

# UBC Archaeology Day Symposium

March 15, 2014, 9:00am–4:00pm  
University of British Columbia, ANSO 207  
6303 North West Marine Drive

## DIGITAL PERSPECTIVES ON THE PAST: NEW METHODS AND RESEARCH IN DIGITAL ARCHAEOLOGY

Digital methods are revolutionizing the way most archaeologists do their work. New geospatial technologies, including ground-based and airborne methods of remote sensing (e.g., laser scanning, or the use of unmanned aerial vehicles or “drones”) now allow for the rapid and accurate 3D recording of archaeological phenomena from single artifacts to excavation units and even entire landscapes. Analog data from earlier projects are being digitized, providing fresh insights and re-interpretations as they are analyzed in new ways. Geographical Information Systems have become increasingly important as a means of integrating these digital data streams and have moved beyond traditional uses in predictive modeling to more nuanced ways of looking at human-environment interactions. The visualization of data in 3D is allowing the virtual exploration of various archaeological discoveries, providing not just an important means of public engagement, but allowing us to ask new questions of the things we find. Archaeologists are only beginning to come to terms with the practical and ethical implications of this rapid digital transformation. This symposium explores some of this new terrain, while showcasing current work in the digital realm by archaeologists working at UBC, SFU, University of Victoria, and beyond.

### Charles Lecture:

**Dr. Fred Limp (Leica Geosystems Chair in Geospatial Imaging, University of Arkansas)**

### ***Seeing into the Past: New Technologies for the Measurement of the World's Heritage***

Fred Limp is the holder of the Leica Geosystems Chair and is a University Professor in the departments of Geosciences, Anthropology and Environmental Dynamics at the University of Arkansas. His pioneering work bridges the fields of archaeology, heritage studies and geomatics/geo-informatics. Limp's research has taken him to six continents and has been funded by the National Science Foundation, National Endowment for the Humanities, USGS, Department of the Interior and many other sources – he has been PI or Co-PI on more than \$45 million (US) in grants and awards. Limp has written or edited 9 books and more than 95 journal articles and edited chapters and published more than 100 articles in national and international professional magazines. He is the immediate past-president of the Society for American Archaeology. He was appointed by Interior Secretary Salazar to the Board of the US National Center for Preservation Technology and Training. He also serves on the boards of the Institute for Field Research and Digital Antiquity. As part of his contributions in geomatics/geo-informatics he was founder and served on the Board of the Open Geospatial Consortium, as well as the Intergraph Geospatial Executive's Board, AmericaView, SPOT Image Academic Advisory Board, The OGC Interoperability Institute, and Oracle North America Users Forum. He is on the editorial board of *Advances in Archaeological Practice* and was a contributing editor for *GeoWorld* magazine, a contributor to *Earth Imaging Magazine* and writes and lectures extensively on spatial technology issues. He was the founding director of the Center for Advanced Spatial Technologies (CAST). A current series on National Geographic TV, “Time Scanners,” and a forthcoming one on the US Public Broadcasting Service (PBS)

feature the CAST's research in locations around the world. Articles on his work have been published in the popular press including *USA Today*, *Omni*, *New Scientist*, *Americas*, *The Economist*, *Wall Street Journal*, *Delta Sky*, *ComputerWorld*, *eWeek*, and *InformationWeek*.

## Program

**9:00–9:25 Free Breakfast and Coffee**

**9:25–9:30 Welcome**

**9:30–9:50**

**Nick Waber (University of British Columbia, Department of Anthropology)**

***Digital Archaeology in 4D: Examining the Potential of Combining Digital Multiview Photogrammetry and GIS as a Scalable Method for Analysis and Conservation Monitoring of Archaeological Features and Finds***

With recent advances in the fields of computer vision and 3D digital modelling, the ability to digitally capture and record complex objects and scenes is becoming increasingly common. These 3D entities then provide a great deal of potential for analysis, especially in regards to objective, quantitative examination and comparison. One particularly interesting aspect of this is the ability to periodically record an entity, and then to analyze how it has changed over time. This provides a valuable tool for anyone interested in monitoring and measuring site, feature, and artifact degradation. This paper proposes a method of adapting photogrammetrically derived 3D modelling with GIS landscape analysis techniques to the issue of recording and monitoring archaeological entities over time, with case studies to illustrate the scalability of the digital toolset.

**9:50–10:10**

**Maude Côté-Landry, Lisa Tweten, Patricia Taylor, Heather Odell (University of British Columbia, Department of Classical and Near Eastern Studies)**

***From Stone to Screen: A CNERS Digitization Project***

UBC's department of Classical, Near Eastern, and Religious Studies (CNERS) owns a small artefact collection and over 1000 epigraphic squeezes (three-dimensional impressions of stone inscriptions). Unfortunately, these collections are fragile and difficult to access. To address this problem in spring 2013 we, a group of graduate students in the department, began the project From Stone to Screen in order to digitize the two collections. We are working with the UBC-based organization Digital Initiatives to produce high quality digital images of the epigraphic squeezes, which will be accessible online and searchable on UBC's library database, while the artefact collection will be photographed and hosted by the CNERS department. This paper will address the unique challenges facing a student-driven, small-scale digital archaeology project, including photography, collaboration, research, and data management. Additionally, it will explore the pedagogical and research benefits of making these collections widely accessible as a digital resource.

**10:10–10:30**

**Suzanne Villeneuve (Project Director, Keatley Creek Archaeological Research Project. Simon Fraser University, Department of Archaeology)**

***Digital Approaches to Archaeology at Keatley Creek***

The Keatley Creek Project has incorporated digital methods into excavations since 2006, which has benefited investigations of major theoretical issues concerning the processes surrounding early cultural developments. The original objective behind new methods was to assist with the recording, analysis and interpretation of complex stratigraphy. Methods have advanced to a very practical, cost efficient, digital paperless approach involving GIS, auxiliary software, video, high resolution imaging, remote sensing and other techniques. Work flow can be made efficient enough to view and produce results (including graphics) as excavations unfold. It is now possible to complete in weeks (with greater detail, accuracy, data and analysis capability), what used to take multiple research seasons to complete. This has led to new ways of analyzing and correlating results, and ways in which we engage with, learn from and interpret the past. Benefits also extend to collections management, student training and learning experiences.

**10:30–11:00 Questions, Coffee Break and Snacks**

**11:00–11:20**

**Kevin Fisher (University of British Columbia, Department of Classical, Near Eastern and Religious Studies)**

***A Digital Revolution? 3D Modeling of Built Environments and Landscapes Using Photogrammetry***

Photogrammetric methods are beginning to revolutionize the way we record the archaeological record, providing a relatively low cost alternative to laser scanning/LiDAR for many applications. This paper discusses the potential for photogrammetric modeling at various scales through case studies from two regions. The first examines efforts to record a series of polychrome stucco masks adorning the façade of an Early Classic temple at the Maya site of El Zotz, Guatemala. The second looks at the integration of close-range photogrammetry for the daily recording of excavations of urban spaces at the Late Bronze Age site of Kalavassos-Ayios Dhimitrios, Cyprus with the use of an unmanned aerial vehicle (UAV) as a digital photography platform to produce 3D models at the scale of an entire urban landscape.

**11:20–11:40**

**Katie Roth (University of British Columbia, Department of Anthropology)**

***Connecting Through Collections: Digital Collections Management at the Laboratory of Archaeology***

The Laboratory of Archaeology (LOA) is a facility dedicated to education and research through its archaeological collections. Over the last five years, LOA has utilized digital technology to dramatically expand its capacity to share those collections with researchers, community members, and students. The use of an object database, complete with thousands of images, has improved daily lab operation and has enabled LOA to be a partner in the Reciprocal Research Network (RRN). The RRN provides researchers with the ability to search LOA's collections, create projects, and start dialogues with LOA staff and other project collaborators before even visiting the lab. This presentation will provide an introduction to the RRN, including a tutorial on how LOA engages researchers and community members through this virtual network. This will demonstrate how LOA is using digital technologies to encourage collaborative research, enhance access to its collections and, ultimately, further our knowledge of the past.

**11:40–12:00**

**Darcy Mathews (University of Victoria, Department of Anthropology)**

***Hiding the Powerful Dead: Ancestral Presence and Funerary Ritual at Rocky Point***

Rocky Point is one of the largest recorded mortuary landscapes on the Northwest Coast, with more than five hundred visible funerary petroform burial features distributed within and between two neighbouring cemeteries. Using a novel suite of morphological and spatial analyses, a patterned use of stone and soil is evident in the making of these burials. With these results in hand, an intra-cemetery scale visibility analysis was conducted at one cemetery using LiDAR and high precision GPS derived data. Despite patterning in the building of these funerary petroforms, these burials are hidden in the landscape, or built at the threshold of perception. This anti-monumentality is seemingly paradoxical, but when considered within Coast Salish frames of reference, there is power in the unseen. Visible yet hidden, the dead exist as inherently liminal and dangerous but retain a posthumous social, economic, and political life among the living.

**12:00–1:00 Free Lunch**

**1:00–2:00**

***Charles Lecture***

**Fred Limp (Leica Geosystem Chair in Geospatial Imaging, University of Arkansas)**

***Seeing into the Past: New Technologies for the Measurement of the World's Heritage***

"The past is a foreign country – they do things differently there" was the lead sentence in a 1953 novel by LP Hartley. The first part of that sentence later became the title of a hugely influential book 1993 by David Lowenthal. "Discovering" the past(s), "understanding" it, "explaining" it, "(re-)creating" it, "interpreting" it, communicating it: all of these are key roles of professions such as the historian, classicist, and archaeologist. But how do we do this? How can we tell others what we have found on our journeys there? Travelers into the past return and report. They create narratives, texts that describe what they have seen and what they think it means. Sometimes they draw plans and sometimes generate images. In all these endeavors they must convert a lived, multidimensional world into a linear narrative: words on a page. They shrink the world and pull the past back to us through the rabbit hole. They have no choice and this is no criticism of them – they are doing the best they can. But for those who don't see the past as linear and narrative driven, and especially for those communities today where the past is real and central to their current lives, this text-based account is, at best, a pale simulacra of the past's richness and complexity.

While no panacea, we are now provided with new tools and approaches to how we record the evidence of the past and the ways in which we communicate it. New technologies make it possible to make high-precision high-quality recording of physical evidence of the past and new visualization and representation technologies give us new tools to interpret, analyze and communicate our understandings. We can now (virtually) walk through our (re)creations and, most importantly, change them to reflect multiple perspectives and voices. Seeing the past looks at a number of these new approaches and how they are changing, once again, how we see the past. While powerful, these new approaches also raise challenges and tensions in our fields. How we can adapt to these and respond is a key part of the presentation.

**2:00–2:20**

**R.G. Matson (University of British Columbia, Department of Anthropology)**

### ***Determining Chacoan Great Kivas at Cedar Mesa, Utah: Adventures in Remote Sensing***

During investigations of two Chacoan Great Houses on Cedar Mesa in 2009 several putative Great Kivas were located and mapped. Two of these were associated with the two Great Houses and two were isolated. If these were all Great Kivas this would be an anomalous concentration and include an association with a ceramic tradition not found before. In 2012 we (Lipe and I) investigated these using augering, GPR and electromagnetic conductivity. First Chacoan Great Houses and Great Kivas are introduced, then Cedar Mesa and its archaeology, prior to the 2012 remote sensing presentation.

### **2:20–2:40 Free Coffee and Snacks**

### **2:40–3:00**

**Lisa McLean (University of British Columbia, Department of Classical and Near Eastern Studies)**

### ***Visual Effects and Digital Animation for Archaeology***

Recreation and restoration utilizing 3D art in archaeology involves digital artists working collaboratively to accurately represent artifacts or sites for recording or sharing purposes. Lisa McLean talks about creating geometry that can be textured and viewed as a 2D image or manipulated with 3D viewing software, achieving a better understanding of how things or places looked thousands of years ago. See the six minute video, "The Many Layers of Time of the Ishtar Temple" and view digitally created Images of the Pithos hall from the ongoing Kalavassos and Maroni Built Environments (KAMBE) Project in Cyprus and observe a walkabout demonstration using the latest in film industry 3D software.

### **3:00–3:20**

**Kate Hennessy, Michael Blake, Natasha Lyons, Dave Schaepe, and Andy Phillips (Simon Fraser University; University of British Columbia, Department of Anthropology; Stó:lō Research and Resource Management)**

### ***Digging into the Scowlitz digital archives: the Sq'ewlets Virtual Museum of Canada Project***

*Sq'ewlets: A Stó:lo-Coast Salish community in the Fraser River Valley* is a Virtual Museum of Canada-funded exhibition being collaboratively produced by a team of *Sq'ewlets* and *Stó:lo* community members, archaeologists, anthropologists, and new media designers. The exhibit will highlight the important roles that archaeology and oral history play in the *Sq'ewlets* community today, and feature interviews with and commentary from *Sq'ewlets* community members, archaeologists, historians, and field school students who collaborated on research at the *Sq'ewlets* site from 1992 to 2006. In this presentation, we will discuss the evolution of this project, the role of digital and social networks in our communicative process, and the emergence of participatory design practices that facilitate the development and sharing of concepts and ideas. The long history of community-based archaeological practice at *Sq'ewlets* represents a guiding framework for our digital exhibit production process, and for the representation of the digital collection from the *Sq'ewlets* site, the broader history of the contemporary community, and the significance of these to *Sq'ewlets* people today.

### **3:30–3:40**

**Bryn Letham (University of British Columbia, Department of Anthropology)**

***Refining the Late Pleistocene-Early Holocene Sea Level Curve in the Prince Rupert Harbour, British Columbia: Old Methods and a Few New Tricks***

Since the end of the Last Glacial Maximum the west coast of British Columbia has undergone dramatic changes in relative sea level. These sea level histories vary between areas due to locally different isostatic responses to deglaciation and tectonic conditions. Early human occupation of this area was influenced by this dynamic landscape, and therefore knowing where the coastline was at different times in the past is critical for surveying for archaeological sites from these time periods. This paper describes the field methods used and the utility of digital core scanning, LiDAR imaging, and GIS analyses for refining our understanding of the sea level history of the Prince Rupert Harbour, one of the most densely occupied areas on the Northwest Coast prior to European colonization, yet an area where no Late Pleistocene or Early Holocene sites have been identified. Preliminary results of this ongoing field and lab research suggest that the post-glacial sea level curve for this area may not have been as extreme as previously assumed.

**3:40–4:00 Questions and Discussion**

**Sponsored by the UBC Faculty of Arts, Department of Classical, Near Eastern and Religious Studies, and the Department of Anthropology**