What kinds of 3D content are most likely to be addressed by repositories in the near future? How might scholars working with 3D artifacts influence decisions that will shape collection policies relating to this content? What does it mean to archive a 3D project? What files should be preserved? How long should content be archived? Short-term or long-term? When can archived material be de-accessioned? How do we address situations where proprietary software/platforms used for a given project is no longer available or supported by its creator? And what can we do immediately to begin preserving our own work?
- Technology Learning Curve/Infrastructure for Collaboration- How to address the technology learning curve? What information can be generated/shared with subsequent scholars to encourage 3D research? Is there a standard 3D toolkit? Would it help if recommendations for project development were posted online? How to

support scholars working at institutions without the infrastructure for 3D work? How to build a community of scholars working with 3D? How can we easily connect scholars across disciplinary boundaries?

Alyson Ann Gill

Heather Richards-Rissetto

Lisa M Snyder

Non invasive methods to assess above and underground spatial pattern

In this session, we would like to show application examples of different geophysical methods used for pattern recognition in the underground and above ground. This will cover techniques for underground pattern recognition like geo-electric tomography and geo-magnetics as well as pattern identification using airborne/ satellite radar or multispectral techniques on the terrain surface. We would like to focus especially on soil pattern and substrates that are linked to archaeological remains of different aspects.

Michael Märker

Christian Sommer

Open open open. The rise of open scientific publishing and the archaeological discipline: managing the paradigm shift

The field of scientific publishing is rapidly changing and evolving: numerous publishing experiments were conducted with varying degrees of success over the last two decades. The past few years have seen the emergence of the 'Open Science' movement, encouraging, among other practises, 'open data', 'open publication', and 'open edition'. All together, these initiatives have a transformative impact on the research and Higher Education communities, and are contributing to shatter and replace the existing scientific publishing paradigm, affecting the paid-for subscription model used by many scientific journals, and undermining the common practice of releasing reports under embargo. With all publicly funded scientific papers published in Europe targeted for free access – ensuring their full availability to and reuse by anyone – by 2020 (a deadline unrealistic for many), and other parallel initiatives in the USA (e.g. by NASA) the time for conversing about Open Access is now past and current discussion should concentrate on how we are going to achieve it in practice. The domain of archaeological publication is not immune to these transformations and it is struggling to cope with the new challenges brought forth by this new paradigm. Although the archaeological discipline produces, for example, datasets with high reuse potential that are ideal for Open Content initiatives, its scholars are still pressed to publish peer reviewed articles in accordance to the standard academic practices, as national-level evaluation procedures for the assessment of University research quality have not yet fully incorporated measures of impact such as altmetrics, bibliometrics, semantics and webmetrics ('Open metrics'). Within the dominant discourse, the model that appears to many most suitable for the archaeological scholarship is one that publishes journal articles linked to open access datasets: this covers a spectrum of possibilities ranging from short, scholarly publications describing on-line accessible datasets to full papers that integrate datasets deposited in repositories (either as part of the journal or externally maintained). These models, however, have varied acceptance. Despite their potentiality, for example, data papers growing popularity in other disciplines still does not seem to be reflected in the archaeological practise, where they do not receive appropriate recognition as they are not considered to meet the standards of 'traditional' scientific publishing. Thus, besides a general agreement that Open Access enables reproducible scientific research, an ultimate and complete solution for all the data sharing and reuse issues has not been theorised yet. Held in conjunction with the official launch in Atlanta of the Open Access Journal of Computer Applications in Archaeology (JCAA), this session is intended to be a showcase and forum for theory, initiatives, experiences, proposals and projects related to the broader theme of Open Publishing in Archaeology, with the ultimate goal of using the discussion of the CAA community to help forge the future directions of the Journal. Topics of interests include, but are not limited to:

- relationships between open publishing and open data/content and open repositories
- relationships between scientific paper and data paper
- intellectual property rights or security/privacy issues
- interoperability of published data and the semantic web
- lessons learned (case studies)
- new publishing formats
- new scientific writing model.

Arianna Traviglia

Xavier Rodier

PATH MODELLING AND THE MATERIALITY OF MOVEMENT

In this session, we want to explore the state-of-the-art and challenges in connecting path modelling approaches to material traces of ancient movement in the form of trails, roads, boundaries, constructions and landmarks. Given the general scarcity of material traces of movement, path modelling is often used to reconstruct and analyse potential trackways for daily activities or routes for the transport of people, goods and ideas – however, testing these models remains problematic in many cases exactly because of this lack of data. We intend to address the following questions in this session: - How can we set up path models that are better informed by material, experimental, historical and ethnographical evidence of ancient movement practices? What practices of movement have produced the material traces left behind in the present-day landscape, and how can they be recognized in e.g. LiDAR-based elevation models? And can we use path models to predict and interpret specific material traces of movement? - Usually, data on surviving material traces of movement are fragmentary and have a low chronological resolution and therefore offer severe challenges for testing purposes. How can we test path models using detected traces of trails, roads, boundaries, constructions and landmarks? What do we do in the absence of material traces? - What happens when paths are no longer used, and what is the role of post-depositional processes in preserving material traces of movement? Can we model both the use-life and afterlife of paths? We solicit papers reflecting on one or more of these issues that try to connect theoretical considerations to practical applications, without any limitation on the geographical, cultural or chronological setting. Nevertheless, we will pay particular attention to proposals dealing with path networks and whose content focuses on landscape and territories.

Philip Verhagen

Laure Nuninger

Axel Posluschny

Quality Assurance and Quality Control in Image-Based Modelling

The increased affordability, and perceived ease of use, of technologies developed for engineering and remote sensing have led to their widespread adoption in archaeology over the past five years. In particular, low cost 3D image-based modelling solutions like Agisoft PhotoScan have made photogrammetry and “Structure from Motion” (SfM) buzzwords of the moment. The ability of such software to ingest relatively unstructured images, which lack any deliberate camera network design other than high overlap, and to yet produce visually pleasing meshed surfaces is an astonishing application of computer-vision stereo-matching algorithms originally intended for basic scene reconstruction. Indeed, some software packages or online services purport to offer high-accuracy finished meshes without any user intervention whatsoever. But as the noted Australian photogrammetrist Clive Fraser argued in an editorial in the *Photogrammetric Record* (30(149), March 2015, 3-7) no purely SfM commercial software packages have made it to the commercial market, nor are they any packages that can produce results of the highest orders of accuracy without significant user intervention. In order to achieve accuracy and repeatability the non-linear “thick lens” camera model used by photogrammetric engineers has had to be integrated. His editorial is at once an informative overview of a field that has witnessed continuous development from the early efforts of Albrecht Maydenbauer in the late 19th century to conduct photographic surveys of built heritage to millimetric levels of accuracy, but also a warning: without the firm grasp of the underlying principles of photogrammetric engineering, the enthusiastic adoption of techniques of computer-vision techniques can undermine decades of efforts to establish standards of photogrammetric accuracy. The rapidity of the adoption of SfM recording methods, largely, it seems because of their ease of use, has led archaeologists into dangerous territory, especially when these new technologies have wholly supplanted time-tested manual methods. Without precisely the quality control and quality assurance processes that are routinely followed in industry with these same technologies, the reliability, repeatability and long-term value of such 3D data-products may be in jeopardy. This session will consider how established QA/QC regimes can rectify this situation. These

may include robust methods of camera calibration, the use of ground-control points and check-points to validate model accuracy, the archiving of photogrammetric data-sets, accurate drawing from 3D data, appropriate file-formats, the history of photogrammetry in archaeology, and discussion of what constitutes a final photogrammetric product in archaeology. The session will challenge the participants and audience to look beyond mere "visualization" as the exclusive function of SfM and image-based modelling to reliable methods that can match or exceed the quality and repeatability of traditional methods of documentation. This session will also welcome contributions from users of laser scanning as well. The advent of more affordable systems like the FARO Focus3D has led to increased adoption of laser scanning technologies in research and teaching environments. In part, due to the costing and financial structure of institutions in relation to the costing / price point of equipment. Not every laser scanner, however, is the same. In fact, there are parallels with the case of photogrammetry and computer-vision. For example, there has never been an established standard to adequately compare laser systems between manufacturers. The immediate point of reference is the manufacturer's specifications, which are determined using different methods between manufacturer. It has always been down to the end user, research institutions like i3Mainz or laboratories, such as the Seibersdorf Laboratory in Austria, to generate comparison reports. The laser scanner part of the session welcomes case studies based around the difference in arcseconds accuracies and precision between laser scanners; experiences in using E57 as a universal file format versus .LAS; as well as best practice in target vs targetless based workflows.

Adam Patrick Spring

George Bevan

Rip – Model – Learn: towards the Total Model

Cultural Heritage is an expression of the ways of living developed by a community and passed on from generation to generation, including customs, practices, places, objects, artistic expressions and values. It is often expressed as either Intangible or Tangible Cultural Heritage (ICOMOS, 2002). Archaeological Heritage can be understood as a complexity of activities with boundaries not really well-defined. Archaeologists, architects, scientists, hardware/software engineers and other scholars interact and learn from each other, even if they belong to different cultures, far removed in space or time. As a part of Cultural Heritage, Archaeology includes tangible and intangible heritage. For this reason, the new techniques of digital surveying and modelling allow us to capture heterogeneous data for the construction of models enabling the cognition and popularization of archaeology. These technologies have produced important methodological changes in those disciplines that concern the study, analysis, protection and management of archaeological elements. Any intervention dealing with Archaeological Heritage, regardless the scale of the object, triggers a customized System of Knowledge aiming at collecting, interpreting and archiving a great amount of information. Basically, the components of this system fall into one of four categories: historical, cultural, quantitative (derived from measurements acquired through surveying) and qualitative (its source lies in the interpretative capacities of the researcher and can be defined as an act of knowledge performed on the measured data). The techniques and instruments of digitalization have made possible a large-scale production of 3D objects belonging to archaeological heritage summarizing historical, quantitative and qualitative features. Nowadays digital technologies allow us to create an "open knowledge system" of virtual models to study, manage, document, preserve, evaluate and popularize archaeology linking the concept of representation to the concept of information and viceversa. In this framework, the session aims at presenting researches focused on the development of new digital technologies for 3D integrated survey, the creation of 2D and 3D content suitable for building a comprehensive multilayered model and multimedia products (i.e. animations and simulations) both for research and dissemination purposes. Contributions will discuss the use of integrated and multidisciplinary approaches in archaeology, use of digital data acquisition technologies, data processing and management. The focus will be on: • 2D and 3D data capture methodologies and data processing in archaeology; • construction of 2D/3D models; • integration of different technologies for the management of the optimization of the numerical and polygonal models; • ontologies and semantic processing in cultural heritage, data management; • archiving and communication of archaeology content; • development and

exploitation of the innovative technologies; • innovative graphics applications and techniques; • diagnoses and monitoring for the preventive conservation and maintenance of archaeology; • information management systems in archaeology. The session aims at outlining theoretical foundations as a starting point for further debate about the changing approach to archaeological heritage.

Carlo Bianchini

Alfonso Ippolito

Carlo Inglese

Luca James Senatore

Same as it ever was... Same as it ever was

This session challenges the CAA community to critically examine its composition and lack of diversity - while the faces may have changed this community remains largely homogenous. Like the rest of archaeology, we fail to represent the communities we work, additionally women are also very under-represented, especially at senior level. We welcome papers from under-represented groups, individuals and discussants, to consider the consequences of the apparently homogeneous community on the questions we ask, the voices we hear and what we are missing. How does this lack of representation affect what we do in digital archaeology, our research fields, tools, methods, ambitions and our data? Does the diversity issue lead to problems such as all-male panels and difficulty in career progression? How can we address these challenges, support the CAA community to diversify, and how can members of underrepresented groups better support each other? As session organisers we realise that these can be difficult subjects to discuss, and we would like to encourage a safe environment where people can share and listen.

Hugh Corley

Lorna-Jane Richardson

Structural Analysis for Cultural Heritage

Ever present in the world of cultural heritage are the challenges associated with assessment, diagnosis, and preservation of as-built infrastructure with potentially unknown materials, techniques, or damage. Historical buildings, monuments and sculptures require delicate handling. Therefore, the techniques used to capture the existing conditions must be non-destructive, though at the same time must acquire accurate information at the surface, subsurface and volumetric levels. Collaboration between engineers, scientists, historians, and other stakeholders can reach beyond documentation and visualization towards the production of actionable data on the current "state of health" of buildings, monuments, and artworks as well as predict how structures or their constituent elements might respond to theoretical stresses in the future. Potential topics include modeling at different scales (micro vs. macro), characterization of the effects of common forces (seismic, subsidence, weathering, vandalism, etc.) and their potential impact, as well as structural monitoring and lifecycle management. Recent and ongoing research explores the application of Building Information Modeling (BIM), Finite Element Analysis (FEA), and other analytical approaches for cultural heritage. Technology must be leveraged to aid in modeling and simulating problematic aspects such as heterogeneous materials, existing damage patterns, seismic vulnerability, and unknown construction techniques. Structural engineering methods and software tools better enable cultural heritage practitioners to make informed decisions through understanding how the built environment responds to the always present forces that shape it.

Falko Kuester

Michael Hess

Dominique Rissolo

The Creation of Big Data Labs for Archaeology, Heritage, and Global Initiatives

The creation of big data laboratories in archaeology, heritage and other disciplines to lead global digital initiatives is a growing trend at many universities. This full-day session is designed to bring together teams from laboratories and centers that are attempting to work with digital archaeological data and projects at a

large scale, across a variety of applications and specialties. Moving from small-batch digital archaeology projects to larger projects and sets of interrelated projects is essential for archaeologists to fully benefit from the digital technologies and infrastructure that are continually emerging, and key to making real progress in addressing archaeological questions by using digital tools. This scaling up presents a new set of challenges. The aim of the session is to present and discuss the research directions taken by different groups, technical and organizational strategies, visions for pursuing funding and collaborations, and commonalities and differences. The initial participants in this session will include: • Herbert Maschner, Executive Director, Center for Virtualization and Applied Spatial Technologies (CVASt), University of South Florida. • Thomas Levy, Director, Center for Cyber-Archaeology and Sustainability, UC San Diego • Maurizio Forte, Director, Dig@Lab, Duke University • Ethan Watrall Associate Director of the Matrix Center for Digital Humanities & Social Sciences; Director of the Cultural Heritage Informatics Initiative, Michigan State University The session will take an unorthodox format, and will be divided into four sections. The first morning session will be presentations by the Center directors. The second morning session will be a series of presentations on specific projects within these centers by directors, research faculty, and research staff. These presentations will be followed in the afternoon by a forum led by the panel of lab directors, intended to create broad discussion. The forum will be followed by an early evening poster session and reception highlighting the lab projects with student participation in order to encourage open interaction and more detailed individual conversations. Anyone looking to get involved in digital archaeology, start a project, or expand one should attend this session.

Herbert Maschner

Thomas Levy

Rachel Opitz

The Technology Lag: A Panel Discussion Regarding the use of the Computing Technologies Toolkit For Cultural Resource Compliance Projects

The use of digital, computer aided technologies, such as 3D scanning, printing, and virtual modeling, as well as digital geospatial and geostatistical analysis is nothing new to archaeological research. However, while these technologies see an abundance of use and research in the academic community (as evidenced at this conference), the professional, CRM, community seems to exhibit a reluctance to embrace them. It is only very recently in the US that we have seen many States moving to GIS based site management practices, and digital record keeping, allowing consultants online access to site records and reports, thus creating tremendous time and cost savings over the rather more labor intensive practice of travelling to a State archive and scanning through physical paper copy records. The same cannot be said, however, for the use of 3D site documentation and analysis, and other forms of digital data capture and site preservation, even though these have proven to be tremendously useful additions to the archaeologist's toolkit. The technologies that allow this type of work to take place are becoming less and less costly, and more and more accessible – in many ways thanks to the research conducted by the CAA and other similar communities. As such, this panel discussion looks at the types of permitting requirements States and other regulatory agencies are putting forth in order to answer the question of whether this seemingly slow uptake is real or imagined. If there truly is a reluctance to embrace the “technological toolkit,” then discussion aims to reason why this reluctance exists (ie. Is the technology not trusted? Are the deliverable products too inaccessible or not easily managed? etc.), and what may be done to help ensure that the valuable insights and innovations born in the academic community become integrated and integral tools for the professional/consulting community as well.

Brian Seymour

Michael Scafuri

Sarah Kessick

Timothy Dodson

The ups and downs of archaeological simulation

The continuing rise of computational modelling applications, in particular simulation approaches, resembles the 'hype' cycles our discipline experienced in the past. The introduction of statistics, data management or GIS all started with inflated expectations and an explosion in applications, followed by a 'correction' phase seeing the early optimism dwindling and a heavy critique towards exaggerated claims and examples of misapplication. The next phase, 'maturity', is reached when the use of a particular technique is not questioned any more (although particular applications of it may still be) as it becomes part of the standard research toolkit. The verdict is still out whether the use of simulation techniques in archaeology is reaching the peak of the 'optimism' phase or is perhaps still in the midst of the 'correction' phase. However, lessons learned from other, now commonly used, computational methods or coming from other disciplines could accelerate the process of establishing simulation in the mainstream of archaeological practice. The Special Interest Group in Complex System Simulation would like to open the discussion to a wide audience of archaeologists and therefore invites all CAA2017 participants to take an active part in the roundtable. During the meeting we will consider the current place of simulation in archaeological practice, the main challenges facing modellers and the road map for the future.

Iza Romanowska

Juan Antonio Barceló

Urbanism at the micro, meso and macro scales: Advances in computational and quantitative methods to study cities and their built environments

Over previous decades many advances in archaeology and contemporary urban geography have been made using computational and quantitative methods to study cities and their built environments at various stages of development. In recent years the proliferation of new approaches allowing for the documentation and analysis of built spaces have enabled the acquisition of large volumes of data on ancient settlements encouraging fresh lines of enquiry. Advances in data acquisition via geophysics and remote sensing methods have offered a more comprehensive picture of cities, towns, and villages in two, three, and sometimes four dimensions. These developments have contributed to better understanding of the form, size, and spatial configuration of past settlements, and have facilitated their interpretation through various forms of computational analysis. Methodologies such as Space Syntax, 2D and 3D GIS based analysis, spatial interaction models, network analysis, and urban scaling have been employed to explore socio-economic aspects of culturally diverse settlements at different spatial scales. These studies demonstrate the potential of computational methods to offer insights into the social organisation of past societies, often from a comparative and interdisciplinary perspective, as well as the challenges entailed in applying these methods to fragmented archaeological datasets. This session invites papers that discuss the use of computational methods for the acquisition and analysis of settlement data at the micro (building), meso (settlement) and macro (regional) scales. We especially welcome papers on the innovative applications of 2D and 3D spatial analyses to the built environment, works that adopt a comparative and diachronic perspective, and studies that seek to evaluate the theoretical contributions and challenges associated with the use of these computational approaches.

Eleftheria Paliou

Adrian Chase

Visualisation as Analysis in Archaeology

Visualisation has had longstanding, albeit contested role in the field of archaeology. Archaeological visual media broadly refer to 2D and 3D productions, drawings, maps, photos, models, videos, sounds, and exhibitions. They can contribute to the communication of knowledge to specialists and to a wider audience. Yet, visualisation can also facilitate the creation of new knowledge in archaeology. Visualisation as a process in knowledge making is now acknowledged in recent geovisualization and geovisual analytics literature as well as in the field of computer sciences but has not yet gained much attention in archaeology.

In this session, we call for papers that begin to address the ontological turn of archaeological knowledge making through visualisation methodologies that enable information processing, which in turn, can enhance our understanding of the past. We especially welcome papers that explicitly enable interaction and navigation of the spatial, temporal and thematic components in archaeological data and that demonstrate how visualisation methods facilitate deeper insights into archaeological phenomena. We propose the following format: a three-minute (3M) 'thesis' and one 'tweet-able' slide presentation. After the presentations, participants will engage in an open round table discussion on the changing role of visualisation in archaeology and the challenges and opportunities for further developing these methodologies. The 3M presentation is an opportunity for authors to showcase their visualisation tools and what insights they gained into archaeological data and archaeological phenomena. The subsequent round table discussion will be organised around the central theme of further work that is necessary in order to improve visualisation as an analytical tool in archaeology.

Neha Gupta

Michael Carter

Web-based infrastructure as a collaborative framework across archaeological fieldwork, lab work, and analysis

Archaeology is a collaborative, ongoing process from field to lab to dissemination. Fieldwork comprises data recording experts using diverse non-digital and digital methods that produce a complex set of data. Archaeologists use these field data for a myriad of purposes such as analysis, interpretation, and dissemination. While digital technologies have been part of the archaeological workflow for more than thirty years, the management and integration of field data, legacy, and other data is still complex. Archaeologists are looking for shareable methodologies that allow for the integration of innovative digital practices for fieldwork recording and subsequent data management, analysis, and dissemination. Recent advancements of web technology are transforming web browsers into effective computation and visualization platforms. For example, web browsers now efficiently execute JavaScript code enabling faster and greater processing as it is processed on client side requiring less memory storage than web servers. HTML5 standard includes WebGL-- a JavaScript API for rendering interactive 2D and 3D computer graphics in browsers without plugins. These advancements are two ways technology is transforming the ways it is possible to access and work with 3D archaeological data on the web. This session fosters a discussion on the potential for web technology to reshape archaeological practice as it enables us to more quickly and efficiently bridge fieldwork, lab work and analysis through innovative data integration and dissemination. Participants address questions such as: (1) Can web technology augment or facilitate the integration of 3D documentation techniques in on-site archaeological recording? (2) Can web-based 3D platforms increase collaborative and interpretative processes during the excavation? (3) Which kind of infrastructure(s) best promote the integration of 3D digital methods in the day-to-day fieldwork practices? Papers will discuss the use of web-based platforms as one of the possible solution to combine traditional and innovative methods to promote collaborative fieldwork. For example, certain infrastructures allow researchers unable to participate in the fieldwork experience to access and conduct analysis remotely, hence promoting interdisciplinary and 'at-distance' collaborative workflows. Building on this idea of remote participation, the second part of the session focuses on web-based infrastructure (platforms) for the integration, analysis, and dissemination of archaeological data. Participants address questions such as: (1) What web-based platforms exist for collaborative archaeological research? What are their advantages? Disadvantages? (2) Is a single, all-encompassing platform the best solution? Is it even possible? Or, it is best to have several platforms that serve specific purposes? Why? Why not? (3) What role do standards and best practices play in developing web infrastructure that brings together legacy and recently acquired field data? And (4) Should we place greater emphasis on designing collaborative workflows for existing platforms rather than the development of new platforms? This session covers themes that contribute to re-defining archaeological methods and practices for on-site data recording and subsequent data integration and dissemination that can foster collaborative research. The session will be divided into panels focused on specific digital archaeology problems. Each panel will comprise three/four 10-15 minutes presentations followed by an open discussion.

Fabrizio Galeazzi

Heather Richards-Rissetto

Women in CAA

Session format: This will be a Roundtable/Panel session in which each panelist will give a “flash” position paper (10 min?) followed by a short discussion (5 min?) between the panelists. The session will conclude with an open floor discussion. Position papers will be submitted to the session chairs one month (?) prior to the session and shared with all panelists. As with many professions, women comprise a lower proportion than men in professional archaeology and a significantly lower proportion in computer science. CAA membership reflects this trend, and over the past decade the majority of the steering committee members, including those who have run for executive steering committee positions, have been men. This panel session, through the presentation of position papers and discussion, will provide a platform for discussion of concrete solutions to issues women in computer applications in archaeology face. Topics may include, but are not limited to, the process of professionalization for women, continuing education to address access to resources, the power of increasing visibility of female role models and developing mentoring opportunities for students, actions for improving retention and promotion of women, the importance of creating a formal network of CAA members with the shared interest of developing women in the field, or lessons from how other professional organizations have handled these disparities (looking both within and outside of Anthropology). Position papers should identify issues, but also focus on concrete solutions for enhancing women's roles within the field. CAA, through its annual conference, is an important forum for learning about the intersection of digital technologies and archaeology. It also fosters a strong network of digital archaeologists, so are there ways to encourage more women to join CAA and thus benefit from the support of this community? Are there additional steps that we can take to encourage women not only to volunteer for leadership roles within CAA but also within the wider discipline? The goal of this session is to seek action to equalize opportunities for and representation of women in computer applications in archaeology.

Katie Simon

Sara Gale

Lisa Fischer