

EIPC KEYNOTE ADDRESS AND ABSTRACTS

Keynote Address: *Oceanic islands as model systems for human ecodynamics*

Professor Patrick V. Kirch, Departments of Anthropology & Integrative Biology, University of California, Berkeley, USA

Oceanic islands offer outstanding 'model systems' for investigating the long term dynamic relationships between human populations and their ecosystems. As a model system, islands are tractable because many of their state factors are simpler than on continents, and because their scale is more manageable. Nonetheless, islands have the same key processes as are found in larger systems. In this keynote address I discuss a comparative approach to understanding long term human ecodynamics by focusing on the results of recent and on-going archaeological and paleoenvironmental research in Hawai'i and French Polynesia. These islands were all colonized by Polynesians from the same ancestral culture, with similar socioeconomic patterns. However, island ecosystems varied considerably in scale, geologic age and soil nutrient status, marine resources, and other factors. Comparing the historical trajectories of the human-environment interactions on these islands provides insights into the impact of humans on pristine ecosystems, differential ecosystem vulnerability and resilience, and socioeconomic and political responses to human induced environmental changes.

Session 1: THE ARCHAEOLOGY OF RAPA NUI

Chair: Christopher Stevenson

Investigating the spatial scale of precontact Rapa Nui community organization: A multiscale approach

Alex E. Morrison, University of Hawai'i, Mānoa and International Archaeological Research Institute, Inc., USA

The island cultures of Polynesia are often considered to be prime case studies in emerging complexity. Despite the continued use of classic evolutionary labels such as simple and complex “chiefdoms” it is evident that extensive variability in social organization was present across the region. Since hierarchical social organization is often considered one of the hallmarks of “complexity”, it is imperative to develop techniques for measuring organizational scale with archaeological data. The density and visibility of surface remains on Rapa Nui make it an exemplary place to examine organizational scale. Documenting community organization with archaeological material requires a distributional approach utilizing large continuous spatial datasets. In this paper, I present a multiscale spatial statistical approach incorporating over 2000 archaeological features. Comparative examples are also presented from the islands of Hawai'i and Samoa.

Sustainability and craftsmanship: A preliminary report on five seasons of excavations in Rano Raraku statue quarry, Rapa Nui

Jo Anne Van Tilburg, University of California, Los Angeles, USA; and Cristián Arévalo Pakarati, Independent researcher, Rapa Nui, Chile

The Easter Island Statue Project (EISP) Conservation Initiative is a multi-disciplinary project in collaboration with the Archaeological Institute of America (AIA). It includes excavation, environmental monitoring, conservation intervention, heritage management, and stone artifact sourcing. The prelude to this work was our creation of a GPS map to centimeter level accuracy of Rano Raraku interior statue quarry. This paper provides a preliminary excavation report for two statues (RR-001-156 and RR-001-157) in Rano Raraku. It describes the technological features discovered at the statue base illustrating how the statues were manipulated in place as well as design and other aesthetic innovations. It summarizes the description of 179 of 509 recovered stone tools (*toki*) using the non-invasive technique of X-ray fluorescence analysis and the relative success of sourcing *toki* to basalt quarries. A brief review is offered of the scant ethnographic and socio-political information. Finally, the data management contribution of this project to heritage management is described.

Miro O One (Wooden boat made of earth)

Charles Love, Western Wyoming College, USA

Between 1800 and 1860, Easter Island was visited by many European & American explorers and whaling ships simply passing by. Most of the records from those ships list how little Rapa Nui had to offer them since most were seeking fresh water, and firewood for their galleys. What is not recorded is how the islanders viewed them, the visitors. At least six inland archaeological sites and seven coastal sites give us a glimpse of how they viewed the new foreigners. Excavation of one inland site reveals how much the Rapanui had learned about the techniques of European sailing and how to incorporate them into ritual behavior. They accomplished this by building earthen boats modeled after the explorer's sailing vessels, complete with raised prows & sterns, holds, and even cargo and ballast areas. The outside hull was painted with bright yellow ochre. This Miro O One was most likely constructed between 1840 and 1860.

Documentation of 'Orongo village in the late 19th-early 20th centuries

Georgia Lee, Easter Island Foundation, USA; and Paul Horley, Chernivtsi National University, Ukraine

The ceremonial village of 'Orongo is the place of the annual birdman competition – the event of utmost importance in the late history of Easter Island. The site is composed of about 50 stone houses constructed with dry masonry techniques. The houses provided protection against the gusty winds and rains characteristic of the site, but they were prone to collapse after heavy rainfall. The 19th century explorers demolished several houses to extract the *moai* Hoa Hakananai'a and some painted slabs that adorned their interiors. As a result, many

'Orongo houses were ruined in the early 20th century. The village was thoroughly surveyed and restored several times, culminating with a complete restoration project by William Mulloy. However, the original village was different from its current aspect – many walls were re-erected with different slabs, carved stones embedded in the walls were lost, foundation stones were changed, etc. An analysis of the archival imagery from expeditions by Geiseler, Thomson, Agassiz, and Routledge revealed interesting details about the original appearance of the site. The most unexpected result was a discovery of a huge carved boulder that once adorned the sacred precinct of Mata Ngarau, lost to the waves between 1904 and 1914-1915.

Continuity or collapse? Assessing settlement and land use on Rapa Nui (Easter Island) on an island-wide scale using ¹⁴C data

Mara A. Mulrooney, University of Auckland, New Zealand

The archaeological landscape on Rapa Nui contains a palimpsest of surface archaeological features reflecting a long history of settlement and land use. The popular narrative of societal collapse prior to European contact relies on chronometric data from the late pre-contact period and also cites major settlement shifts as evidence for societal collapse and socio-political reorganization. This paper explores the archaeological evidence for proposed changes in settlement by assessing the spatial and temporal distribution of archaeological features that have been dated using the radiocarbon dating method. A corpus of over 300 determinations from archaeological contexts is placed into an island-wide GIS database and assessed. The results of this study suggest that Rapa Nui settlement exhibits continuity rather than punctuated, detrimental change in the late pre-contact period.

Peg-based statues of Easter Island

Paul Horley, Chernivtsi National University, Ukraine

Starting with Routledge's discovery of a statue with a peg-shaped base in the interior of Rano Raraku, many authors discussed the existence of peg-based statues designed to be "planted" in the soil rather than set on an *ahu*. Yet another *moai* with a peg-shaped base was excavated by the Norwegian expedition. Two red scoria statues were re-erected at Vinapu and Hanga Roa, being "planted" for stability purposes. But, were these images designed for such an installation type? Can we distinguish a special statue design that required "planting" or were these images merely flawed carvings? This study focuses on historical documentation of peg-based and "planted" images, aiming to validate the hypothesis about the existence of a special *moai* group that was not designed for placement on an *ahu*. The results obtained do not support the "statue planting" hypothesis – peg-based statues most probably should be considered as an aberrant phenomenon and not an alternative design. Therefore, the monumental stone sculpture of Easter Island was created as free-standing sculpture (placed on the *ahu* or used as territory markers) that did not require any "planting" into the soil.

The Hotu Matu'a Collection

Dale F. Simpson Jr., College of DuPage, USA and Terevaka.net Archaeological Outreach Program; and Carlos Paoa Huke, Guide, Rapa Nui, Chile

This presentation highlights a collection of 683 pieces of Easter Island material culture that until now has been viewed more by tourists than scholars. While there are many museum and individual collections of Easter Island material throughout the world, very rarely do we find a collection amassed by an individual from Rapa Nui. For over 30 years, Carlos Paoa Huke has been investigating, guiding, and transmitting his ancestral culture. Also within this period, Carlos has been collecting, buying, and conserving pieces of material culture that are curated in the Hotel Hotu Matu'a. In the Rapa Nui winter of 2011, both authors reviewed, organized, classified, and documented this collection. This article highlights this process along with providing discussion about key pieces found in the Hotu Matu'a collection. As such, this presentation will serve those interested in material culture studies, the contemporary period of Easter Island, and the creation of Rapanui identity through artifact accumulation.

Rano Raraku: Unfinished or unfinishable moai?

Nicolas Cauwe, Royal Museums of Art and History and Catholic University of Louvain, Belgium

Rano Raraku contains hundreds of 'sketches', which fill all the carved faces of the quarry, the number as well as the incomplete state of which have been explained in terms of abandonment. In contrast to this interpretation, we see a voluntary occupation of the quarry, transforming the workshops of former years into panels abounding in works of art of a new genre. The layout and abundance of these unfinishable *moai* reflect a desire to fill all the

ancient quarries with human faces and bodies. Moreover, the parallel between these figures imprisoned in the rock and the statues standing below is evident. In both cases these anthropomorphic figures were destined to remain in the quarries forever, some two thirds buried in the ground, others equally immobile due to the impossibility of completing them. Yet all possess the elements, which confer existence on them: eyes, ears, mouth, and nose. It seems therefore that the aim of the last workers of Rano Raraku was to populate the volcano with human figures.

Agriculture and cult platforms: Are they compatible?

Morgan De Dapper, Ghent University, Belgium

All the excavations done to date have shown successions, renovations or transformations of the statue platforms. By and large, it appears that the *ahu* and *moai* were built for a limited period and then reconstructed or restored some generations later. However, we have yet to understand the motives which inspired the Rapanui to endlessly dismantle and rebuild their great cult altars. Some indications, found at Ahu Motu Toremo Hiva (Poike) and Ahu te Niu (western coast), may feed the debate and give us a glimpse into some of the reasons for such actions. At these two sites, immediately above the oldest platforms, we find the systematic presence of fine layers of sheet-wash deposits from agricultural activities on the slopes above. This detail is of crucial importance. It means that during periods when the cult platforms were not in use, agricultural activities were carried out in the vicinity. Would the regular cessation of the functioning of the *ahu*, then their reconstruction, follow a pattern of monotonous alternation between cult site and food production? This theme is explored.

More than Mata'a and Toki: Some aspects of lithic technology on Easter Island

Johannes Moser, German Archaeological Institute, Germany

The most prominent and easily recognizable stone tools on Easter Island are the so-called *mata'a*, the tanged or stemmed pieces made from obsidian and the so-called *toki*, which are knapped and/or grinded adzes made from basalt and obsidian. This paper deals not only with these aforementioned distinctive tool types, but also with all the other stone artifacts within a wide spectrum of types found on Easter Island. In the last five years the German Archaeological Expedition to Easter Island, in cooperation with their Rapanui counterparts, carried out several surveys and excavations at Ava Ranga Uka A Toroke Hau at the Quebrada Vaipu in Terevaka. The investigations in the Cueva 1 at Ava Ranga Uka A Toroke Hau yielded a great quantity of lithic remains. Besides the modified implements such as side scrapers, splintered and notched pieces, laterally retouched flakes and blades, hammerstones, *mata'a*, and *toki*, all the essential components of the débitage such as flakes, blades, chips and debris and different types of nuclei are present. The manifold material allows us in a case study to focus on the analysis of technological aspects in the applied lithic tool production sequences in the sense of a 'Chaîne opératoire'.

Monumental architecture and cultural landscape management at Ava Ranga Uka A Toroke Hau (Rapa Nui)

Burkhard Vogt, German Archaeological Institute, Germany; Hans-Rudolf Bork, Christian-Albrechts-Universität, Germany; Andreas Mieth, University of Kiel, Germany; Annette Kühlem, German Archaeological Institute, Germany

Fresh water resources on pre-contact Rapa Nui were of utmost significance for managing cultural and ritual landscapes. At Ava Ranga Uka A Toroke Hau, a system of gravity walls and other monumental structures was built across the Quebrada Vaipu, a creek in the very center of Rapa Nui. Embankments, terraces, rocks with *taheta*, a megalithic water tank, two or three dam-like barriers and an extensively paved surface transformed the valley into a human-made landscape that was used until the 16th or early 17th century. The nearby Ahu Hanua Nua Mea may attest not only to an earlier occupation but also to the social control of fresh water through the Rapanui elites. The relief presents sections of up to 6 m of cultural layers alternating with alluvial sediments, the complex formation of which will be presented. Major emphasis will also be put on the functional principles of the monumental assemblage in its hydraulic setting and its apparent ceremonial use. Since 2008, the site has been under study by a German mission including the German Archaeological Institute in Bonn, the Hafen City University in Hamburg and the Institute of Ecosystem Research of Kiel University.

Paint industry on Rapa Nui? The colorful workshops on fluvial terraces near Rano Aroi

Andreas Mieth, University of Kiel, Germany; Hans-Rudolf Bork, Christian-Albrechts-Universität, Germany; Burkhard Vogt, German Archaeological Institute, Germany; Daniel Newman, Eva Haberkern and Stefan Dreibrodt, University of Kiel, Germany; Carolin Lubos, University Frankfurt am Main, Germany

In a tributary of Quebrada Vaipu on the southern slope of Maunga Terevaka, a fluvial terrace was investigated. At the rim of the terrace, 17 exposures were opened and a sequence of sediments and remnants of different human activities were identified. Below a gravel and a colluvial layer in horizontal distances of 125 to 270cm, numerous human-made pits were identified; filled with thin reddish-brown, light greyish and dark greyish to black layers. Mineralogical and chemical analyses proved that these layers consist of charcoal (black material), iron oxides (reddish-brown) and phytolith layers (light greyish). Some layers consist entirely of phytoliths and others consist only of iron oxides. Besides some limnic diatomites, very few minerals of volcanic origin are mixed in the layers. The findings imply that the Rapanui intentionally produced organic iron oxides in large quantities and of high purity. The source for the iron oxides might have been enormous amounts of plant material, as indicated by the pure phytolith layers. The processes of iron oxide production must have involved intensive burning. This is the first investigation of these kinds of colorful pits on Rapa Nui. The techniques, resources, and purpose of the iron oxide production are still under investigation. The distinctive color of the iron oxides implies that the products could have been used as paints, either on human skin or as paints on stone. Was this place perhaps a center of pigment production for painting *moai*?

Revisiting the collapse of Rapa Nui (Easter Island) through a voyage of 18th century journals

Jan Boersema, Institute for Environmental Studies (IVM), the Netherlands

For many scholars, Rapa Nui (Easter Island) is a textbook example of a flourishing and highly-developed culture, with fascinating religious practices, which collapsed due to the over-exploitation of its natural resources. This interpretation has attracted a number of critics, whose doubts about this 'overshoot and collapse' theory have been voiced since 2002. Since the last EI conference in 2007, these collapse-contesting voices have become stronger and the debate more intense. In a recent book, I have scrutinized the evidence so far and concluded that a collapse, in the way most authors have described it, involving deforestation followed by severe erosion, hunger, starvation, tribal warfare and even cannibalism, is neither supported by the earliest historical writings – the 18th century journals of European explorers – nor by the scientific evidence that has later become available. My paper will focus on these early journals (four European countries, at least twelve written sources). What do they tell us? How reliable is the information given? And why do they have a bearing on the present debate?

Session 2: SPATIAL TECHNOLOGY IN PACIFIC ISLAND RESEARCH

Chair: Mark McCoy

Growing Images: Creating surface scans and archaeological knowledge of Moriori carved trees (rakau momori) on the Chatham Islands

Ian Barber, Justin Maxwell and Richard Hemi, University of Otago, New Zealand

Historic carvings in the bark or sapwood of a living tree trunk represent a novel and increasingly rare archaeological site type. Uniquely in Oceania, precontact Chatham Islands Moriori people carved living kopi or karaka (*Corynocarpus laevigatus*) trees with anthropomorphic, and less frequently, zoomorphic or other representations. A research project has begun in partnership with Moriori people to relocate or discover and record all remaining Moriori tree carvings (*rakau momori*). We report on the novel application of hand held, 3D laser scanning technologies to capture high resolution images of selected *rakau momori* that are becoming increasingly faint or damaged with time. These images are evaluated against paired, high quality, digital SLR photographs of the trees to assess condition loss and carving detail. We consider the contribution of these results to the growth of knowledge about *rakau momori* vulnerability, diversity and meaning in an Eastern Polynesia setting.

Sociopolitical visualscapes on Rapa Nui

Dale F. Simpson Jr., College of DuPage, USA and Terevaka.net Archaeological Outreach Program

In this presentation I discuss how the ancient Rapanui landscape was demarked using political visualscapes created by district *ahu* and *moai*. By using example *ahu* found on the northwest coast, the southern coast and at 'Anakena, I argue that during the chiefdom integration period, district *ahu* served as sociopolitical centers for chiefly hegemonic control over territory, resources, and inhabitants.

Teaching space: Geospatial technology and data management as organizing principles for archaeology field schools

Rebecca Phillipps, University of Auckland, New Zealand

Field schools run through active research projects frequently require students to rapidly acquire new skills in the field and maintain a reasonable standard of data quality. Multiple staff and students work on research project data, sometimes over a number of years, so standardized data acquisition and management is essential. Teaching geomatics in field schools provides students with a number of skills that supplement those traditionally taught on an archaeology field school. Increasingly, students are both familiar with and competent in computing and geospatial interfaces (e.g., Google Earth). Focusing on training students in the use of instruments to record spatial data in survey and excavation, and data management through ArcGIS, provides a valuable skill set. Teaching these skills also meets the desire of a research project for common methods of data acquisition to preserve data integrity and uniformity, developing best practice for data management. Acquiring and managing spatial data on an archaeological project is often the job of specialists, however. Integration of students into the data acquisition phase of the field work ensures students are familiar with the structure of such data sets when they carry out subsequent individual research projects. Case studies from archaeological field schools in New Zealand are presented to highlight developing methods for 'teaching space'.

The placement of stones: Maps and settlement patterns in Pacific archaeology

James L. Flexner, Washington & Lee University, USA

Settlement pattern archaeology has a fairly long and productive history in the Pacific Islands. One of the key methods in this kind of approach is the visualization of archaeological sites and landscapes using cartographic techniques. In the Pacific, much of the surface archaeology is composed of stone architecture, from the massive stone *moai* of Rapa Nui, to more humble stone walls, terraces, and house sites that cover this and many other islands. In the 21st century, the traditional mapping equipment (tape and compass, alidade and plane table, theodolite) available to archaeologists has been augmented with a host of modern technologies (GPS, 3D laser scanning, CAD, GIS, and other mapping software). Yet the advent of high-tech mapping solutions does not negate the value of more traditional techniques, and in fact there are many reasons why the old methods persist. While our technology gets faster and more precise, there is still much to recommend approaches that require the

mapping of Pacific archaeological landscapes by hand, “stone-by-stone” when searching for meaning in past settlement patterns.

The first Hawaiians: The spatial signature of early settlement in Hawai‘i

Maria Codlin, University of Otago, New Zealand

In the last few decades, research on the timing of early settlements on Pacific Islands has increasingly relied on large databases of radiocarbon dates, where only a small fraction of these dates are suitably “hygienic” for accurate dating. Currently, there is too great a focus on the dates themselves rather than the sites that are being dated. Also, it is not clear how well these few dates reflect the true pattern of early settlement. This research compares the trends in number of sites dated in the first few hundred years of settlement in Hawai‘i to those in New Zealand, which by comparison, has a well studied and quite complete record of early settlement. Using a site-based approach, I look at the spatial signature of colonization in Hawai‘i, and what this means for understanding the timing of this process.

Landscape analyses through photogrammetry in Kaupo, Maui

Alex Baer, University of California, Berkeley, USA

This paper will explore recent advances in photogrammetry and its application towards understanding the cultural landscape of Kaupo, Maui. Archaeological studies have benefited from an increased ability to generate three-dimensional models at scales ranging from the broad regional level down to individual structures and artifacts. While LIDAR, laser-scanning, and similar methodologies afford high degrees of accuracy, the cost of data-generation is beyond many research projects. Though not as accurate as these laser-based platforms, photogrammetry offers an alternative methodology for creating 3D data that is far more cost-efficient, and, at the landscape level, more accurate than the coarse digital elevation models currently generated from topographic contour lines. Using basic photographs available online, this paper will demonstrate how photogrammetric methodologies have allowed for an increased understanding of settlement and subsistence patterns within the district of Kaupo, Maui.

Digitizing place: Geospatial accessibility in the Republic of Palau through Google Earth

Nicholas Belluzzo, University College London, UK

Modern geospatial technology has emerged as a disruptive technology. It has altered and even augmented the way individuals interact with and understand their environment and social relationships. However, what has not been thoroughly considered is whether the requisite educational and economic thresholds to access GIS data justifiably create a superior, more precise product. Access to data is limited to specialists, a pragmatic management concern in the Pacific region and elsewhere. Those individuals responsible for day-to-day monitoring of cultural resources require geospatial information to ensure responsible stewardship, yet, in many situations, lack access to existing data. Beyond management concerns, computational technology is no longer an innocuous Turing machine performing simple mathematical functions. Advanced applications of digital technologies can marginalize certain demographics, thus increasing the digital divide.

Geospatial applications are growing ever more sophisticated and specialized, yet there is a concurrent trend towards open-source and accessible solutions. In consideration of this, a database was developed in the Republic of Palau for visualizing and aggregating geospatial data. Rather than deploying the database on a more traditional platform, Google Earth was leveraged. Due to Google Earth’s availability, low-cost (free), and accessible interface, complex geospatial data was rendered in a way that was both accessible and participatory. Able to host both scientific data and local knowledge, it is hoped that the database will be replicable elsewhere while preserving and managing information more effectively and consistently with Palauan concepts of place.

Computer based simulation modeling in Pacific Island archaeological research: Current perspectives and future prospects

Alex E. Morrison, University of Hawai'i, Mānoa and International Archaeological Research Institute, Inc., USA

Recent advances in computer technology have created novel opportunities for developing powerful simulations of both ecological and social processes. In this paper I describe how computer simulation can be used as a tool for investigating the dynamic sufficiency of a variety of hypotheses about the prehistory of Oceania. I begin by reviewing more traditional simulations of environmental characteristics as well as new Agent Based Models that focus on the dynamism of socio-ecological processes. Simulation models have the potential to incorporate temporal and spatial scales, both of which have traditionally been of interest to archaeologists working on a variety of issues in the Pacific Islands. Finally, I suggest that when used properly, simulation models can help researchers understand how emergent macroscale phenomena may develop from mechanisms operating at the microscale.

Quantifying the influence of visibility and horticulture on the spatial distribution of Maori fortifications, Queen Charlotte Sound, New Zealand

Tristan Wadsworth, University of Otago, New Zealand

This research is aimed at investigating relevant factors influencing the spatial distribution of Māori *pā* (fortifications) in Queen Charlotte Sound, New Zealand. New Zealand archaeology has often implied a spatial relationship between the distribution of *pā* and *kumara* horticulture, and visibility is often considered an influence on the distribution of fortifications. Queen Charlotte Sound is an ideal region to test these assumptions, located outside those North Island regions on which they were based. Cost surface and viewshed analyses were conducted using Geographic Information Systems (GIS) to quantitatively test these supposed relationships against random datasets. Neither proximity to horticultural sites, nor expansive viewsheds were found to have significantly influenced the distribution of *pā* sites in Queen Charlotte Sound, and this research questions the value of applying generalizations made at a national scale to regional datasets.

Social networks and the history of Ngāpuhi: A case study in interaction and territoriality in East Polynesia

Mark D. McCoy, University of Otago, New Zealand; and Thegn N. Ladefoged, University of Auckland, New Zealand

Ngāpuhi is Aotearoa/New Zealand's largest tribe (*iwi*) and today is made up of 150 *hapū* (subtribes). Its origin out of inter-group confederation and territorial expansion is a topic well documented in Maori oral traditions and has been the subject of anthropological interest for over a century. However, it is unclear what effect, if any, these processes had on people's daily lives and social networks. On the one hand, sporadic conflict and new alliances may have had little impact due to the fluid group dynamics that typified life in pre-European contact New Zealand. On the other hand, we might expect the ethnogenesis of Ngāpuhi may coincide with more mutually exclusive networks representing increased territoriality. Previous archaeological excavations located in the tribe's homeland in the inland Bay of Islands region tracked one part of this history through documenting the construction of defensive features (*pā*) beginning in the late pre-contact period. In this paper we report on the results of new research in the coastal Bay of Islands. In the spatial analysis presented here, we synthesize survey data from remote sensing, obsidian sourcing and technology studies, and radiocarbon dates on fortification building, that for the first time allow us to create a material-based, regional model of how local social networks developed over time.

Automatic 3D documentation of cultural heritage objects and monuments on Easter Island from digital photographs using low cost systems

Thomas Kersten, HafenCity University Hamburg, Germany

Easter Island, one of the most unique – and remote – areas on Earth, is well known for its huge volcanic rock statues (*moai*), which have been protected as UNESCO (United Nations Educational, Scientific and Cultural Organization) World Cultural Heritage monuments since 1995. In addition to the *moai*, there are many other important cultural heritage objects and monuments on the island, e.g., petroglyphs and rock gardens, which are increasingly at risk of damage by animals, by exposure to weather (erosion) or by human vandalism. But so far,

most of these objects have not been digitally documented and copied using an appropriate recording technique. Due to the increasing performance of the Internet and advanced computer vision technologies, it is now possible to capture the reality of objects as-built for various purposes (renovation, historic preservation, visualization, structural condition and damaged state analysis, etc.) using standard commercial digital cameras as low cost systems. In this paper the new recording techniques are demonstrated using several cultural heritage objects of Easter Island such as *moai*, petroglyphs and archaeological excavation sites. The precision of the automatically generated 3D models is investigated by comparison of results from terrestrial laser scanning.

Session 3: PACIFIC ARTS

Chair: Carol Ivory

Takona, The art of Rapa Nui body painting

Tricia Allen, Independent researcher, Hawai'i, USA

Takona, or body painting of Rapa Nui, is getting international attention. In 2011, the Ministry of Culture of Venezuela hosted a major body art exhibition featuring an exhibition and demonstration of *takona* and tattoo by the artist, Mokomae. This presentation summarizes both the Caracas event as well as the body art done at the Tapati festivals and contrasts the body art of today with the scant references of earlier observers and with body painting as practiced elsewhere in the Pacific.

Art on the borders: Contemporary Taiwan aboriginal art and new media

Yuh-Yao Wan, National Dong Hwa University, Taiwan

Modern technological media such as computers and the Internet provide a new interactive platform that makes visual art creativity and interaction immediately international. In light of this development, contemporary Taiwanese aboriginal art is challenging definitions of traditional cultural practice, and is creating new values and a new relevance for artworks and craft knowledge resulting from implications of both new technology and disciplines. The traditional contexts in which aboriginal arts are produced, disseminated, and interpreted have changed. This paper first examines the website environment and art content from the website portfolios of selected Taiwanese Aboriginal artists. Interviews and group dialogues conducted among Aboriginal artists and viewers are used to present different views on contemporary art practices, trends in new media, and cultural learning on the web. Moreover, inquiries regarding context change, cultural identity and globalization reveal the agendas of Indigenous art society, cultural education, and cross-cultural issues imposed by the global impact of new technology on visual culture.

Material manifestations of Hawaiian modernity: The collection and display of cultural and natural history in the nineteenth century

Stacy L. Kamehiro, University of California, Santa Cruz, USA

This paper examines Native Hawaiian and Euro-American settler engagement with natural and cultural history study and collecting in the nineteenth century. It explores how and why settlers collected, studied, and exhibited Hawaiian scientific specimens and cultural artifacts. It also considers indigenous interpretations of foreign historical and scientific practices and the ways Native Hawaiians collected and displayed material culture and natural history, particularly in world fairs, as they endeavored to contribute to modern scientific and historical study and demonstrate their proficiency in international idioms of nation-making.

Barava plaques revisited

Deborah Waite, University of Hawai'i, Mānoa, USA

Barava plaques are slabs of fossilized *Tridacna gigas* clam shell from Western Province, Solomon Islands (e.g., the islands of Choiseul, Simbo, New Georgia, Vella La Vella and Santa Isabel). They have been articulated in openwork to re-present clusters of images: rings, anthropomorphic figures, skulls (?), and birds. Dimensions vary from small fragments of only a few centimeters in height and width to a height of around 40 centimeters. Many *barava* and *barava* fragments reside in museums and private collections. The period of production allegedly began in ancient times (variously defined) and extended into the early 20th century. Today they are being produced for sale.

Archival and historical research plus examination of many *barava* in collections (and associated formal analysis) indicates a complexity heretofore not recognized. There appear to be two distinct types that share a common material, production process, and certain images, but differ in compositional and proportional relationships, in correspondences with images in other media and, to a degree functionally. Variable terminology utilized over the years would appear to reflect these discrepancies. This paper, unlike previous studies, examines the differences as well as commonalities within a multi-dimensional contextual framework.

Session 4: RONGORONGO

Chair: Paul Horley

The rongorongo tablets and the multiple of number two: the “Metoro’s method”

Francesc Amorós i Gonell, CEHI University of Barcelona, Spain

The “Metoro’s pattern” is based on an historic event, when in 1770 the Spanish officers signed the official deed of possession, “the natives of Rapanui signed at the same time, writing down on (the bottom) of the document to be better corroborated certain characters according to their style” (e.g. *rongorongo*). In 1869 Metoro, an Easter Islander working on Brander’s plantation in Tahiti, revealed to Bishop Jaussen the right way to read the *rongorongo* tablets. He considered himself to be the local expert in *rongorongo* reading, which is why he knew very well the correct starting point and direction of the tablets’ inscriptions. Since then, its reading seems very “easy”. This paper gives attention to a topic neglected by scholars: the reason for which the number of the inscribed lines in the *rongorongo* tablets on the recto and the verso sides is always “even” and why the number of lines on both sides of all the known unbroken tablets are a multiple of the number two. The author also re-assesses, from a new angle, two of the most controversial topics such as the indigenous “signatures” in the Spanish treaty of annexation of 1770, and the use of the sign 76 (*ure*; “phallus”) as a grammatical particle.

Structure of the text on the Santiago Staff and its possible analogues in Polynesian oral tradition

Albert Davletshin, Russian State University for the Humanities, Russia

The “Kohau Rongorongo” text on the Santiago Staff has received a lot of scholarly attention. Its extremely rigid structure is striking and I will argue that it is even more rigid than we used to think. It can be described with the formula -A-Sprout-(B)-C_{i,j}-(Stroke)-, where brackets indicate optional positions. It is still unclear at which part of the inscription this formula explicitly starts. Numerous parallel sequences A-Sprout-(B)-C and A-Sprout-B are found in the text. The glyphs occupying positions A and B are not random and usually include only signs from a certain subset, which allows one to recognize different text fragments (paragraph divisions?). Adjacent sequences with identical A and C glyphs can be compared with two rhetorical devices used in the Hawaiian ‘genealogical’ chant Kumulipo – linking rhymes and pairing of names by meaning. Stylistic similarities between the two texts (Santiago Staff and Kumulipo) will be discussed.

Palaeographic analysis of rongorongo inscriptions

Paul Horley, Chernivtsi National University, Ukraine

Palaeographic studies are very useful for understanding the inner mechanics of written systems, which may bring important pieces of evidence for non-deciphered scripts such as *rongorongo* of Easter Island. This contribution summarizes the results obtained in study of almost the entire corpus of inscribed artifacts, detailed digital photographs and casts thereof. The main conclusion is that *rongorongo* scribes were highly professional, producing inscriptions with a surprisingly small number of errors and corrections in spite of very laborious carving process. The corrections can be observed as erased parts of text, unused pre-carved outlines and glyphs “squeezed” into tight spaces. Many scribal corrections have a direct relationship with the following text, being examples of pre-term writing. This is the most widespread type of scribal corrections, appearing on several tablets. The famous Santiago Staff features a considerable number of corrections that are completely unrelated with neighboring glyphs, which (in addition to its highly-structured text) makes this artifact stand out from other inscribed objects from Easter Island. The study of scribal corrections clarifies the multi-stage process used to create the inscription and provides hints about possible allographic forms of the signs.

Literary approach to structure and content of Kohau Rongorongo texts of Easter Island

Albert Davletshin, Russian State University for the Humanities, Russia

Analyzing a highly structured sequence on the Aruku Kurenga Tablet, Alfred Métraux was the first to discuss possibility that KRR (Kohau Rongorongo) texts reproduce chants. He rejected this suggestion, because sign repetitions seemed to be too sparse for him. I will argue that many structured sequences of signs, including “intricate sequences”, ABCABC and ABA repetitions, lists, palindromes and inverted sequences, might be explained through different rhetorical and poetic devices widely attested in Polynesian oral tradition such as

versification, *figura etimologica*, repetitions of different kinds, enumerations, antimetabole, chiasmus, appositional expansion, etc. Interestingly, these devices are attested in KRR texts in those cases when a sign sequence appears written in a slightly different way in various texts (remembering a rhetorical device known as elaboration). These observations have important implications for our understanding of structure, content and grammar of KRR texts.

Session 5: BIOANTHROPOLOGY OF THE PACIFIC: RECENT APPLICATIONS OF BIOARCHAEOLOGICAL INQUIRY

Chair: John Dudgeon

Dietary microfossils from Rapa Nui dental calculus: Does regional variability provide evidence for subsistence practices?

Monica Tromp and John V. Dudgeon, Idaho State University, USA

Microfossils extracted from dental calculus represent dietary and/or occupational artifacts embedded during life, offering a unique view of human-environment subsistence relationships. While recent studies have reported on the successful recovery of microfossils from calculus, this study is the first to employ high frequency sampling from a large archaeological skeletal collection. In addition to presence-absence data, our sampling strategy provides some evidence for subsistence activities and the geographic distribution of certain foods.

We recovered dental calculus from teeth of 114 Rapanui skeletons from 12 important regional sites dating from the late prehistoric and early protohistoric era (AD 1680 - 1750). Soil samples from Rapa Nui and modern plant material was also analyzed and used for reference. Scanning electron microscopy and x-ray microanalysis was employed to identify and quantify major taxa of embedded phytoliths and diatoms, while light microscopy was used for starch grains. The majority of phytoliths were classified as globular echinate, characteristic of the *Aracaceae* (palm), while small numbers of *Poaceae* (grass) and unidentified phytoliths were also seen. All diatoms were exclusively terrestrial and recovered starches were exclusively from *Ipomoea batatas* (sweet potato).

Analysis of dental calculus, modern reference plant material and soil samples from Rapa Nui suggest that microfossils may not always be a direct representation of diet, but also of soil-derived microfossils, as is the case with the *Aracaceae* phytoliths. In addition, we show that geographically extensive, high frequency sampling of calculus permits testing precise hypotheses about dietary adaptations and species persistence over relatively brief archaeological timescales.

Diet reconstruction in prehistoric Rapa Nui and its implications for models of resource depletion

Amy S. Commendador, Idaho Museum of Natural History, USA; John V. Dudgeon, Idaho State University, USA; Kelley Esh, University of Hawai'i, Mānoa, USA; and Bruce Finney, Idaho State University, USA

Previous research suggests that by the mid-17th century Rapa Nui experienced a dramatic reduction in available resources due to overexploitation. Archaeological evidence points to a shift from use of higher quality marine resources such as sea mammals and off-shore fish in the early phases of occupation, to an emphasis on agriculture and chicken husbandry, with some near-shore collecting/fishing in the later phase. We examine the strength of this argument through the use of stable carbon and nitrogen isotopes in human tooth dentin. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values were also obtained from a sample of faunal material from excavations at 'Anakena Beach to investigate the prehistoric food web. Our results show a decline in $\delta^{15}\text{N}$ values through time, suggesting dietary change; overall, however, it appears that higher trophic level marine resources did not make up a significant component of the prehistoric diet during either period. Rather, emphasis was always predominantly on terrestrial foods. Declines in $\delta^{15}\text{N}$ must be therefore explained in terms of changes in the terrestrial food base.

Bioarchaeology of the Mariana Islands: Prehistoric Chamorro health and lifestyle

Michael Pietrusewsky and Michele Toomay Douglas, University of Hawai'i, Mānoa, USA; Marilyn Swift, Randy Harper and Michael A. Fleming, Swift and Harper Archaeological Resource Consulting, Saipan, Commonwealth of the Northern Mariana Islands

Previous investigations of health and disease in the Mariana Islands suggested that the prehistoric Chamorro of the smaller islands (Rota, Tinian, and Saipan) experienced higher frequencies of indicators of stress than those living on Guam. Possible reasons for these differences included differences in environment and/or resource availability and the greater impact of natural disasters on smaller islands.

Recent archaeological excavations of additional human skeletons from Tinian and Saipan provide an opportunity to expand these interisland studies of the health and lifestyle of prehistoric Chamorro when compared to skeletons from Guam. The indicators of health investigated include cribra orbitalia (CO), linear enamel hypoplasia (LEH), stature, trauma, infection, and dental disease (AMTL, caries, abscessing, alveolar resorption, calculus, and attrition).

Comparisons between Tinian and Saipan Islands reveal few differences. When the skeletons from Tinian and Saipan are compared to those from Guam, significantly higher frequencies of several indicators suggest more childhood stress and oral-dental disease in the Guam skeletal series. In a majority of indicators, no significant differences were found for the skeletons from any of the Mariana Islands. Unexpectedly, these results suggest that the prehistoric inhabitants of Tinian were subjected to lower stress levels than those living on the larger islands of Saipan and Guam. Cultural habits such as chewing Areca (betel) nut and other environmental and cultural differences are examined to explain these differences.

This research was funded by US Capital Improvement Funds administered under the CNMI and federal governments and the CNMI Department of Public Works and the US Federal Highways Administration.

“Traditional” vs. “3D geometric” morphometric analysis: A Polynesian example

Vincent H. Stefan, City University of New York, USA

This craniometric research is an investigation of the origins and biological affinity of the prehistoric Rapanui and Eastern Polynesians, through the utilization of “traditional” and “3D geometric” morphometric analytical methods. Despite all the research that has been conducted on the prehistoric Polynesians via “traditional” craniometrics, very few have utilized 3D geometric morphometric methods in identifying population history or biological affinities of the prehistoric Rapanui and Polynesians.

Over the last couple of decades the utilization of 3D geometric morphometrics in the collection and analysis of human craniometric data has become state of the art, while the traditional caliper based method of collection for craniometric data has been nearly relegated to ancient history. This ongoing study is designed to quantify the differences in results obtained through multivariate statistical analyses of “traditionally” obtained craniometric data to those obtained via the “3D” digitizer method.

There are three objectives that this research proposes to address: (1) the quantification of the craniometric variation within the prehistoric Polynesian skeletal samples utilizing data obtained via the “traditional” caliper based method; (2) the quantification of the variation between the Polynesian skeletal samples utilizing data obtained via the “3D” digitizer method and geometric morphometric statistical analyses; and (3) the assessment of congruence/disparity of results obtained via the two methods. This presentation will discuss the results obtained from this research.

Rapa Nui dental morphology

Vincent H. Stefan, City University of New York, USA; Randy Rozen and George W. Gill, University of Wyoming, USA

In this presentation, the dental morphology of prehistoric Rapanui will be described, compared and examined within the context of Polynesian dental variation. Forty-two morphological dental traits, of the ASU Dental Anthropology System, were studied in 111 Rapanui individuals, and will be compared to published data of other prehistoric Polynesian populations, as well as other published research of prehistoric and modern Rapanui dentition. These results will be utilized to assess the range of dental variation within the prehistoric Rapanui population, as well as between various prehistoric Polynesian populations. This presentation will discuss the results obtained from this research.

Geometric morphometric analysis of the permanent dentition for testing bioarchaeological kinship hypotheses on Rapa Nui

Nicholas Holmer, Marie Holmer and John Dudgeon, Idaho State University, USA

The prehistoric skeletal series from Rapa Nui has been studied extensively by previous researchers. Many of these studies have focused on the origin of its inhabitants, utilizing the time-tested methods of craniometric and linear morphometric analysis. Although highly informative and crucial to our understanding of the place of the Rapanui in Pacific context, craniometric methods lack the fine scale resolving power to adequately distinguish and classify sub-population variation in isolated, interbreeding populations.

The rapidly growing and increasingly popular body of techniques derived from 3-dimensional morphometric analysis combines the “traditional” methods of metric analysis with the high-precision capabilities of modern 3-D scanners to increase the resolution of sub-population structure in these cases. This has made it a popular method for dental arcade and dental element analysis among species and sub-species in order to determine and/or support independently derived measures of genetic relatedness. Because biological kinship within the population on Rapa Nui is not well understood outside of historic and ethnographic data, new methods of metric analysis may provide insight into the process of internal differentiation and creation of lineage affiliation referenced in these accounts.

In this presentation, previously recorded (high-resolution laser scanning) permanent dental elements from the Rapanui skeletal series in the Museo Antropológico P. Sebastián Englert are analyzed using 3-D morphometric techniques to determine if discrete similarities in crown morphology have a genetic basis. These data are compared to current archaeogenetic research to test phylogenetic hypotheses. Special attention is given to the evaluation of 3-D morphometrics of permanent dentition as an independent means to reckon biological kinship on Rapa Nui.

Archaeogenetics and paleodemographic estimation of founding populations and features of residential geography on Rapa Nui (Easter Island)

John V. Dudgeon and Monica Tromp, Idaho State University, USA; and Amy S. Commendador, Idaho Museum of Natural History, USA

The development of improved techniques for extracting, amplifying and analyzing DNA from old or degraded tissue has provided unprecedented access to phylogenetic data for studying founding populations and the development of community structure in archaeology. Methodological advances in DNA extraction efficiency have resulted in increased throughput and have made large-scale sampling strategies viable, allowing the evaluation of anthropological and evolutionary hypotheses of mating and social behavior. Using mitochondrial and microsatellite data recovered from late prehistoric and early protohistoric (A.D. 1680 – 1750) skeletons from Rapa Nui (n=98), we present evidence for genetic lineage construction and emerging community structure under alternative models of colonization and demographic change.

In this study, Rapa Nui mtDNA HVRI and HVRII sequence variation shows greater haplogroup variability compared to recent archaeogenetic evidence from Central East Polynesian (Deguillox et al. 2011), supportive of a multiple colonization model. Microsatellite phylogenies suggest a refinement of previous craniometric (Stefan 1999) and archaeogenetic (Dudgeon 2008) studies arguing that lineage endogamy and differential mobility of males and females is explained by the emergence of corporate tribal entities after A.D. 1500.

Our results suggest that genetic affinity maps to geography and subsistence features, rather than simple isolation by distance (IBD) models, and is characteristic of a socially diverse, infilled population landscape. We do not find supporting evidence for strict lineage endogamy reported in early ethnohistoric accounts, but rather limited and geographically patterned female endogamy, the details of which require further explanation within a framework of insular demographic expansion and emerging territoriality.

Ancient human diet and mobility patterns in Tutuila, American Samoa: Stable isotope ratio results from human burials

Eric J. Bartelink, State University, Chico; Phillip R. Johnson, Texas A&M University; Olaf Nehlich, Max Planck Institute, Leipzig, Germany and University of British Columbia, Canada; Benjamin T. Fuller, Max Planck Institute, Leipzig, Germany and University of California, Irvine; and Michael P. Richards, Max Planck Institute, Leipzig, Germany and University of British Columbia, Canada

The application of stable isotope ratio analyses in West Polynesian archaeology is relatively recent. In this study, we evaluate diet and potential mobility patterns on Tutuila Island, American Samoa, using a multi-isotope approach. Our sample includes 32 radiocarbon-dated burials from several coastal sites that span ca. 1600-100 B.P. We evaluate the relative contributions of marine and terrestrial resources to the diet using stable carbon and nitrogen isotope ratio analysis of bone collagen, and also provide a partial food web reconstruction for the island. To evaluate potential evidence for mobility, we present preliminary results using stable sulfur isotope ratios of bone collagen. The results will be evaluated in light of archaeological subsistence models proposed for West Polynesia.

Prospects and Challenges for the next-generation of bioanthropological research in the Pacific: Observations and comments

Elizabeth Matisoo-Smith, University of Otago, New Zealand

As demonstrated by the range of papers presented in this session, recent developments in DNA, isotope and morphometric analyses are opening up new opportunities for bioanthropological research. But new techniques alone are not what is going to drive major advances in our understanding of human variation in the past and today. What are the key questions for biological anthropology in the Pacific region today? Do we actually have the tools and the appropriate samples to allow us to address these problems? What challenges and opportunities do we face now and in the future in bioanthropology in the Pacific?

Session 6: (SOCIAL) ANTHROPOLOGY AND HISTORY: RAPA NUI IN THE WORLD SYSTEM

Chairs: Andrea Seelenfreund and Diego Muñoz

Rapanui in the world and the world in Rapanui

Grant McCall, University of Sydney, Australia

Rapa Nui is remote, but has not been isolated since the shadow of the world system fell over it in the 18th century, with those contacts and involvements increasing to the present day. Tourism and migration have contributed to this place becoming culturally, socially and financially part of a world system of influence, both filtered through Chile and independent of the influence of that South American metropole. The paper explores recent events and how this structuration has proceeded.

Identity and conflict: The kinship's quandaries in Rapa Nui (preliminary remarks).

Diego Muñoz, Center for Research and Documentation on Oceania, France

Studies of kinship have generally focused on the structural dimension and little has been reflected on how certain events are able to change social structure. Sahlins (1997, 2007) has presented some outstanding examples of this different perspective. Godelier (2009), on his part, invited us to question the widespread notion in anthropology that there are societies based primarily on kinship. This has always been partly related (and sometimes determined by other social relations that have little to do with kinship). Thus, family relationship, descent, or specific terminologies, are closely related to the spheres of power, economy, ideology, but also with the vagaries of history.

For those of us interested in the dynamics of kinship among Rapanui, there is only Grant McCall's (1976) remarkable study to go back to. But the insular world and reality has changed significantly over the past 40 years. In this paper, I wish to present new data on Rapa Nui kinship that has recently been collected and propose some hypotheses about its dynamics. On the other hand, I will identify the perspective of the "social" role which the family plays in island society today. I will give an update of the characteristics given for the 1970s and later identify how certain events (migration, ethnic relations and legal aspects) have outlined the current kinship system on Rapa Nui.

Hakaara o te kahu: Clothing Rapa Nui

Andrea Seelenfreund, Universidad Academia de Humanismo Cristiano, Chile

In this paper, I will look at some of the details of Roggeveen's, Gonzalez's and Cook's encounters on Rapa Nui concerning cloth and clothing. Through a deconstructive exercise, I wish to analyze some aspects of the material exchanges between the Rapanui people and Europeans which were crucial from the first moments, particularly issues concerning textile and clothing in order to understand their role within Rapanui culture. This paper examines some of the information concerning cloth and clothing on Rapa Nui as disclosed in the travel logs of the first three voyages. I will analyze some aspects of the material exchanges between Rapanui and Europeans, particularly issues concerning textiles and clothing, in order to understand their role within Rapanui culture. Further, I will consider the context of social organization and beliefs in which textiles, particularly *tapa* and European cloth were given and received at the time of these encounters, and in which ways European textiles and clothing in modern day Rapa Nui maintain some of the symbolic associations with the earliest contact period. This analysis of an aspect of material culture from the perspective of both sides of the isle may help us understand or catch a glimpse of what Rapanui people thought when they first encountered Europeans, an exercise into indigenous insights that has rarely been attempted for the island.

Culture, power and public politics: The case of traditional health on Easter Island in the last decade

Valentina Fajreldin, Universidad de Chile, Chile

The National Native Peoples Health Program of the Ministry of Health in Chile is without a doubt a privileged space, where in the last fifteen years indigenous issues and problems have been addressed. Until recently, Easter Island has kept relatively at the margins of this process.

As a recent development then, the topic of intercultural health has taken on importance on the island. A series of agents, discourses and practices on “Rapanui traditional health” have derived from the contact with the public health policies on indigenous peoples in Chile. Internal politics, but also the experiences of other ethnic groups in mainland Chile, have influenced the process.

This presentation explores in a comparative historic perspective some of the changes and issues surrounding traditional health and how it is experienced on the island nowadays.

I propose to reflect, stimulated by interdisciplinary discussions, integrating points of view from medical anthropology, bioethics and public health. This discussion attempts to develop a critical questioning in relation to the extension of health issues into socio-political spheres, as well as a brief reflection on the macro- and micro-political dimensions that underlie such an approach in the context of Chilean public policies on its indigenous populations. I also question the effects and the consequences of focusing resources and actions towards specific groups or themes when faced by such a diverse set of specific discourses and practices.

The evolution in Rapanui’s political power: 1862-1898

Cristián Moreno Pakarati, Independent researcher, Santiago, Chile

The Rapanui political power suffered a series of changes in the 19th century. Prior to the Peruvian slave raids of 1862-1863, the paramount chief of the island was the birdman, even though he shared some portions of that power with local chiefs: the so-called *tangata honui* and the military leaders called *matato’a*, as well as the Ariki Mau, who was still respected because of his bloodline as the last direct descendant of the first “king” Hotu Matu’a, and still held some privileges. Rapa Nui had a divided society and such an administration of political power was in agreement with the way the society was in those days.

After the Peruvian slave raids, the Rapa Nui society was devastated and the indigenous inhabitants had to re-invent their political structure. Foreign powers like the Catholic Church and a French illegitimate sovereign became involved in Rapa Nui’s political scenario and had a huge influence in this re-invention. By the 1880s, before the Chilean annexation, this new political structure was completely active even though the new “king” was not completely legitimate. Nevertheless, increased pressure from the Chilean Nation-State’s representatives and a clash with the private sheep company compelled the Rapanui to increase legitimacy in political power leading to the election of “king” Riro Kainga.

His tragic outcome again divided the Rapanui people in many political factions and attitudes towards the foreign powers.

This paper deals with the inside complexities of Easter Island political power in the 19th century.

Beyond Easter Island: Insularity land flows in contemporary Rapanui identity

Diego Muñoz, Center for Research and Documentation on Oceania, France

Oceanic societies today are characterized by migration of people from small lowly urbanized islands towards urban centers and highly urbanized islands, and by the relationships that these migrants maintain with their communities of origin (Gille et Toulleland 1999, Lockwood 2004). By focusing on these links, Epeli Hau’ofa (1993) identified a new configuration of island communities, which he called “translocal communities”.

This paper proposes to consider Rapa Nui as the center of a network, which links the island with continental Chile as well as with French Polynesia (and even beyond), where I intend to reinstate Rapa Nui within the social dynamics of the contemporary Pacific. I have centered my analysis on how the displacement and relocation of Rapanui people outside the island has affected identity and the relationships on island society. I believe that the present Rapanui society consists of territorially dispersed communities, which under various forms of articulation form a notion of social totality, where Easter Island is the focus or place of belonging. Travels by the Rapanui and permanent residence outside of Easter Island do not generate feelings of rupture with the home community; on the contrary, there are a number of social obligations that establish a notion of totality.

Session 7: MONUMENTS AND PEOPLE IN THE PACIFIC REGION

Chair: Helene Martinsson-Wallin

Mortuary architecture on Pohnpei: A case study from Temwen Island

Alex Craib and Danielle Stanzak, Independent researchers, University of Oregon, USA; Katherine Seikel, Australian National University, Australia; and William S. Ayres, University of Oregon, USA

Monumental construction on Pohnpei, Eastern Caroline Islands, is scattered across the island and is typically comprised of large-scale settlement sites and tomb complexes (*lolong*). *Lolong* typically conform to a standard layout, which makes comparative study of the structural features of architecture valuable. Recent fieldwork on Temwen Island included mapping and test excavation of a *lolong*, which is believed to be unfinished. It has an enclosing wall built of large basalt boulders and a rubble foundation (likely in place for a tomb platform), and thus it is not constructed with the header-stretcher stonework typical of the large tombs at Nan Madol and elsewhere on Pohnpei. This structure provides a case study in the architectural features of *lolong* as well as sequences of construction, which can improve interpretations of this type of architecture and the variations in its construction around Pohnpei.

Orientations of prehistoric monumental tombs in Pohnpei (Federated States of Micronesia)

Cesar Esteban, Instituto de Astrofísica de Canarias, Spain

I present an analysis of the orientations of burial stone enclosures in two archaeological sites on the island of Pohnpei (Federated States of Micronesia): Nan Madol and Sapwtakai. The results indicate that the most relevant enclosure of Nan Madol, Nan Douwas, is fairly well oriented with respect to the cardinal directions. Moreover, from the exact location of Nan Douwas, the sunrise at the equinoxes and the June solstice are observed to occur over the edges of nearby reef islands on its local horizon. This fact is discussed in light of the scarce oral and archaeological information available about the history and religion of the pre-European Pohnpeian culture and archaeoastronomical studies for other areas of the Pacific. An alternative explanation of these results can be formulated in relation to stellar targets: the rising-points of the stars of Orion's Belt and the Pleiades. These two groups of stars were very important in the ancient calendars used in Micronesia and Polynesia as well as in the Carolinian Star Compass for traditional inter-island navigation.

Mortuary architecture and society on Pohnpei

Katherine Seikel, Australian National University, Australia; and William S. Ayres, University of Oregon, USA

Mortuary architecture and burial practices observed archaeologically offer numerous avenues for improved understanding of past cultural behavior. On Pohnpei, Eastern Caroline Islands, a wide range of mortuary contexts have been found. Among these, elaborate stone tombs (*lolong*) are the most useful to archaeologically document the relationships of social and political structure to burial practices. Non-tomb burial contexts are less well understood compared to the *lolong*, but examining variation in mortuary practices is essential to provide information about prehistory, socio-politics, and ritual change on Pohnpei. Analyses of *lolong* suggest that they are clan burial places denoting high status (Ayres 1990; Ayres and Scheller 2003; Seikel 2011), and evidence from mortuary architecture and practices shows that construction using columnar basalt as a building material increases after approximately AD 1300, suggesting expansion of regional relationships in stone acquisition. This paper considers the regional variation in tomb construction styles, dates of use, and spatial context of tombs within communities on Pohnpei.

Monuments, landscape and mindscape: Contemplations on prehistoric mounds in Samoa

Helene Martinsson-Wallin, Gotland University, Sweden

In Samoa there are a few examples of large prehistoric mounds. The oral traditions have indicated that they had functioned mainly as pigeon mounds (*tia seu lupe*). Surveys and archaeological investigations have shown that there are various types of mounds and that the two largest mounds, Pulemelei and Laupule probably served as

house platforms connected to chiefly power and ritual activities. This paper discusses the inter- and intra-site relationships of the mounds and their prehistoric as well as present contexts.

The stone statues of Ahu Ura Uranga te Mahina, Rapa Nui

William Ayres and Joan Wozniak, University of Oregon, USA; and José Miguel Ramírez, Universidad de Valparaíso, Chile

The architectural complex at Ahu Ura Uranga te Mahina on Rapa Nui's south coast reflects a long, complicated sequence of *ahu* structural evolution. The center shows two large, late-period *ahu* and four earlier or subsidiary structures. At least eight large stone images originally stood on these structures. This paper reports on the statuary study done as part of the UNESCO-JAPON project at this complex. Research questions relate to the sequence of statuary development represented at Ura Uranga, as well as to the status of images in court areas of *ahu*, from the standpoint of sculptural form and shaping, transport, and ritual meaning. Additionally, we had concerns with structural maintenance and statuary conservation. The research provides new information about statue transport, raising images, and sculptural patterns. A prone court image preserves some detail about the completeness of images that were being transported from the quarry to *ahu*, and overall, the set indicates some aspects of chronological change in style.

Ceremonial complexes in Rapa Nui – Temporal and spatial perspectives

Helene Martinsson-Wallin and Paul Wallin, Gotland University, Sweden

The ceremonial sites of Rapa Nui, the *ahu*, are complex structures that incorporate and display a variety of temporal and spatial relationships. Using diachronic and synchronic perspectives on a series of case studies, we will highlight the complex relationship between humans and the environment in the making and re-making of place.

Session 8: ISLAND ECODYNAMICS

Chair: Thegn Ladefoged

Tracking prehistoric landscape use over time by obsidian hydration dating

Christopher Stevenson, Virginia Commonwealth University, USA; Thegn Ladefoged, University of Auckland, New Zealand; Oliver Chadwick, University of California, Santa Barbara, USA; Peter Vitousek, Stanford University, USA; Rafael Paoa Rapu and Sonia Haoa, Independent researchers, Rapa Nui, Chile

The dating of Rapa Nui prehistoric contexts by obsidian hydration dating (OHD) has been used for over 50 years, starting with the Norwegian archaeological expedition and extending until the present day. Evaluating the accuracy of archaeological hydration rate calibrations has been difficult because many contexts contain obsidian and carbon fragments from centuries of activities at one location. Using new calibrations that measure hydration by infrared spectroscopy, we examine mixed contexts and show that OHD and AMS dating are providing similar age ranges and terminal dates, thereby supporting the applied hydration rate and dating results. Application of OHD on a regional scale from survey areas in Te Niu, Vaitea, and Hiva Hiva reveal the intensity and duration of landscape use and that significant populations levels were present on Rapa Nui into the 19th century.

Soil nutrient distributions on Rapa Nui reflect variations in climate, lava flow age, and land use history

Oliver Chadwick, University of California, Santa Barbara, USA; Peter Vitousek, Stanford University, USA; Christopher Stevenson, Virginia Commonwealth University, USA; and Thegn Ladefoged, University of Auckland, New Zealand

There has not been a comprehensive inventory of soils and their nutrient properties on Rapa Nui even though this information would assist in interpreting archeological evidence for pre-European Polynesian agriculture. We analyzed more than 500 samples mostly taken from soils on Terevaka and its subsidiary cinder cones, a few coming from Rano Kau, and none from Poike. We interpret the results in the context of similar studies undertaken in Hawai'i. Younger volcanic flows have higher soil nutrient levels than do older ones. Also soil morphological indicators of periodic anoxic conditions suggest that higher elevations received enhanced orographic rainfall, perhaps as much as 3000 mm. The north side of Terevaka appears to be in a rain shadow because nutrient levels are higher and there is evidence of calcium carbonate precipitation in deeper horizons. Even on relatively young lava flows receiving low rainfall, the soil nutrient levels are low. This result may be due to problems with dating the lava flows or relatively poor understanding of rainfall amounts on Rapa Nui. Regardless, we find that exchangeable Ca is low <15 cmol(+)/kg soil and resin extractable phosphorus (P) (a measure of plant available P) is generally <100 μ g/g. On Hawai'i Island, these values for Ca and resin P seem to be the minima below which Hawaiians did not find it advantageous to develop intensive dryland agriculture. The overall infertility of Rapa Nui soils and the lack of broad erosional valleys conducive to intensive irrigation agriculture suggest that inhabitants of Rapa Nui probably started with lower nutrient levels, meaning they had to protect and/or enhance soil fertility through rock mulching and vegetative mulching.

Rapa Nui rock gardens: Are they located in micro-sweet-spots?

Thegn Ladefoged, University of Auckland, New Zealand; Chris Stevenson, Virginia Commonwealth University, USA; Sonia Haoa, Independent researcher, Rapa Nui, Chile; Cedric Puleston, University of California, Davis, USA; Oliver Chadwick, University of California, Santa Barbara, USA; and Peter Vitousek, Stanford University, USA

Ancient Rapanui employed a number of unique and innovative gardening techniques, including rock gardens and lithic mulching. Previous analyses have shown that the soils of Rapa Nui are relatively poor. Soil sampling along four ca. 80 m transects across rock gardens adjacent to natural outcrops indicate that in some instances nutrient levels within gardens are elevated in relation to zones just outside the gardened area. The reasons for these elevated levels are explored, with the natural nutrient rich micro-sweet spots adjacent to outcrops forming optimal conditions for rock gardening practices.

Rain, sun and soil: A consideration of Rapa Nui population dynamics as a function of agricultural productivity before European contact

Cedric Puleston, University of California, Davis, USA; Oliver Chadwick, University of California, Santa Barbara, USA; Peter Vitousek, Stanford University, USA; Chris Stevenson, , Virginia Commonwealth University, USA; Thegn Ladefoged, University of Auckland, New Zealand; and Sonia Haoa, Independent researcher, Rapa Nui, Chile

There have been several attempts to calculate a “carrying capacity” for Rapa Nui, often with the assumption that the population must have exceeded this number, precipitating a crash near the time of European contact. Others have argued that the loss of large trees triggered a demographic catastrophe. Here, we present the argument that the interplay of food, the environment and human behavior is central to the discussion of Rapa Nui’s population dynamics. First, we describe the climate of the island as it varies across time and space based on data gathered from weather stations placed in several locations. Second, we parameterize a model of crop production based on nutrient cycling, whose inputs include climate variables, soil characteristics and human inputs. Third, based on the availability and quality of labor and the food needs of the population, we estimate the dynamic state of food availability and population growth. Finally, we present preliminary results on the time it might have taken a colonizing population to become large enough that further growth was constrained by the convergence of rates of birth and death.

The Dispersal of Polynesian Economic Plants

Melinda S. Allen and Jennifer M. Huebert, University of Auckland, New Zealand

In *Plants, Man and Life*, Edgar Anderson recognized the crucial role of humans in transporting plants and animals around the globe, both intentionally and accidentally. Polynesia is a special case in that these tropical islands had few native plants which could sustain human life, particularly species with starchy carbohydrates. Moreover, natural floral diversity declines across the region with distance from the rich Indo-Malaysian source area. Thus a critical aspect of Polynesian colonization was the translocation of economic species from homeland islands to settler outposts. In addition to food crops, other species with a wide range of uses also were transported. As with natural diversity, the inventory of transferred plants was reduced as Polynesians moved eastward, the result of incomplete and unsuccessful transfers. In this paper we report on a meta-analysis of macrobotanical (including wood charcoal) and microbotanical finds from the East Polynesian region at large. Our aims are to understand the timing, distribution, and other patterning of early economic plant dispersals. The findings stand to contribute to debates about whether Polynesian economic plants were dispersed piecemeal over an extended period of time, or as a portmanteau biota. Methodological aspects of these findings, including preservation and recovery, are also considered.

Late Quaternary plant and arthropod fossil records from Rapa Nui show vegetation change, fluctuating lake levels, and introduced crops and insects

Mark Horrocks, Microfossil Research Ltd., New Zealand; Maureen Marra, University of Waikato, New Zealand; Troy Baisden, GNS Science Ltd., New Zealand; Michelle Nieuwoudt, University of Auckland, New Zealand; John Flenley, David Feek, Massey University, New Zealand; Lilian González Nualart, Sonia Haoa Cardinali and Tahira Edmunds Gorman, Independent researchers, Rapa Nui, Chile

Plant microfossils (pollen, phytoliths and starch) and arthropods preserved in radiocarbon-dated sediments from Rapa Nui crater wetlands and surrounding drylands provide evidence for Late Quaternary environments and human activity. A new method was used, Fourier transform infrared spectroscopy, to positively identify degraded starch. All sites show widespread palm-dominated forest cleared by early people, with several plant extinctions. At Rano Aroi, there is little evidence of agriculture; its cooler, high altitude locality could have restricted this. At Rano Raraku, fossil root casts of wetland plants show a higher, Last Glacial lake level, and microfossils of introduced cultigens suggest this crater was used for extensive horticulture as well as *moai* quarrying. Rano Kau shows evidence of intensive multi-cropping and landslides, with in-washed soils and gravel interpreted as slumped garden terraces. New Rapa Nui insect species are identified, and introduced insects represent new indicators of human presence in sedimentary records from the region.

Isotopic analysis of rodent diet in prehistoric Kohala: Implications for food production and landscape change

Julie S. Field, Ohio State University, USA; John V. Dudgeon, Idaho State University, USA; and Amy S. Commendador, Idaho Museum of Natural History, USA

In this pilot study, a sample of rodent skeletal remains from archaeological contexts in Kohala, Hawai'i are analyzed for the relative content of carbon and nitrogen isotopes in extracted collagen. These remains were collected during the excavation of prehistoric residential features in the Leeward Kohala Field System, and also from residences along the coastline of Kohala. Analyses of the ratio of carbon and nitrogen have the potential to reveal the geographic influence on diet, which in the case of rodents may have been extremely variable across space. In addition, our study will investigate changes in rat diet over the period AD 1420 to post AD 1850, which spans the history of dryland farming in Kohala. The results of this pilot study provide an initial measure of changing subsistence and ecology in the region, and provide a proxy model for human diets.

Vulnerability and resilience in island socioecosystems

Patrick Kirch, University of California, Berkeley, USA; and Jennifer Kahn, Bishop Museum, USA

This paper describes the goals and initial results of a multidisciplinary collaboration focused on island ecosystems and cultural responses to ecosystem change which led to radically transformed landscapes and emergent sociopolitical formations in Polynesia. Using a comparative approach, our project is investigating three contrastive islands in Eastern Polynesia, Mangareva, Mo'orea, and Maupiti, applying the concept of islands as model systems. Our interpretive model utilizes resilience theory to understand long-term human ecodynamics and the evolution of island socioecosystems. The three island case studies provide critical contrasts in island geology and age, geomorphology, size, and climate and marine resources; vary significantly in the degree of socio-political hierarchy and integration; and have existing archaeological and paleoecological data from which we can build. After modeling key environmental state variables, we have developed a series of hypotheses regarding each island's vulnerability to anthropogenic disturbance and long term resilience. Our goal is to understand interactions among anthropogenic landscape change, and shifts in settlement patterns, agricultural infrastructure, production, and ideological control, both how these variables influenced emerging social complexity, and how they affected long term adaptive cycles in island socioecosystems.

Deforestation, drought and humans: New discoveries of Rano Kao, Rapa Nui

Candace Gossen, Independent researcher, Colorado, USA

The mystery of the trees of Rapa Nui (Easter Island) is a complex problem within a dynamic ecosystem. With new physical cores from the volcanic crater lake Rano Kao, this dissertation uncovers a detailed 15,000 year ecological history of Easter Island and its climatic variability. New radiocarbon dating methods establish a more precise chronology which shows that the island before human habitation was very different than what we know today. It had a simple but prolific ecology that transitioned into a barren grassland. What factors caused the transition are unclear but are likely to be human related. As the forests slowly disappeared, it could have triggered changes in regional and local climate, particularly rainfall, which generally leads to a rapid loss of ecosystems. With virtually stable climate conditions over the last 2,000 years, Rapa Nui has lost 33 species of plants, including the giant palms, and still has not recovered today.

This research challenges the previously accepted theory that humans deforested the island for the sole purpose of moving the *moai* around, and focuses rather on uncovering the role of climate change that may have altered the ecosystem. New cores were obtained in 2005 from Rano Kao that were radiocarbon dated using *Scirpus* seeds. The nine meters of core were sampled for oxygen isotope analysis of the lake water changes, a new science to the island. Detailed palynological studies of pollen and non-pollen palynomorphs uncovered changing vegetation patterns that aligned with a 700 year drought cycle. Conclusions support a cool-dry event that occurred 545 years ago, at which time the giant palms disappeared. While it was not the focus of this study, evidence confirms human occupation for more than 500 years before the disappearance of the trees.

Session 9: ARCHAEOBOTANY IN THE PACIFIC REGION

Chair: Jennifer Huebert

Examining ecologically-scaled resource distribution through microfossils extracted from human dental calculus using SEM-EDS and image analysis software

Monica Tromp and John Dudgeon, Idaho State University, USA

Microfossils extracted from dental calculus represent a direct relationship between humans and their environment. Large-scale sampling strategies of dental calculus enable archaeologists to build anthropologically defensible explanations of resource distribution through time. We have employed SEM-EDS and image analysis software to analyze microfossils recovered from a large, geographically dispersed sample of dental calculus from prehistoric Rapanui. We combined data from multiple microfossil classes to examine resource distribution across the island. This is an important development, since microfossil studies generally rely on manual counting and measuring techniques that are not feasible for large sampling strategies. This is largely due to the time and effort required to find and identify rare microfossil classes. We believe this is especially important for counting microfossils extracted from dental calculus, since achieving counting redundancy and/or resampling is often not possible on skeletal material. Our method uses SEM-EDS combined with image analysis software and allows analysts to build or use predefined classification rules that result in separation of phytoliths for automated counting routines and collect measurements for morphometric analysis. This method decreases the amount of microscope time needed for data collection while extracting the maximum amount of information possible, enabling both extensive and intensive sampling strategies, significantly increasing the chances of detecting rare classes.

An archaeobotanical perspective on agriculture in Tongan prehistory: Preliminary results

Ella Ussher, Australian National University, Australia

People of the Lapita cultural complex settled the Tongan archipelago around 2900 years ago, and the islands formed the eastern limit of this first human colonization of Remote Oceania. Over time, a complex maritime chiefdom emerged that continued this tradition of long-distance voyaging, traveling throughout Western Polynesia to gain political influence. Understanding the role of agriculture in the development of this chiefdom is vital, as the full suite of domestic plants and animals were apparently not introduced as a single package by the Lapita colonizers, indicating later introductions through trade and island contact. Additionally, the dispersed small island landscapes within the archipelago are quite unlike the islands of the Western Pacific, and would have forced revisals of agricultural practices to allow crops to be grown successfully. My research will investigate the timing of prehistoric crop introductions in Tonga through a study of ancient plant remains found in Lapita and post-Lapita archaeological sites around Tongatapu. A combination of micro- and macro-botanical techniques will be implemented. This presentation will focus on the methodology that will be implemented, and display preliminary findings from the establishment of a comparative collection and results from the analysis of one of several sites to be researched from around Tongatapu.

Prehistoric food production in Pohnpei, Micronesia: Archaeological and preliminary phytolith evidence

Maureece Levin and William S. Ayres, University of Oregon, USA

In Pohnpei, Micronesia, long-term agricultural change is thought to be reflected in intensification of agroforests and gardens. Subsistence crops include banana, breadfruit, yam, taro and coconut; kava (*sakau*) is also important. Ethnographic data (e.g. Balick 2009; Bascom 1948; Petersen 1977) show that Pohnpeian food production is closely linked to the social system; feasting foods are important and serve to cement social roles. This study examines the agroforestry and garden system intensification process through time. We distinguish agroforestry (with its focus on arboriculture) from gardening (with its horticultural emphasis). Using details from site features and paleoethnobotanical remains as evidence from archaeological sediments, we suggest that the agroforestry and gardening systems intensified throughout the occupation of the island, with major shifts coinciding with political transformations visible in the archaeological record. This differs from systems in much of the Pacific, many of which focused on hydraulic expansion. Archaeological evidence is important for

understanding transformations of these food production systems, while phytoliths in sediments provide more information on the use of specific crop foods such as bananas and breadfruit. Ecologically, these intensified agroforests and gardens appear to be sustainable and thus represent a long-term adaptation beginning in the prehistoric period.

Botanical identifications and the hypothesis of early Chatham Island arboriculture

Justin Maxwell, University of Otago, New Zealand

The permanently inhabited Chatham Islands (Rekohu and Rangiauria), which are isolated, even by Oceanic standards, were one of the last places in Polynesia to be colonized. The climate of this archipelago precluded the introduction of any Polynesian crops. However, recent studies suggest that the kopi/karaka (*Corynocarpus laevigatus*) tree may have been introduced from New Zealand and managed on the Chatham Islands for its edible fruit in a form of arboriculture. Palynology and charcoal analysis have previously been used to identify a variety of past activities and environmental contexts, and to understand the pre-human context and subsequent modification of the landscape, leading to insights into subsistence and settlement patterns. Pollen cores collected from peat beds will test whether kopi was introduced to the Chathams or, alternatively, what changes can be seen in the local environments. Charcoal from archaeological contexts will be used to determine whether selection choices for fuel/firewood match a model of least effort or one of intentional selection. If kopi was an important economic resource then we would expect it to be under-represented in the assemblage, relative to its prevalence in the forest. These two methods are seen as important components of the wider holistic approach toward the investigation of early Moriori resource choice and arboriculture on the Chatham Islands. The preliminary results of the charcoal analysis and palynological work will be presented in this paper.

Evaluating forest transformations and the rise of arboreal subsistence strategies in highly variable environments: The anthropogenic forests of the Marquesas Islands, French Polynesia

Jennifer Huebert, University of Auckland, New Zealand

Polynesian settlers transformed native forests of the central Pacific islands into productive economic landscapes. In several cases, arboriculture was a key component of these subsistence economies. While many agroforests in the region continue to be useful today, some were considerably reduced or have entirely disappeared since western contact, as in the case of the Marquesas Islands. The long-term process of anthropogenic forest transformation, from initial settlement through the historic era, is not well understood in these contexts. Wood charcoal analysis is uniquely suited to provide direct information on past vegetation, and this case study utilizes archaeological charcoal assemblages from Nuku Hiva to assess forest change over time in a high-variance environmental setting. Material from three valleys with contrasting geographic and micro-climate conditions, spanning an 800 year period, are compared. The aim of this research is to better understand the dynamic relationships between social systems, environment and climate. The results of this study will contribute to our understanding of human ecodynamics in the tropical Pacific islands.

From myth to archaeological evidence: Analysis of plant micro-remains from archaeological contexts on Rapa Nui

Merahi Atam, Universidad Internacional SEK, Chile

The analysis of plant micro-remains in archaeological contexts has a great potential for the reconstruction of living conditions of the past. This paper presents results obtained from the analysis of plant micro-remains from site 6-58 on Rapa Nui. One of the main purposes of the study was the compilation of a reference collection of starch remains and phytoliths. Samples were all extracted from tubers and plants that constitute the basic items of the transported landscape that accompanied the first colonizers to Rapa Nui.

The comparative collection is used for the identification of plant micro-remains adhering to obsidian artifacts collected from Hare ηae ηae (site 6-58), a coastal cave, excavated by Chris Stevenson in 1988. Experimental obsidian tools were used on tubers and fibers in order to define which use some of the archaeological tools have been subjected to. By means of this reference collection, I aim to identify the potential use of the lithic tools.

This work allows us to understand and answer questions relating to the use and specific nature of obsidian tools and contribute to archaeobotanical and archaeometric studies on prehistoric Rapa Nui.

Paper mulberry in the Pacific: Genetic analysis of fresh leaves, herbarium samples and tapa

Daniela Seelenfreund, Universidad de Chile, Chile; Ximena Moncada, Centro de Estudios Avanzados en Zonas Áridas, Chile; Sergio Lobos, Universidad de Chile, Chile; and Andrea Seelenfreund, Universidad Academia de Humanismo Cristiano, Chile

Broussonetia papyrifera (L.), family *Moraceae* (paper mulberry) is one of a suite of useful plants introduced into Remote Oceania by Polynesian settlers and dispersed intentionally by humans over the Pacific as far as Easter Island from its South East Asian center of origin. This species is associated with many economic, political and ritual uses and was a basic and necessary item for cultural reproduction.

The research questions we address are; what are the genetic relationships of extant mulberry populations within Remote Oceania and what does paper mulberry tell us about the colonization history of this broad area of the Pacific? Is the molecular data consistent with any of the specific models proposed for the colonization of Remote Oceania and Easter Island in particular?

We have analyzed DNA from fresh leaves collected in Remote Oceania and Taiwan. In addition, we have analyzed DNA from herbarium specimens and have been able to extract DNA from modern cultural material (*tapa* cloth), which may represent an alternative resource in the absence of fresh leaf material from islands where the species has become extinct (for example Mangareva and the Cook Islands). These samples have been analyzed using two types of molecular markers, the non-coding internal transcribed spacer sequences (ITS) of ribosomal nuclear DNA and microsatellites designed for *Morus* species. Results on fresh leaves show three genotypes, separating Asian and Pacific specimens. Herbarium and *tapa* DNA samples are being subjected to analysis with microsatellite markers and in this presentation we will discuss the results obtained so far.

Session 10: TRANSPACIFIC CONTACTS

Chairs: José Miguel Ramírez-Aliaga and Elizabeth Matisoo-Smith

Redrawing the Polynesian Triangle

Elizabeth Matisoo-Smith, University of Otago, New Zealand; Jose Miguel Ramirez, Universidad de Valparaíso, Chile; Andrea Seelenfreund, Universidad Academia de Humanismo Cristiano, Chile; Richard Walter and Michael Knapp, University of Otago, New Zealand

In 2007 we published radiocarbon evidence for pre-Columbian chicken bones recovered from an archaeological site on the coast in south central Chile which, combined with ancient DNA data, we argued was evidence for a likely Polynesian introduction. Based on these data, we began looking for further evidence of Polynesian contact with the Americas. While examining collections at the Concepcion Museum in 2009, we discovered human remains from the island of Isla Mocha, located 30km off the coast of Chile, which had numerous characteristics suggestive of Polynesian origins. Craniometric analyses of these remains confirmed the association with Pacific Island populations. We are currently undertaking archaeological and ancient DNA research on Isla Mocha looking for chronologically secure archaeological and genetic evidence of Polynesian presence on Isla Mocha. This paper will describe the biological results to date.

Chewing kava and chicha: Are there implications for diffusion?

Denise L. Hope and Alice A. Storey, University of New England, Australia

Traditional chew-spit preparation of the Pacific beverage kava was recognized by early European explorers for its similarity to the preparation of the alcoholic beverage *chicha*, observed in communities living along the Pacific coast of South America. Despite being chemically different, kava and *chicha* were both important social and ceremonial drinks, each traditionally prepared in a similar manner. Indigenous people chewed plant material, using the roots of the kava plant (*Piper methysticum*) in the Pacific and tubers or grains, including maize (*Zea mays*), in South America. The plant pulp was then placed in communal vessels and macerated with water to prepare an intoxicating drink. Several scholars of trans-Oceanic contact at the turn of the last century suggested the similarities in preparation link the kava complex of the Pacific with the *chicha* complex of the Americas. This presentation highlights critical information from the historical and contemporary literature to evaluate potential links between these complexes. This information can then be used to examine the true potential of technological or cultural diffusion to account for the similarity in the beverage processing of kava and *chicha*.

Polynesian voyagers in central Chile, 800 – 1000 AD

José Miguel Ramírez, Universidad de Valparaíso, Chile; Elizabeth Matisoo-Smith, University of Otago, New Zealand; and Pamela Orozco, RSE Global, Chile

Recent excavations in an Early Ceramic Period (300 BC – 900 AD) cemetery in the Valparaiso region, central coast of Chile, have shown the same Polynesian traits described for human bones from Mocha Island. The Polynesian material from Mocha Island included samples from both the Early Ceramic Period (Pitren) and from the next (El Vergel: 1300-1400 AD). The chicken material found on the mainland, with Polynesian DNA, was associated to the El Vergel period. The new human material comes from a coastal site 60km to the north, in central Chile. It is associated with an Early Ceramic Period occupation. The timing for this Polynesian arrival connects the initial Explosive Eastern Exploration by Polynesian seafarers and the end of the Early Ceramic Period in central-south Chile. Some interesting implications can be advanced from these new data.

Session 11: GENERAL SESSION

Chair: Jut Wynne

Diversity and community structure of cavernicolous arthropods on Rapa Nui

Jut Wynne, Northern Arizona University, USA

The depauperate nature of Rapa Nui's native arthropod communities is attributed to a long history of forest conversion practices and other intensive human use. Less than four percent of the over 400 known arthropod species are either endemic or colonized the island without human assistance. Arthropod communities of Rapa Nui caves are comprised primarily of non-native species. For the 11 caves sampled from 2008 to 2011, species richness ranged from 35 to four species. The results of several techniques for estimating species richness will be examined and discussed, and community structure (e.g., number of predator and prey species) across caves will be explored. Models estimating the total number of species expected to occur in Rapa Nui caves will also be presented. Within this context, inferences will be drawn regarding the likelihood of additional species' detections resulting from additional sampling; this may include native and/or troglotic species. Identification of endemic and/or native insects is a critical first step in protecting Rapa Nui's limited native natural resources.

Computer modeling of Easter Island wood carvings

Catherine Orliac and Michel Orliac, Centre National de la Recherche Scientifique, France; and Paul Horley, Chernivtsi National University, Ukraine

The wooden sculpture of Easter Island is characterized with unique style that is one of the most elaborated in the whole of Oceania. The detailed stylistic studies could be significantly facilitated by creation of 3D models of the carvings, offering to view the object from any side, to measure individual details, to hide undesired parts of the carving in order to simplify comparison with other artifacts, as well as to create cross-sections at any angle. The most precise 3D models can be created with modern laser scanning equipment, which is, however, quite costly. We propose to use another option – 3D modeling based on reference photographs. This approach is much cheaper, and the resulting models are quite accurate when compared to the original. For this study, we performed 3D modeling of selected artifacts, including *moai kavakava* and a skull pendant from the collection of the Congregation of the Sacred Hearts of Jesus and Mary (Rome), and a turtle pendant from the collections of the Peabody Museum (Cambridge, MA). The resulting models enabled the study of the objects in ways that are impossible in real life – e.g., by creating a set of cross-sections and profiles. We consider this approach as a promising low-cost alternative to 3D laser scanning for the documentation of Rapa Nui artifacts.

The authentic practice of Rapanui wood carving

Sveinn Eggertsson, University of Iceland, Iceland

Traditional wood carving on Rapa Nui (Easter Island) has suffered devaluation following increased contact with the outside world. The most common reason for this is given as a lack of authenticity of the more modern productions (or even all post-contact carving). In this paper I argue that the notion of authenticity should be understood according to Rapanui definitions of what constitutes superior wood carving. According to serious local artists, authentic work is associated with a good understanding of Rapanui aesthetics coupled with proper training in Rapanui carving techniques, enabling an artist to imbue his work with genuine feeling considered particular to the island's art. It is an authenticity of practice that produces real Rapanui art.

Bill Mulloy: The back story

Brigid Mulloy, Independent Researcher, Hawai'i, USA

Most people who are involved in Rapa Nui studies have some idea of Bill Mulloy's contributions to Rapa Nui archaeology, but few have much of an idea about who he was as a man and what drew him to become so professionally focused on the island and personally committed to Rapa Nui and its people. I will outline Bill Mulloy's personal history, his early interest in archaeology, his educational preparation and service during WWII, as well as his work in Plains archaeology before he arrived on Rapa Nui in 1956. His personal letters and professional correspondence, along with the recollections of family and colleagues provide rich sources for insights and give personal details that show how he was uniquely prepared for the opportunity and challenges presented to him on Rapa Nui.

I will explain how he came to be invited to participate in the Norwegian Archaeological Expedition to Easter Island and the East Pacific and also what his first impressions were of Easter Island, which will be documented through quotes from his letters home.

Bill Mulloy made an impact on the history of Rapa Nui beyond his contributions to its archaeology and for him, his association with the island and its people was primarily personal. This presentation explores why this was so and how it was mutually beneficial and will involve sharing some interesting and unexpected Bill Mulloy stories.

Fast 3D documentation of archaeological excavation sites on Easter Island by terrestrial laser scanning

Thomas Kersten and Klaus Mechelke, Hafencity University Hamburg, Germany

Since 2007 the Commission for Archaeology of Non-European Cultures (KAAK) Bonn, part of the German Archaeological Institute (DAI), has taken part in the study of the ancient Rapanui culture where archaeological excavation has been used to research the access to and use of natural resources on the island. The Photogrammetry & Laser Scanning Lab of the Hafencity University Hamburg (HCU) has supported the excavations by fast 3D documentation of two archaeological sites using terrestrial laser scanning systems from Zoller+Fröhlich (IMAGER 5006) and Riegl (VZ-400): (i) Ava Ranga Uka A Toroke Hau (ARUTH), the main excavation site of KAAK, which is located in the center of Easter Island at the southern slope of the volcano Maunga Terevaka approximately 200m above sea level, and (ii) Miro O One, which is located approximately 1.5km from the southern coast of Easter Island. The fast spatio-temporal documentation of the archaeological excavation sites, including the geodetic surveying work and the use of terrestrial 3D laser scanners, is presented in this paper. 3D models and maps have been derived as geo-data products from geo-referenced point clouds. Maps with a scale of 1:20 were generated by orthogonal projection of the scanning data, which have been used as a base for the graphical documentation of the objects by detailed and scaled hand drawings. On the basis of such a draft, detailed and small object structures can be emphasized by drawing after on-site interpretation.

Art as distraction

Daniel W. Ingersoll, St. Mary's College of Maryland, USA; and Kathleen B. Ingersoll, ReAdapt, LLC, USA

Monumental architecture, massive statuary, and other art forms fascinate Westerners and tend to inspire positive judgments about past cultural virtuosity and sophistication. Like the pyramids of Egypt or the stone masonry of Machu Picchu, the *moai* and *ahu* of Rapa Nui have impressed, mystified, and preoccupied the Western cultural imagination since their discovery by Europeans. Explorers, archaeologists, anthropologists, and tourists are drawn to the monumental like moths to light, which is understandable, but that light also blinds. Here a case is made that for Rapa Nui, the obsession for the monumental has led to a certain inability to perceive past Rapanui culture in a holistic fashion. For example, we contend that the labor to sculpt and move the *moai* has tended to be massively overestimated, in comparison to the enormous energy invested in constructing the more homely horticultural infrastructure involving billions of rocks. We argue that the loss of the palms did not cause the culture to crash because *moai* could no longer be transported, but rather that the palms became part of that more humble but enduring subsurface infrastructure. The Western narrative of Rapanui cultural collapse, which hinges in large part on the cessation of *moai* production, we argue is not based so much on empirical data but on a ubiquitous Western mythic story form of apocalypse, here a secular, Malthusian version. The preoccupation with monumental art and the apocalyptic story model shape the perceived outcomes: cultural Armageddon, collapse, and ecocide. The story tells more about us than about them.

The 2500 BP shift at Teouma site (Efate, Vanuatu): from Lapita emigrants to immediately Post-Lapita settled groups

Frédérique Valentin and Estelle Herrscher, Centre National de la Recherche Scientifique, France; Stuart Bedford and Matthew Spriggs, Australian National University, Australia; and Hallie Buckley, University of Otago, New Zealand

In the southern Melanesian islands of Vanuatu, as well as New Caledonia, Fiji and West Polynesia, archaeological records indicate a significant shift in pottery making, settlement approach, landscape use, and mobility pattern by 2500 BP. The relatively uniform Lapita cultural complex has locally evolved in each archipelago into various immediately Post-Lapita cultures. Using mortuary and dietary data recorded in 32

burials from a single site (Teouma, Efate, Vanuatu), we show in this paper that the change impacted not only the economical component of the social system, but also symbolic and religious structures and practices.

Isotopic analysis (nitrogen and carbon stable isotopes signatures in collagen) reveals a major modification of the type of the protein consumed through time, with significant differences for both $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values and a higher consumption of food items impoverished in both carbon-13 and nitrogen-15 for the immediately Post-Lapita group. The dietary patterns shift from a diet mainly based on animal (terrestrial and marine) resources for the Lapita group to a diet mainly relying on vegetal resources for the immediately Post-Lapita group. Analysis of the mortuary behavior indicates a significant difference in the duration and numbers of activities: from a Lapita complex and multi-stage inhumation procedure resulting in non-funerary use skull and bone to a simpler and definitive interment of bodies with no removal and further use of bone for the immediately Post-Lapita group.

Possible explanations involving choices and abandonments will be reviewed including: emigration; adaptation to new conditions, either environmental and/or climatic constraints, or management of population increase; or differential expressions of entities of a wider social system.

Terrestrial laser scanning for the 3D documentation of Easter Island's ahu and moai

Thomas Kersten, Maren Lindstaedt and Klaus Mechelke, Hafencity University Hamburg, Germany

One of the most unique – and remote – areas on Earth, is Easter Island, which is well known for its huge volcanic rock statues – called *moai* by the islanders. Since 1995, the *moai* have been protected as UNESCO (United Nations Educational, Scientific and Cultural Organization) World Cultural Heritage monuments. But so far, although the *moai* are increasingly at risk of damage by animals, by exposure to weather (erosion) or by human vandalism, they have not been digitally documented and copied using an appropriate technique. Today, most of the more than 900 statues are in poor condition. Since 2007 the Photogrammetry & Laser Scanning Lab of the Hafencity University Hamburg (HCU) started documentation of the *moai* by terrestrial laser scanning in cooperation with the German Archaeological Institute (DAI), Bonn, Germany. The long term goal of the archaeological project is (a) to document and to catalogue the remaining *moai* as well as to collect all relevant data into an Archaeological Information System (AIS), (b) to analyze possible deformations on the statues and, (c) to monitor planned conservation activities for selected *moai*. The major focus of this paper is the recording, 3D modeling and visualization of the statues by terrestrial laser scanning.

Bully Hayes and Juan Maristany, the last pirates, which shared out the slaver trading in the South Pacific

Francesc Amorós i Gonell, CEHI University of Barcelona, Spain

The adventurous life of the American pirate Bully Hayes in the South Seas is well known, unlike the one of the Spanish Juan Maristany y Galceran. Both of them carried out merciless activities in the same seas at the same time.

William Henry “Bully” Hayes (1829-1877) became a legendary figure as a slaver and blackbirder in the Pacific Ocean, commanding the ships “Rona” and “Leonora”. In Samoa, he joined the famous American blackbirder, Ben Pease, and together kidnapped the indigenous inhabitants of Micronesia. Bully was murdered in 1877.

Juan Maristany (Marutani) y Galceran, alias “Tara” (1832-1914) is described as a one-eyed ogre, armed with a brace of pistols and a cutlass. He set sail as Commander and Pilot on his own ship “Rosa y Carmen” from Barcelona (Spain) for Callao (Perú). On 23 December 1862, he commanded the Peruvian slaver fleet to Rapa Nui, carrying out the worst genocide in this eastern Polynesian island. Maristany, together with the Irish beachcomber Paddy Cooney (or Connell), his interpreter and recruiter, repeated similar kidnappings against the indigenous inhabitants of central Polynesia (the Gambiers, Australs, Cooks, Tokelau, Samoa, Tonga and the Kermadecs). Maristany died peacefully in his homeland at El Masnou (Spain) in 1914.

Session 12: ARCHAEOOMETRY IN OCEANIA

Chair: Peter Mills

The power of plenty: Contributions of EDXRF in building regional economic models of lithic procurement in Hawai'i

Peter R. Mills and Steven P. Lundblad, University of Hawai'i, Hilo, USA

Over the last eight years, the authors have operated an energy-dispersive X-ray fluorescence (EDXRF) spectrometer at the University of Hawai'i at Hilo with the intent of building a large geochemical database of basalt and volcanic glass artifacts from Oceania. Although EDXRF is far from the most accurate or versatile method for analyzing the geochemical constituents of any given sample, the non-destructive, rapid, and relatively inexpensive analyses are capable of building large sample sizes that allow archaeologists to address many questions that small sample groups cannot. Among the findings established to date are 1) material from the Mauna Kea Adze Quarry was rarely exchanged as far as Kaua'i, but Mauna Kea material was commonly used in some elite contexts on Maui, and 2) some island polities obtained nearly all of their adzes from other political districts, and other districts with locally available adze quarries still regularly obtained non-local adze material, proving that the distribution of specific sources was driven by factors other than material availability.

Geochemical sourcing of Rapa Nui (Easter Island, Chile) obsidian with laser ablation inductively coupled mass spectrometry (LA-ICPMS)

Alex E. Morrison, University of Hawai'i and International Archaeological Research Institute, Inc., USA; and John V. Dudgeon, Idaho State University, USA

The study of lithic resource consumption and transport has become one of the most interesting fields of inquiry in Oceanic archaeology over the last 30 years. New advances in geochemical sourcing technology have resulted in substantial insights into the nature of lithic manufacture, transport, and control across the region. Studies that document the source of lithic material as well as the transport and movement of these items across space have the potential to answer a variety of questions regarding migration, community organization, and economic control. The small size and relative isolation of Rapa Nui makes these research questions even more intriguing since the movement, production, and consumption of raw materials may offer insights into social organization at very fine local spatial scales. From 2001 until 2007, small samples of obsidian debitage from surface locations were collected at three spatially separate locations on the island. One hundred and ten archaeological samples were collected of which seventy were chosen for further geochemical analysis with the LA-ICPMS. In this paper we present the results of the sourcing analysis and offer several hypotheses for the spatial patterns documented.

Geochemical analysis of lithic collections from Lana'i Island, Hawai'i using EDXRF: A model for assessing museum collections in remote locations

Dane Kaylor, Steven Lundblad, Peter Mills, and Katherine Mulliken, University of Hawai'i, Hilo, USA

Non-destructive Energy Dispersive X-ray Fluorescence (EDXRF) is an ideal technique to gather geochemical data from museum collections as they can be returned intact post-analysis. In this study we document a process by which baseline geochemical data was collected to provide the framework against which locally collected material was compared. Lana'i is a small, centrally located island in the Hawaiian archipelago, with one well-documented adze quarry (Kapohaku), a potential local source for artifacts. Working in cooperation with the Lana'i Cultural Heritage Center (CHC) to further their mission of inspiring people to be informed, thoughtful, and active stewards of the island's heritage, we collected geologic samples from the island, which were returned to their original locations after analysis, and analyzed a number of stone tool artifacts from the CHC. Based on the documented geochemistry of the island, we have identified a number of artifacts of local origin, and a significantly smaller number of objects from off-island, that match well with Maui volcanics. No artifacts have thus far been attributed to the large Hawai'i Island quarry at Mauna Kea. This style of research, working with small island collections, can also be performed in remote locations with PXRF, eliminating the need for additional shipping and handling of culturally significant artifacts.

Sourcing the megalithic stones of Nan Madol: An XRF study of architectural basalt stone from Pohnpei, Federated States of Micronesia

Mark D. McCoy, University of Otago, New Zealand; and J. Stephen Athens, International Archaeological Research Institute, Inc., USA

Nan Madol is a massive 81 hectare prehistoric administrative and ceremonial complex made up of 93 constructed islets on the high volcanic island of Pohnpei. Built between A.D. 900 and 1650 over earlier settlement remains along the southern coast of Temwen Island within the fringing reef, the site is noted for its distinctive use of columnar basalt and large boulders. XRF analysis presented here suggests the site's builders favored columnar basalt from the island's main shield building stage (7-8 mya) over post-shield material. Boulders incorporated in the architecture are primarily from post-shield stage Temwen Island but are supplemented by some main shield boulders from mainland Pohnpei. Preliminary findings further suggest that there were shifts in the relative frequency of quarries used to construct different structures. These shifts could relate to exhaustion of accessible stone from specific sources or perhaps changing preferences for stone from different sources due to social or political imperatives.

EDXRF analysis of H-3 highway project lithics: Implications for settlement patterns and exchange across O'ahu, Hawai'i

Steven Lundblad, Peter Mills, University of Hawai'i, Hilo, USA; Jennifer Kahn, Bishop Museum, USA; Katherine Mulliken and Dane Kaylor, University of Hawai'i, Hilo, USA

This study outlines results from EDXRF analysis of lithic artifacts (basalt and volcanic glass) recovered from the H-3 highway project, O'ahu. Preliminary analysis of the data from over 500 volcanic glass fragments identifies two main geochemical groups for the volcanic glass. Neither group is consistent with the composition of the well-documented source at Pu'u Wa'awa'a on Hawai'i Island or any other Big Island source. Composition of the basaltic debitage is indicative of adze production strategies that seem to differ from those on Hawai'i Island and Kaua'i. Preliminary interpretation of the basaltic material is consistent with previously documented lithic workshops at Waiahole, O'ahu, as well as lower quality local sources derived from Ko'olau volcanic series rocks. Adze recycling of high-quality basalt has been well documented in the Halawa (leeward) Valley. Geochemical analysis of this material is an important step in determining the implications of reworked material away from quarry sites as either an access limitation or an indication of increased perceived value.

Session 13: INTERPRETATIVE APPROACHES TO PACIFIC ARCHAEOLOGY

Chairs: Sue Hamilton and Colin Richards

Doorways to another realm: The materiality of houses (hare paenga) and ceremonial complexes (ahu) of Rapa Nui (Easter Island)

Sue Hamilton, University College London, UK; and Colin Richards, University of Manchester, UK

There has been much debate concerning the emphasis placed on the monumental architecture of Rapa Nui and the concentration of archaeological work on these sites. More recently work by Chris Stevenson, Sonia Haoa, and Helene Martinsson-Wallin has redirected attention towards ‘domestic’ contexts. In this paper we attempt to dissolve the boundaries between what have been considered different areas of archaeological evidence. Specifically, we wish to show – through the deployment of ideas of materiality and practice, that the use of architectural ‘wrapping’ as a both a practical and a social strategy to enhance physical and conceptual skins/membranes, was allied with concerns over the dangerous and ambiguous nature of conduits between different notional worlds. We will explore the nature of this ‘wrapping’ and its strategic association with material and conceptual conduits of transformation in the architect of both ceremonial monuments (*ahu*) and houses (*hare paenga*), where it is used to simultaneously conjoin and separate two worlds or realms – the everyday and the sacred. We suggest that these strategies were essential to social reproduction in prehistoric Rapa Nui.

Inscribing: Bodies, petroglyphs and the landscape on Rapa Nui (Easter Island)

Karina Croucher and Colin Richards, University of Manchester, UK

Due to extensive research by Georgia Lee, Rapa Nui is well known throughout Polynesia for its amazing number and variety of petroglyphs. This paper will examine the petroglyphs of Rapa Nui in a slightly different way by emphasizing the manner in which they are structured in relation to topographic position. We will argue for the need of a holistic approach to the interpretation of decoration within the island world, based upon the process of inscription, which fuses rock art (petroglyphs), the tattooed body and topographic features. It is hoped that this paper will add to a growing field of new interpretations of the archaeology of Rapa Nui, particularly understandings of the nature and qualities of a prehistoric Polynesian island world.

Essence, substance and form: Rethinking cremation practice in Rapa Nui (Easter Island)

Jane Downes, University of the Highlands and Islands, Scotland, UK

This paper will consider the practice of cremation – cremation rites and technology including fuel use and other resources employed, and the effect or products of cremation and their disposal. Cremation has the effect of rendering the body, changing its form, dispersing essence and substance, enabling the remains to be reconceived and reconfigured in a number of different ways, and to become reintegrated, to form a constituent part of other things. Hence, the act of cremation will be examined in the context of cosmogony and eschatology, and more specifically of *tapu*. As a rite, cremation is notable because it could be conceived as the antithesis of *tapu* – in that a person or body becomes indistinct and unbounded through the process (but is in keeping with a notion of the de-totalizing of the body into fragments argued by Gell in the context of the body and tattooing). I will also explore the relationship between cremation fire and *ao*, the act of cremation creating a conduit between *po* and *ao* – in effect being the *atea*, opening up the space to *ao*.

Identity creation in pre-European Mangere, New Zealand

Matthew Campbell, CFG Heritage Ltd. and University of Auckland, New Zealand

The Northern Runway Development (NRD) site was excavated prior to the new runway development at Auckland International Airport in 2008-09. Several distinct clusters of features (Areas A-I) represented several related occupations between the mid-15th and mid-18th centuries. The feature types included houses, storage pits, postholes and extensive shell middens. In two excavation areas, a total of 88 burials were excavated, making this the largest pre-European archaeological burial assemblage yet described from New Zealand. The presence of the burials necessitated a 100% clearance strategy for Areas A and B, resulting in rich artifactual and faunal assemblages being recovered. Many burials were found in a feature type not previously described archaeologically, but known ethnologically as *rua kopiha*, and many burials contained deliberately placed stones and shells from non-local sources. Several *rua kopiha* contained no human bone but instead contained non-local

rock, dog burials or artifacts. These burials are interpreted as cenotaphs memorializing absent persons and represent the creation and maintenance of identity in a period of political upheaval.

The space between the stones: Monuments and practice on Uneapa Island

Sarah Byrne, University College London, UK

Island Melanesia is home to a diverse tradition of monument-building which, unlike Polynesia, has been the subject of little archaeological attention. Recent research on Uneapa island, West New Britain, Papua New Guinea has revealed a dynamic landscape comprised of stone ‘seats’, ‘tables’, ‘mumus’ and standing stones, axe-grinding grooves, grinding hollows, mortars and various forms of rock art across the landscape. Locales range from single features to large-scale complexes of over three hundred arranged features. Many of these places are remembered as being clan meeting places (*lupuanga mudina*), used up to the time of European contact; public arenas in which a range of social activities took place, including oratory, song and dance performances, cooking, feasting and cannibalism, etc. This research not only provides new insights into the role of monument building in ‘big-man’ societies in Melanesia, but also impacts on how Polynesian monuments are interpreted and studied. It challenges the idea of monument building as primarily manifesting chiefly hierarchy and draws attention to how the nuances of social practice rather than structure greatly influenced how these places were constructed and developed over time.

Beyond environmental determinism: Identifying multivariate causes of cultural change by Maori in the Hauraki Plains after the transformation of their physical surroundings

Caroline Phillips, University of Auckland, New Zealand

Earthquake subsidence of the Hauraki Plains, in the North Island of New Zealand, resulted in the coastal land becoming prone to flooding during the monthly spring tides, as well as times of northerly winds and heavy rainfall. The Waihou River, which flowed through the plains, had been explored and its banks occupied by Maori on an intermittent repeated short-term basis over some 200 years prior to this event. The inhabitant’s response was not merely a practical one – the quarrying of sub-fossil shell to raise the foundations of their settlements – but involved significant changing practices and behaviors. This paper explores changes not only in environmental, but also economic, socio-political and ideological parameters, and attempts to identify multivariate causes that enabled the inhabitants to continue residing – but in a different manner – on the same land.

Life after Roggeveen: The archaeology of contact on Rapa Nui (Easter Island)

Joshua Pollard, University of Southampton, UK; and Kate Welham, Bournemouth University, UK

The potential that archaeology holds to explore the social worlds of Rapa Nui between first contact with Europeans in 1722 and colonial annexation in the late 19th century is rarely considered. It may be that this is because it is seen as a period of marked social and economic decline – a sad shadow of a previously glorious prehistory – or a time whose understanding is better served by historical record. But, by comparison with many other places in Polynesia, early historical accounts of Rapa Nui are patchy and almost invariably related to fleeting shore-side encounters. Here we argue that archaeology can offer much. While still an infant field of study, the material record of contact-period events shows this as a time of marked cultural re-contextualization that witnessed the development of new cult practice shaped out of existing religious structures and the potentials offered by encounters with Europeans. We outline how the archaeology of contact might be taken forward on Rapa Nui.

Session 14: CULTURAL HERITAGE IN MICRONESIA

Chair: Felicia Beardsley

The corals of Kosrae: Historic ecology and the conservation of biodiversity

Zoe Richards, The Australian Museum, Australia; J.P. Hobbs, University of Western Australia, Australia; C-C Shen, National Taiwan University, Taiwan; J. Stephen Athens, International Archaeological Research Institute, Inc., USA; and Felicia Beardsley, University of La Verne, USA

Known as the ancient capital of the Pacific Ocean, Leluh was a complex hierarchical society that developed on the island of Kosrae (Micronesia) in the six centuries preceding European contact from A.D. 1250-1850. The ruins are uniquely characterized by the extensive use of coral for construction, most notably, to build the sacred truncated pyramid tombs. In this project $^{230}\text{Th}/\text{U}$ radiometric techniques are used to date coral fragments collected from three tombs. The type and frequency of corals used to build the tombs is contrasted with the structure of the modern coral reef community and the new information is provided to benefit site preservation.

Harbor, sea wall and island construction: Comparing those of Micronesia with other known maritime structures

Rosanne Hawarden, Underwater Heritage Group, Inc, New Zealand

From the 13th to the late 15th centuries CE, monumental maritime structures were constructed of local stone, coral and earth in Micronesia, specifically at Nan Madol, Pohnpei; Lelu, Kosrae; Mua/Lapaha, Tonga; certain *ahu* on the south coast of Easter Island and Kilwa Kisiwani in East Africa. Extending from the littoral into lagoons or the sea, these structures are surprisingly well preserved whether *ahu*, islands, canals, wharves, quays, moles, breakwaters, harbor walls or causeways. This and the massive construction effort required attests to a significant understanding of marine construction by the builders. Construction of artificial islands and canal systems is a common feature. Island building in lagoons observed by W.G. Ivens in the Solomon Islands in the 1920s may be a remnant of a widespread practice and reasons for this are considered. In the case of Tonga, two phases are discernable associated with a 3km canal system, subsequent land reclamation and the large pyramidal tombs or *langi* nearby. The Tongan legend of the gigantic double-hulled canoe Lomipeau suggests the use of these wharves by large *tongiaki* designed for inter-island trading. Comparing the design and construction of these contemporaneous maritime structures, built without cement, clarifies their function and points to the shipping utilizing them.

The mission for Micronesia, transmission: A practitioner's view

Kelly G. Marsh, Bureau of Arts and Culture/Palau Historic Preservation Office and Charles Sturt University, Australia; and Dirk H.R. Spennemann, Charles Sturt University, Australia

Though cultural and environmental conservation have long been part of Micronesia, modern government-supported cultural resource management is a relatively new concept and associated set of activities with island historic preservation offices striving to strike a balance between the two systems. This paper examines some of the characteristics between the culturally appropriate transmission of knowledge and skills from elders to succeeding generations and the documentation and dissemination practices within the general framework of US historic preservation practice. The paper explores ways that such practices can be adapted through subtle as well as more overt modifications that encourage the flow of information from one generation to the next.

A Kosraean goddess, statues and a painted cave

Felicia Beardsley, University of La Verne, USA

Results of the last two archaeological field seasons on Kosrae are presented. Fieldwork focused on the site of Menke, home to Sinlaka, the Breadfruit goddess, the head of ancient Kosrae's pantheon of deities. The site consists of an expansive temple complex, a ritual compound attached to a statue annex, a cave with a painted ceiling, large statues carved from boulders and bedrock deposits, and a series of housing compounds with their associated gardens, all connected with a network of paved pathways. Oral history places the site at the heart of Kosraean culture and tradition, but it made no mention of the statues or organization of the site.