



NEW ZEALAND
ARCHAEOLOGICAL
ASSOCIATION

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New Zealand Archaeological Association Conference 2021

Taupō

4-7 July

Sponsors

The New Zealand Archaeological Association gratefully acknowledges the support of the following sponsor:



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Acknowledgements

We would like to acknowledge the following people who assisted with the organisation of this year's conference: Dylan Tahau and Ngāti Tūwharetoa, Te Maari Gardiner and Otukou Marae, Gerard O'Regan, Perry Fletcher, Alex Jorgensen, Aimee Foster, Sarah Mossop and the team at Suncourt Hotel and Conference Centre, Taupō Museum, Prue Campbell from the Yum Food Company, Waipawa Buses, Cathy Barr, Eleanor Sturrock and Rachel Darmody.

Cover Photograph:

Oil on Canvas, 1890-1910 by William George Baker. View looking south, possibly from where the Waikato River flows into the lake. A carved whareniui is in the foreground to the right and Mount Tongariro, Ngauruhoe and Ruapehu can be seen in the distance.

Baker, William George, 1864-1929. Baker, William George 1864-1929: L Taupo [ca 1900?]. Ref: G-616. Alexander Turnbull Library, Wellington, New Zealand. /records/22843125

PROGRAMME

Venue: Suncourt Hotel and Conference Centre, 14 Northcroft Street, Taupō

Sunday 4 July

Morning	10:30 am 11:30 am – 12:30 pm	Registration opens Mihi Whakatau and Conference Opening
Lunch	12:30 pm – 1:15 pm	Registration open throughout lunch
Afternoon	1:15 pm – 2:45 pm 2:45 pm – 3:15 pm 3:15 pm – 4:45 pm 5:30 pm – 7:00 pm	Session 1: Papers Afternoon tea Session 2: Papers Welcome Event, Taupō Museum, 4 Story Place

Monday 5 July

Morning	8:30 am – 10:15 am 10:15 am – 10:45 am 10:45 am – 12:30 pm	Sessions 3A and 3B: Papers Morning tea Sessions 4A and 4B: Papers
Lunch	12:30 pm – 1:15 pm	Lunch Student Lunch
Afternoon	1:15 pm – 3:15 pm 3:15 pm – 3:45 pm 3:45 pm – 5:00 pm	Session 5: NZAA Workshop Afternoon tea and posters Session 6: Papers
Evening	7:30 pm – 8:30 pm	Public Lecture in the Tauhara Room

Tuesday 6 July

Day	8:20 am – 4:00 pm Approximately	Field Trip
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Wednesday 7 July

Morning	8:30 am – 10:00 am 10:00 am – 10:30 am 10:30 am – 12:15 pm	Session 7: Papers Morning tea Session 8: Papers
Lunch	12:15 pm – 12:45 pm	Lunch
Afternoon	12:45 pm – 2:15 pm 2:15 pm – 2:30 pm 2:30 pm – 4:15 pm	Session 9: Annual General Meeting Afternoon tea Session 10: Papers
Evening	7:00 pm – 11:00 pm	Gala Dinner

Field Trip

Meet outside Suncourt at **8:20 am** where busses will take us down the lake to Otukou Marae for a pōwhiri followed by morning tea. We will then visit Te Pōrere and Opotaka (where we will have lunch). We will then drive back up the north-western side of Lake Taupō to the Kakaho rock art site and then back to Taupō at approximately 4:00 pm outside Suncourt. It will be cold so dress warmly. It will take approximately 20 minutes to walk up to the top redoubt/pā at Te Pōrere. There will be a packed lunch but please remember to fill your water bottle and bring it along.

Gala Dinner

The gala dinner will be held at the same location as the papers, in the Tauhara Room, Suncourt at 7:00 pm.

Tikanga

The Conference will be opened at Suncourt by mihi whakatau from the tangata whenua of Ngāti Tūwharetoa at 11:30 am. This will commence with a karanga from the tangata whenua with a reply from our side. We will enter the conference space and be seated. The first speeches are given by tangata whenua, followed by a waiata. This is then passed over to our side to be given in Māori or English, followed by a waiata. During the waiata everyone should stand to sing in support of our speaker. The koha is then handed over by the last speaker on our side. The tangata whenua will finish with a karakia and the hongī will take place to conclude the mihi whakatau.

Please ensure you are there on time. Below are the waiata that will be sung after each speech from our side.

Waiata

Ehara i te mea

Ehara i te mea
Nō nāianeī te aroha
Nō ngā tūpuna
Tuku iho, tuku iho

Te whenua, te whenua
Te oranga mo te iwi
Nō ngā tūpuna
Tuku iho, tuku iho

Mā wai ra

Mā wai ra
Mā wai ra e taurima
Te marae i waho nei?
Mā te pono, mā te tika
Me te aroha e

E toru ngā mea

E toru nga mea (repeat)
Ngā mea nunui (repeat)
E ki ana (repeat)
Te paipera (repeat)
Whakapono (repeat)
Tūmanako (repeat)
Ko te mea nui (repeat)
Ko te aroha (sing all together)

CONFERENCE OPENING

10:30am Registration Open

11:30am Mihi Whakataua and Conference Opening

12:30pm Lunch

1:15pm NZAA President's Welcome – Please be seated in time

PAPER PROGRAMME

Sunday 4 July			
Session 1: Māori/Pākehā archaeology of the 19th Century			
<i>Session Chair: Jessie Garland</i>			
	Time	Author(s)	Title
1:30pm- 2:45pm	1:30-1:45pm	Brooke Tucker	Revisiting Sealers Bay: Rescue and Research on Whenua Hou
	1:45-2:00pm	Rebecca Cox , Matthew Gainsford, Kurt Bennett	HMS Buffalo Re-examination Project
	2:00-2:15pm	Diane Bradshaw	HE PŪKENGĀ KŌRERO 'TE KETE RUKURUKU Ō WHAKAOTIRANGI' Preserving Hawaiki-iti: A Site of Cultural Significance
	2:15-2:30pm	Andy Brown , Lynda Walter, Josie Hagan	Revealing the Archaeology of Te Raupatu ō te Whakatōhea
	2:30-2:45pm	Questions	
	2:45-3:15pm	Afternoon tea	
Session 2: Chronologies			
<i>Session Chair: Simon Bickler</i>			
3:15- 4:45pm	3:15-3:45pm	Catherine Milson and Fiona Petchey	AMS Micro Dating, Shell Seasonality and Hard Water
	3:30-3:45pm	Fiona Petchey , Atholl Anderson, Bruce McFadgen, James Robinson	Accurately Dating the Māori Past Using Marine Shell – The Needle and The Haystack
	3:45-4:00pm	James Robinson	The Chronology of Gunfighter Pā in Taitokerau
	4:00-4:15pm	Rowan McBride	The Chronology of Waikato Wetland Pā - Preliminary Results from Excavations at Five Wetland Pā in the Central Waikato Region
	4:15-4:30pm	Gretel Boswijk , Neil Loader, Giles Young, Alan Hogg	Isotope Dendrochronology in New Zealand
	4:30-4:45pm	Questions	
5:30-7:00pm	Welcome event, Taupō Museum, 4 Story Place, Taupō		

PLEASE NOTE THAT TODAY'S SESSIONS ARE RUNNING CONCURRENTLY IN TWO ROOMS

Monday 5 July

Session 3A Tauhara Room: Advances in archaeological methods <i>Session Chair: Karen Greig</i>			
TAUHARA ROOM 8:30- 10:15am	Time	Author(s)	Title
	8:30-8:45am	Monica Tromp	Microarchaeology and its Contribution to Understanding Our Past
	8:45-9:00am	Robyn Kramer , Rebecca L Kinaston, Peter Holder, Karen Armstrong, Charlotte King, Walter Sipple, Hallie Buckley, Adam Martin, Malcolm Reid, David Barr, Kavindra Wijenayake, and C. Bataille	A Novel Strontium (87Sr/86Sr) Isoscape Model for New Zealand Provenance Studies
	9:00-9:15am	Rebecca Kinaston , S. Keith, B. Husdon, J. Geber	Intensive Horticulture in the Waikato Led to a Primarily Vegetarian Diet for Māori ca. 250-170 Years Ago
	9:15-9:30am	Josie Hagan	Rotoehu Forest LiDAR Review and Preliminary Fieldwork Results
	9:30-9:45am	Charlotte L. King , Hallie R. Buckley, Peter Petchey, Lisa Matisoo-Smith, Darren R. Gröcke	Histories Hidden in Hair: Using Isotopic Methods to Reconstruct Everyday Life on the Goldfields
	9:45-10:00am	E. Sudron , R. Kinaston, H. Cawte, S. Halcrow	Reconstructing the Childhood Diet and Residency of Four People who Visited the Dentist in Invercargill Between 1881 and 1894
	10:00-10:15am	Questions	
	Session 3B Motutaiko Room: Nineteenth Structures in Aotearoa New Zealand <i>Session Chair: Katharine Watson</i>		
MOTUTAIKO ROOM 8:30- 10:15am	Time	Author(s)	Title
	8:30-8:45am	Jeremy Moyle	'Wasted Space' and Cultural Norms at 87 Maitland Street, Dunedin
	8:45-9:00am	Kirsty Sykes	Same Activities, Different Times: Finds from the Opawa Bridge Replacement, Marlborough
	9:00-9:15am	Neville Ritchie	The Queen's Redoubt Project - An Update on Progress
	9:15-9:30am	Russell Cook	Broken Bridges and How to Get Over Them: Maintaining and Restoring Nineteenth Century Bridges Throughout Dunedin
	9:30-9:45am	Rosemary Baird , Katharine Watson	Aotearoa Unearthed: Making an Archaeology Podcast
	9:45-10am	Questions	
	10:15-10:45am	Morning tea	

Session 4A Tauhara Room: Computational Applications in Archaeology <i>Session Chair: Andy Brown</i>				
	Time	Author(s)	Title	
TAUHARA ROOM 10:45am-12:30pm	10:45-11:00am	Simon Bickler , Ben Davies	Virtual Vaka: A Computational Tool for Thinking About Seafaring	
	11:00-11:15am	Greg Hil	Remade Ground: Modelling Nineteenth Century Landscape Change with GIS	
	11:15-11:30am	Jessie Hurford	Applying GIS to the Study of Goldfields	
	11:30-11:45am	Patricia Pillay	An Intra-Island Social Network Analysis of Obsidian on Ahuahu Great Mercury Island	
	11:45am-12:00pm	Matthew Felgate	Applying Single-Context Archaeological Recording in the Digital Age: Some Do's and Don'ts: Lessons at Mokoia Pā, Panmure, Auckland (R11/98)	
	12:00-12:15pm	Ben Jones , Simon Bickler	Scaling Up Deep Learning to Identify Earthwork Sites in Te Tai Tokerau, Northland	
	12:15 – 12:30pm	Questions		
	Session 4B Motutaiko Room: Material Culture/Landscape/Identity <i>Session Chair: James Robinson</i>			
	MOTUTAIKO ROOM 10:45am-12:30pm	10:45-11:00am	Shelagh Norton , Eileen Wilkes	Hillforts Studies Group – An Overview of Māori Pā and British Iron Age Hillforts
11:00-11:15am		Dave Wilton	Just a Fragment of Old Newspaper ...	
11:15-11:30am		Garry Law	Sea Level Rise - Planning for the Unexpected	
11:30-11:45am		Ross Ramsay, D. Hein	The Chemistry of Glasses and Glazes from Myinkaba, Myanmar, First Recognised Glass-Making Concern in South East Asia	
11:45am-12:00pm		Georgia Kirby, Elizabeth Ramsay , Graeme Collett, Ross Ramsay	Was Mehetia Island (Society Islands) an Important Hub for Early Māori Voyagers to New Zealand? Further Evidence from Cognate Toponyms	
12:00-12:15pm		Harry Allen	The Head is Sacred: Māori Portraits and Design in Advertisements and Bank Notes by NZI, BNZ, RBNZ and Texaco	
12.15-12.30pm		Questions		
12:30-1:15pm		Lunch and student lunch		

1:15-3:15pm	Session 5: Workshop: NZAA – A Professional Organisation? <i>Session Chair: Katharine Watson</i>		
3:15-3:45pm	Afternoon tea and posters		
3:45 – 5:00pm	Session 6: Historical Cemeteries <i>Session Chair: Joe Mills</i>		
	Time	Author(s)	Title
	3:45-4:00pm	Hallie Buckley , Peter Petchey, Charlotte King, Anne Marie Snoddy, Lisa Matisoo-Smith	The Best of Times, The Worst of Times: The Southern Cemeteries Bioarchaeology Project
	4:00-4:15pm	Brittany Moller , Charlotte King, Hallie Buckley, Peter Petchey	Minds of Old: An Analysis of Archaeological Brain Material within the New Zealand Colonial Context
	4:15-4:30pm	Peter Petchey , Hallie Buckley, Charlotte King, Annie Snoddy, Jitlada Innanchai	The Search for Drybread: Investigations at the Drybread Cemetery and Diggings, Central Otago
	4:30-4:45pm	Shirley Wallace	How Genealogical Research enabled Identification of Individuals in a Pioneer Cemetery
	4:45-5:00pm	Questions	
7:30pm	Public talk by Gerard O'Regan in the Tauhara Room		

Wednesday 7 July

Session 7: Heritage Management Policy <i>Session Chair: Mary O’Keeffe</i>				
	Time	Author(s)	Title	
8:30-10:00am	8:30-8:45am	Caroline Phillips	Archaeological Significance: An Example from the Bay of Plenty	
	8:45-9:00am	Eva Forster-Garbutt	Archaeological Site Management and Council: Insights from Te Whanganui-a-Tara	
	9:00-9:15am	Kevin Jones	The Wellington and Waikato Expressways	
	9:15-9:30am	Rebecca Ramsay	Climate Change and Archaeology – Implementing a Strategic Plan	
	9:30-9:45am	Rob Brassey	Saying So Can Make It So: A Review of Some Recorded Pā in the Upper Waitematā Harbour	
	9:45-10:00 am	Questions		
	10:00-10:30am	Morning tea		
	Session 8: Lithics <i>Session Chair: Alex Jorgensen</i>			
10:30am-12:15pm	10:30-10:45am	Anke Verena Zernack Erlend Kirkeng Jørgensen, Anthony Newton, Felix Riede	The Geoarchaeological Significance of Ocean-Rafted Pumice Found in Mesolithic to Medieval Contexts in Northern Norway	
	10:45-11:00am	Anne-Claire Mauger	Pounamu Manufacture and the Archaeology of Māori Society in East Otago	
	11:00-11:15am	Caitlan Butler	Use-Wear and Procurement: An Assessment of Use-Wear on Obsidian Artefacts from New Zealand Archaeological Sites	
	11:15-11:30am	Dan Witter	The Kaikoura NCTIR Lithics	
	11:30-11:45am	Phil Moore	Sourcing Chert: Defining Artefact Distributions in Central New Zealand	
	11:45am-12:00pm	Karyne Rogers	Investigating the Kawhia Museum Geological Taonga Collection using Non-Destructive pXRF Fingerprinting	
	12:00-12:15pm	Questions		
	12:15-12:45pm	Lunch		

12:45-2:15pm	Session 9: ANNUAL GENERAL MEETING		
2:15-2:30pm	Afternoon tea		
2:30-4:15pm	Session 10: Archaeology of te ao Māori <i>Session Chair: Gerard O'Regan</i>		
	Time	Author(s)	Title
	2:30-2:45pm	Emma Ash, Louise Furey	Looking to the Past to Inform the Future
	2:45-3:00pm	Isaac Mclvor	Pā Tawhito in Waikato at the Interface of Mātauranga Māori and Archaeology
	3:00-3:15pm	Matiu Prebble	The Archaeobotany and Palaeoecology of Leafy Green Vegetables in Aotearoa
	3:15-3:30pm	Matthew Campbell, Richard Walter, Armagan Sabetian	Tracing Changing Life Histories of Tāmure (<i>Chrysophrys auratus</i>) in Tikapa Moana through Otolith Chemistry
	3:30-3:45pm	Brigid Gallagher	10 years of Mahi at Waipaopao
	3:45-4:00pm	Warren Gumbley	The Waikato Horticultural Complex: Some Vital Statistics
	4:00-4:15pm	Questions	
4:15-4:30pm	Mihi poroporoake/conference closing		
7:00-11:00pm	Gala dinner in the Tauhara Room, Suncourt		

ABSTRACTS

The head is Sacred: Maori portraits and design in advertisements and bank notes by NZI, BNZ, RBNZ and Texaco.

Harry Allen, University of Auckland

In this digital age when our world is now inked in multiple ways, Maori have attempted to limit the use of Maori motifs and designs with limited success. This paper looks at part of the long history of cultural appropriation in NZ, using New Zealand Insurance advertising, BNZ and Reserve Bank of New Zealand bank notes, and the slick advertising introduced by Texaco after it entered New Zealand in the 1920's. There is a brief discussion about how Maori might establish some agency in the global processes now at work.

Looking to the past to inform the future

Emma Ash, Louise Furey, Auckland War Memorial Museum

A storm event in 2018 eroded away several meters of midden on Ōtata Island, Noises Group, highlighting the risk changing climatic conditions pose to heritage sites. In response, excavations were carried out by Auckland Museum in partnership with manawhenua and landowners to recover important information. Excavations revealed five layers of occupation, the earliest sealed beneath tephra from the 1400AD eruption of Rangitoto. The integration of mātauranga Māori with the archaeology is a central component of the project and results will be used to reconstruct the environment around Ōtata in the past. This will provide valuable baseline data for several ecological projects currently underway around the Noises Group, contributing to a wider project focused on ecological restoration of Tikapa Moana (Hauraki Gulf), while also exploring future risks to heritage sites.

Aotearoa Unearthed: Making an Archaeology podcast

Rosemary Baird Heritage New Zealand Pouhere Taonga

This paper describes the process of making the 'Aotearoa Unearthed: Archaeology for Everyone' podcast, which is a joint project by HNZPT and NZAA, released for Archaeology week 2021. Rosemary will talk about the genesis of the format, her approach in interviewing archaeologists and the audio editing process.

Katharine Watson will briefly share about her role as NZAA representative and consultant and reflect on the experience of being interviewed for the first episode.

Rosemary will then share about the reach and download numbers of the podcast, and what she is dreaming and scheming about if a second series comes to pass.

Virtual Vaka: A Computational Tool for Thinking About Seafaring

Simon H. Bickler¹, Benjamin Davies², Garry Law³

¹ *Bickler Consultants Ltd*

² *University of Utah*

³ *Independent researcher*

Seafaring has had a profound impact on human history, especially in the Pacific. While ancillary signals of seafaring are widespread in the archaeological record, direct evidence for ancient seafaring technology and knowledge is scarce, leaving a great deal of uncertainty about the influence seafaring had on the exploration, colonisation and continued communication networks across water. This uncertainty lends itself to a model-based approach, which is manifest in a long history of computer simulation studies of ancient seafaring across the world. We discuss our efforts to develop computational models of seafaring in the past using agent-based simulation as ‘tools to think with’: technologies that can be deployed in the iterative process of theory-building. We describe the latest version of our agent-based simulation, Virtual Vaka, with a new on-line capability can be used to send vessels out with a variety of navigational and technological capabilities anywhere on the globe. It draws on available environmental data, allowing for exploration of voyages using real weather conditions from the last 70 years, while also maintaining the capacity to use modelled data for both weather and bathymetry to simulate past journeys as far back as the Pleistocene. Finally, we simulate inter-island voyages between Aotearoa and distant neighbours such as Lord Howe and Australia to examine how potential interaction spheres were created while others were not.

Isotope dendrochronology in New Zealand

Gretel Boswijk¹, Neil Loader², Giles Young^{2,3}, and Alan Hogg⁴

¹ *School of Environment Te Kura Taiao, University of Auckland Te Whare Wānanga o Tāmaki Makaurau*

² *Department of Geography, Swansea University Prifysgol Abertawe, Wales*

³ *Natural Resources Finland (LUKE), Helsinki*

⁴ *Te Aka Mātuatua School of Science, University of Waikato Te Whare Wānanga o Waikato*

Ring-width dendrochronology has enabled the development of precise chronology in Aotearoa New Zealand. Whilst much of this work has focussed primarily upon North Island kauri, other species such as matai, miro, and totara also occur in the environment as living trees, as taonga or in the archaeological record. Unfortunately, inter-species cross-dating using existing kauri chronologies has so far proved unsuccessful, so the development of well-replicated tree-ring chronologies for these long-lived and nationally distributed species would represent an important contribution to understanding the socio-cultural and environmental histories of these islands. Despite the optimism of early researchers, recent analysis of ring-width variability in matai and miro has shown these species to be very challenging for classic dendrochronology. Analysis of the chemical (stable isotope) composition of tree-rings may however provide an alternative approach to support chronology building and precision dating for these species. This paper presents initial proof-of-concept for the further investigation and development of isotope dendrochronology in New Zealand.

HE PŪKENGĀ KŌRERO 'TE KETE RUKURUKU Ō WHAKAOTIRANGI' Preserving Hawaiki-iti: a site of cultural significance

*Diane Bradshaw, GNS Science - The MacDiarmid Institute Stakeholder Relations
Ngāti Mahuta ki Kawhia, Ngāti Te Wehi ki Aotea.*

Aotea and Tainui canoe traditions describe the arrival of Māori ancestors from called Hawaiki in Eastern Polynesia. Aotea harbour is where Whakaotirangi, female ancestress of Tainui at Hawaiki iti established her kumara and taro gardens in the mid-1300's, nurturing the tubers she carefully concealed on her body during the voyage. The gardens were operative over a long period of time, as evidenced in the many archaeological remains from centuries of occupation in the form of pā, storage pits, ovens and midden.

The Aotea block including the gardens was leased in the early 1900's by the Maniapoto Māori Land Board for farming. The land was transferred to the Morrison family in the 1950's and much of the historical gardens and pa sites were planted in pines in the 1980's and 1990's. Prior to planting, significant archaeological observations were made and mapped.

Today, those pines are fully mature and require removal within the next 2 years. The pine forest footprint covers many historical sites and it is a challenge to remove them with as little disturbance as possible. Diane Bradshaw has been undertaking the liaison between iwi, forestry and farmer to ensure this land is protected and preserved as best as possible. Diane will describe the site, its historical and botanical significance and the efforts towards future preservation.

Whakatauaāki

Mā te hau mahana o te kāhui o te rangi, me te wairua o ngā tūpuna e manaaki i o Papatūānuku
An aphorism

May the warm winds and the spirit of our ancestors guide us to take care of the land

Saying so *can* make it so: A review of some recorded pā in the upper Waitematā Harbour

Robert Brassey, Auckland Council Te Kaunihera o Tāmaki Makaurau

Is it time for NZAA to take a more rigorous approach to the requirements for records for new sites submitted to ArchSite? How should we manage existing records that may be unreliable?

ArchSite is now being used for a range of purposes never envisaged when the site recording scheme began. Site records are increasingly being used as evidence for imposing statutory restrictions over land, and the existence of recorded sites on or adjacent to a property can have significant financial and other consequences for landowners. Information from ArchSite also finds its way, in some cases without acknowledgement, into documents and publications in the public realm, and may be used uncritically for research purposes.

In some parts of the Auckland region there are significant numbers of recorded sites that are dubious or have site records that contain information that is incorrect. I illustrate some of the issues and consequences by examining a sample of recorded pā in the upper Waitematā Harbour, some of which are scheduled in the Auckland Unitary Plan.

Revealing the Archaeology of Te Raupatu ō te Whakatōhea

Andy Brown¹, Lynda Walter², Josie Hagan³,

¹Horizon Archaeology

²InSitu Heritage

³University of Otago

The Eastern Bay of Plenty is a rich cultural landscape incorporating evidence of long-term Māori occupation and more recent European settlement. The archaeology of the area is poorly understood relative to the Western Bay of Plenty, but investigations associated with a recent increase in land development have provided some insight into the archaeological record particularly in the Ōpōtiki area. This paper outlines some recent fieldwork results from Ōpōtiki and considers them within the context of the defining historical event – Te Raupatu ō te Whakatōhea – and broader themes of dispossession.

The Best of Times, The Worst of Times: The Southern Cemeteries Bioarchaeology Project

Hallie Buckley¹, Peter Petchey², Charlotte King¹, Anne Marie Snoddy,¹ Lisa Matisoo-Smith¹

¹ Department of Anatomy, School of Biomedical Sciences, University of Otago.

² Southern Archaeology

Since 2016 the Southern Cemeteries Bioarchaeology Project has been assisting communities with answering questions concerning the location of lost graves in Otago goldfields and early settler cemeteries. One of the primary research aims of this project is to investigate the biological adaptations of Europeans and Chinese during this early gold rush and colonial period of history in Aotearoa. This paper will provide a summary of the cemetery excavations at Milton, Lawrence and Drybread to date. Using multiple bioarchaeology methods the integrated biological life histories of selected individuals from these sites will be presented. Archival records and material culture from the graves are also explored to contextualise the individuals within the wider society of the times.

Use-wear and procurement: an assessment of use-wear on obsidian artefacts from New Zealand archaeological sites.

Caitlan Butler, University of Auckland

Understanding patterns of technological organisation, their indicators, and how they relate to raw material procurement has been the subject of many archaeological studies. In New Zealand this can be a challenge as metrics commonly used in such studies are not always reliable. This study conducts a use-wear analysis, along with a technological analysis, of obsidian from the sites of Pouerua, Tamewhera, Waipirau Pa, Oneroa Beach, Te Mataku, and Kohika, located in the North Island of New Zealand, in an attempt to identify whether use-wear intensity reflects procurement. The use-wear analysis identified the location and extent of use-wear allowing for the intensity of use to be identified. The technological analysis likewise allowed for reduction intensity to be identified through flake measurements and dorsal scarring. The results of this analysis suggested similarities in the intensity of use-wear and reduction across the sites, and high proportions of Kaeo and Mayor Island obsidian, suggesting direct access to these sources. The results suggest that there may be a link between use-wear and procurement.

Tracing changing life histories of tāmure (*Chrysophrys auratus*) in Tīkapa Moana through otolith chemistry

Matthew Campbell^{1,2}, Richard Walter^{3,4}, Armagan Sabetian⁵

¹*Anthropology Department, University of Auckland;* ²*CFG Heritage Ltd;* ³*Southern Pacific Archaeological Research, University of Otago;* ⁴*School of Social Sciences, University of Queensland;* ⁵*School of Science, Auckland University of Technology*

Tāmure (snapper, *Chrysophrys auratus*) is the most commonly identified fish in pre-European middens in northern New Zealand and is an important catch in the modern commercial fishery. Tāmure breed in open water but after around one month migrate to structured estuarine environments where they remain for up to a year before returning to open waters. Today, coastal, urban and ocean sprawl have been identified as critical factors driving significant change in the benthic ecosystems of estuaries and harbours in Tīkapa Moana (the Hauraki Gulf), which are critical tāmure nurseries. In this paper we address the question of whether the adult tāmure populations exploited by pre-European Māori were recruited from a wider range of nurseries than are currently available. Their life history will be reflected in the trace element chemistry of their otoliths. We compare the otolith chemistry of two archaeological assemblages of otoliths with two modern assemblages and show: firstly, that the chemistry of estuarine environment has changed between pre-European times and the 21st century; and, secondly, that the populations targeted by 15th century fishing communities in Tīkapa Moana were recruited from a more diverse pool of nurseries than are currently active. This work is a methodological case study that is part of a wider biological and archaeological programme of research on the long-term history of coastal fisheries in New Zealand.

Broken bridges and how to get over them: maintaining and restoring nineteenth century bridges throughout Dunedin.

Russell Cook, New Zealand Heritage Properties

In recent years, the Dunedin City Council has undertaken a series of infrastructure upgrade projects that have included the maintenance of a number of nineteenth century bridges. While the decking of these structures was typically replaced during the mid twentieth century to accommodate for the increasing weight of modern automobiles the supporting abutments have remained largely unchanged since their initial installation.

These projects have offered the opportunity to explore the transportation infrastructure of nineteenth century Dunedin, demonstrating common issues faced by the aging structures and methods employed in repairing and supporting the original heritage fabric while maintaining the amenity value they provide. This paper will examine the variations in materials and methods of construction observed while discussing the individual issues inherent to the structural types and the solutions that enable them to continue to operate for the foreseeable future.

Applying single-context archaeological recording in the digital age: some do's and don'ts: Lessons at Mokoia Pā, Panmure, Auckland (R11/98)

Matthew Felgate, Maatai Taonga Ltd

Executing a research strategy for an archaeological investigation can require active adaptation to unforeseen circumstances. Through the course of a 21-month field investigation at Panmure preparatory to and during construction of a new bridge across the Tamaki River, some broadly applicable lessons were learned regarding effective investigation and recording methods. Technologies such as digital recording and photogrammetry, and learnings on how to use them, are part of this story. Other more physical aspects of applying a single-context recording approach in a built-up urban environment for complex archaeological material are also covered.

Archaeological Site Management and Council: Insights from Te Whanganui-a-Tara

Eva Forster-Garbutt, Victoria University of Wellington School of Architecture

Councils have an important role to play in the statutory management of Aotearoa's archaeological sites. This paper will present a brief synopsis of the steps that Wellington City Council has taken recently in terms of archaeological site recognition, management and protection.

HMS *Buffalo* Re-examination Project

Rebecca Cox¹, Matthew Gainsford² and Kurt Bennett³

¹ *Mercury Bay Museum*

² *W. Gumbley Archaeologists*

³ *HMS Buffalo Re-examination Project*

HMS *Buffalo*, a significant archaeological site in New Zealand's maritime history, is located within the surf zone of Buffalo Beach, Whitianga. The ship, originally built in 1813, India, eventually shipwrecked during a storm event in 1840. The volunteer-driven HMS *Buffalo* Re-examination Project was established to revisit the vessel 35 years after the initial archaeological investigation by the South Australian Heritage Branch. Rapid seabed scouring of the site, seen over the past five years, offered an opportunity to record the extensive remains of hull structure and to conduct material analyses. Recent fieldwork has more fully investigated and interpreted the site through traditional underwater survey methods, photogrammetry, recording site formation processes and sampling ship construction elements. In addition, through the Project's public outreach program local schools and the public have been included to learn about the ship and maritime archaeology. While this Project is led by volunteers with limited financial resources, it is envisioned that new data collected from the site will encourage future management initiatives to protect a globally significant archaeological resource and promote future research avenues.

10 years of mahi at Waipaopao

*Brigid Gallagher
Mish Mish Heritage*

The northern entrance to the Tauranga harbour has been known variously as Katikati, St Georges Bay and Anzac Bay before having its traditional name of Waipaopao recently returned to it. After 10 years of working together with the local marae Otawhiwhi of Te Whanau a Tauwhao hapu, Ngati te rangi iwi and Western Bay of Plenty District Council this is an opportunity to reflect on the results of excavations, the effects of coastal change and the ongoing care and management of this significant whenua.

The Waikato Horticultural Complex: Some vital statistics.

Warren Gumbley, The Australian National University, W.Gumbley Archaeologists

This paper offers an overview of the extent, nature and timing of arguably the largest horticultural complex in New Zealand. Adaptation of Polynesian horticultural systems to New Zealand has been a persistent and important theme in the understanding of Polynesian settlement. The intensified swidden horticultural system practiced in the inland Waikato offers insight into the complexity of the adaptive measures employed and the agronomies represented in the archaeology.

Rotoehu Forest LiDAR Review and Preliminary Fieldwork Results

Josie Hagan, University of Otago

Rotoehu Forest is a large (~ 8875 ha) production forest in inland Bay of Plenty. A small number of localised archaeological surveys have been carried out resulting in the identification of few, highly conspicuous sites. In order to fill the large survey gaps, Timberlands Ltd supplied recently captured LiDAR data to facilitate a desk-based review of the forest, which informs an on-going archaeological survey. This work set out to relocate recorded sites and identify unrecorded sites with high spatial accuracy to provide better management outcomes. Here I discuss that results of the LiDAR prospection, which accurately located most landscape features (i.e., non-midden) and identified approximately 300 areas of archaeological interest to be tested by survey, a potential five-fold increase in the number sites in the forest. These results demonstrate systematic LiDAR prospection as an effective tool for large-scale archaeological surveys, proving cost and time effective for the client and contributing to wider settlement patterns of North Island.

Remade Ground: Modelling nineteenth century landscape change with GIS

Greg Hil, La Trobe University

The nineteenth century was a formative period for much of our contemporary cultural landscape. From the establishment of urban centres, to the environmental legacy of the gold rush, it is hard to overstate how influential this era was in producing the landscapes we know and live in today. As modern development continues to reshape the world around us it is now often the task of archaeologists to make sense of those changes as they relate to what came before or after. If archaeologists can determine how pre-colonial ground surfaces were shaped into their present form,

they may be better equipped to manage and interpret cultural heritage materials that are uncovered. In this paper, I present a means to model, visualise, and ultimately interpret historical landscape change through the use of nineteenth century topographic maps, LiDAR, and GIS. This paper is based on ongoing PhD research at La Trobe University in Melbourne.

Applying GIS to the study of goldfields

Jessie Hurford, New Zealand Heritage Properties

Gold was discovered at Lindis Pass and Gabriel's Gully in 1861, prompting a rush of miners to Otago. Now, 160 years later, the contemporary landscape retains a distinct archaeological signature, with visible workings and miners' huts connected by complex race networks and water management systems. Collectively, these features constitute a modified anthropogenic landscape, with mining activities forming a unique palimpsest (a rewritten multi-layered record) of human occupation, events, and technologies. While many of these features can be seen from above (e.g., in aerial imagery and LiDAR), their visibility on the ground often decreases over time as they are subsumed into the landscape. Drawing on recent archaeological surveys, I present a simple application of GIS used to assist with the mapping of goldmining features. Here, the use of geodatabases is shown to be invaluable for the study of goldfield landscapes, with mapped features forming a unique "living" record.

Scaling Up Deep Learning to Identify Earthwork Sites in Te Tai Tokerau, Northland

Ben Jones¹, Simon H. Bickler²

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²*Bickler Consultants Ltd, New Zealand*

Northland has over 12,000 archaeological sites recorded in the NZAA ArchSite database with around half, including earthwork features, related to Maori history. These include pa, pits, and terraces. Other sites such as stone structures, sod walls, tracks, ditches, and drains representing both more recent and longer-term landscape history are also present, identifiable, and recorded using LiDAR data. Although it is relatively easy to identify many of these archaeological sites and features using LiDAR, as we have previously discussed (Jones and Bickler 2017, 2019), the challenge is to scale up this process to search *regions* to allow for a landscape interpretation and reconstruction. As the Northland LiDAR is now becoming available, we have been working on using GIS to develop Machine Learning training data specific to the identification of these earthwork sites. We present our latest attempts to scale up the identification of archaeological sites in the forested areas of Te Tai Tokerau and determine the most effective Machine Learning tools for New Zealand archaeologists (Bickler 2021).

The Wellington and Waikato Expressways

Kevin L. Jones, Archaeologist

There are important regions that contribute to this story: roading north of Auckland, roading and Transpower in the Waikato, roading and Transpower in the Wellington to Manawatū region, and the 'archaeology response' to the Christchurch and Kaikōura earthquakes both of the latter carried out under a form of 'public works' statutes.

We have not learned much about earliest settlement, especially if compared with what we have learned from Wairau Bar in the last decade. We have gained a radiocarbon chronology of a large 'random sample' of sites. Population expansion in the later period from about AD 1500 has become clear and suggests that large population and the commencement of pa building are linked in some way. We have an opportunity to look more closely at stone and subsistence to seek evidence for any attendant resource scarcity. For the wider Cook Strait region, populations in the 18th and 19th C probably moved back and forth across the Strait region. This seems to be confined and quite different from the earliest period movements.

The Heritage NZ Pouhere Taonga Act 2014 and RM Act both mandate iwi consultation by authority (consent) applicants as part of the consent process. Authority applicants, from large companies and corporations to individual landowners, have generally approached this in good faith. Along with Treaty settlements this has sharpened up differences between the interests of particular iwi and needs careful handling by the Crown agencies. Some iwi still have strong grievances and suspicion arising from land development procedures or blunders that go back several generations. Who should be consulted and should we expect a seamless process? Iwi are actively training kaitiaki and tangata o tiaki in this area and this can only be mutually beneficial to iwi and to archaeologists, not least in developing a practice of day-to-day consultation as development proceeds.

Nowhere has there been any value for money accounting for expenditure on archaeology carried out for public works. This is important in the event of any policy challenges on the value and scope of such archaeology.

Intensive horticulture in the Waikato led to a primarily vegetarian diet for Māori ca. 250-170 years ago

Rebecca Kinaston¹, Waikato-Tainui, Sian Keith², Beatrice Husdon³, Robyn Kramer¹, Jonny Geber.⁴

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In May 2018, the remains of at least seven kōiwi (254-171 cal BP) were discovered at Tamahere during earthworks for Waka Kotahi NZ Transport Agency's Hamilton Section of the Waikato Expressway. The kōiwi were placed in the top fill of a borrow pit and were most likely moved to the pit as disarticulated remains after decomposition elsewhere – an interment type known as a secondary burial. Approval was granted by the Hamilton section's Tangata Whenua Working Group of the Waka Kotahi New Zealand Transport Agency for the osteological and isotopic analysis of the kōiwi, who are now reburied. Here, we discuss the results of the isotope analyses used to interpret the diet and childhood residency of the kōiwi, within the context of a rare borrow pit secondary burial. Compared to a dietary baseline for Aotearoa, the Tamahere individuals (n=7) were eating a diet that consisted almost

completely of plant foods, most likely kumara and taro. This dietary interpretation was supported by the mild tooth wear and presence of caries (tooth cavities) within the dentition of the kōiwi. Additional strontium isotope analysis of two individuals suggested these people were local to the Tamahere area. We use the isotope and osteological results alongside oral histories to help reconstruct the lives of the people interred in Tamahere, a place of intensive horticulture similar to that found across the Waikato during this period.

Histories Hidden in Hair: Using isotopic methods to reconstruct everyday life on the goldfields

Charlotte L. King¹, Hallie R. Buckley¹, Peter Petchey³, Lisa Matisoo-Smith¹, Darren R. Gröcke³

¹ *Department of Anatomy, School of Biomedical Sciences, University of Otago*

² *Southern Archaeology*

³ *Durham University,*

From 1861 – 1870 people flocked to New Zealand from around the world, hoping to make their fortunes on the colony's goldfields. Historical records from the time give few details about the lives led by the people at the goldrush – record keeping tended to focus on the financial rather than the personal side of life. We are able to understand their lives using biological evidence from their physical remains. In this paper we will discuss how the unusual preservation of hair in goldfields cemeteries has allowed us to reconstruct life events leading up to time of death in incredible detail. We report carbon and nitrogen isotopic results from archaeological hair associated with the Tuapeka goldrush. These results highlight dietary variation between individuals and seasonal restriction of access to resources. Two exceptional individuals have hair so long that it allows us month-by-month insight into around 2 years of life prior to death, revealing larger-scale events such as movement to the goldfields and bouts of illness.

Was Mehetia Island (Society Islands) an Important Hub for Early Māori Voyagers to New Zealand? Further Evidence from Cognate Toponyms

Georgia Kerby¹, Elizabeth G. Ramsay², Graeme S. Collett³, William R. H. Ramsay⁴

¹ *Kiwi North*

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Current research has identified three shaped scoria blocks located within Maori occupation sites in the Catlins and on Rakiura, southern New Zealand. Using geochemistry these blocks can reasonably be traced back to Mehetia Island, eastern Pacific. This island was sacred to early Tahitians and moreover their oral traditions record that Mehetia Island was a departure point for canoes sailing for New Zealand. An investigation of cognate toponyms between Mehetia and New Zealand demonstrates a high incidence of shared place names. In particular, the very young, sacred volcanic peak *Hi'ura'i* on Mehetia finds its cognate *Hikurangi* repeated 17 times in New Zealand associated with prominent peaks and hills. The significant number of shared place names gives further support for direct voyaging links between Mehetia Island and New Zealand. Strangely, this voyaging link with New Zealand is apparently poorly preserved in current Maori oral traditions.

A Novel Strontium ($^{87}\text{Sr}/^{86}\text{Sr}$) Isoscape Model for New Zealand Provenance Studies

Robyn T. Kramer¹ Rebecca L Kinaston¹, Peter Holder, Karen Armstrong, Charlotte King¹, Walter Sipple, Hallie Buckley¹, Adam Martin, Malcolm Reid, David Barr, Kavindra Wijenayake, and Clément Bataille
Department of Anatomy, Otago School of Biomedical Sciences, University of Otago

Strontium isotope ratios ($^{87}\text{Sr}/^{86}\text{Sr}$) are increasingly used as geochemical tracers in provenance studies for both modern and archaeological materials due to their high resolution and predictable scalar spatial patterning (Bataille et al. 2020). Different biological tissues (e.g., hair, teeth, bones) form and remodel at different rates meaning that these tissues record snapshots of an individual's isotopic environment at different time intervals during their life. The interpretation of human and animal tissue $^{87}\text{Sr}/^{86}\text{Sr}$ values relies on the existence of a baseline map depicting the bioavailable $^{87}\text{Sr}/^{86}\text{Sr}$ in the environment, known as an isoscape. A $^{87}\text{Sr}/^{86}\text{Sr}$ isoscape does not currently exist for New Zealand inhibiting our ability to use this powerful provenancing tool. This research 'fills the gap' by developing the first isoscape that captures the variation of bioavailable $^{87}\text{Sr}/^{86}\text{Sr}$ across New Zealand's complex geological landscape.

The resulting NZ $^{87}\text{Sr}/^{86}\text{Sr}$ isoscape accounts for 43% ($R^2 = 0.43$, RMSE = 0.0008) of the variation observed in the bioavailable $^{87}\text{Sr}/^{86}\text{Sr}$ data. Region-of-origin prediction maps, in the form of probability density surfaces, for archaeological kurī (*Canis familiaris*) samples will be shared to illustrate how the isoscape can be used to provenance archaeological samples from the earliest known Māori settlements, like Wairau Bar, and post-contact settlements, like Whenua Hou.

Sea Level Rise - Planning for the Unexpected.

Garry Law, Independent Researcher

Coastal transgression and erosion driven ultimately by sea level rise and is not a continuous process. It is episodic around combinations of tides, storm surge and waves. While it will affect known sites it will also reveal unknown ones. How can this latter issue be best managed? Defensive human responses when assets are threatened are understandable but not always rational. Sudden ill-planned interventions happen which can affect sites. How can archaeological interests ensure they are 'in the loop' on these? What agencies need to take roles and what resourcing is needed?

Pounamu Manufacture and the Archaeology of Māori Society in East Otago

Ko te Whakairo O Te Pounamu mo te Matai Whaipara Tangata O Te Porihangā Maori Ki te Tai Rawhiti O Otago

Anne-Claire Mauger, PhD candidate (Archaeology Programme/Mātai Whaipara Takata, School of Social Sciences/Te Puna Pāpori, University of Otago/Te Whare Wānanga o Otāgo).

In the 19th and early 20th centuries, multiple campaigns of fossicking in Otago extracted a large quantity of pounamu, now partially deposited in museums, with little regard to the tangata whenua and the archaeological context. Only few excavations were carried out since then to provide a secure chronology to these taonga. Consequently, little is known of the context of technological innovation in the manufacture of pounamu. This project aims to understand when and how pounamu became a significant taonga in southern Māori society, by reconstructing manufacturing processes, and their chronology through the analysis of available and new radiocarbon information.

I tērā rautau, i tērā atu rātau hoki, ka nui te rapu pounamu i Otago, he maha ngā rapunga hoki, ā, ka nui te pounamu i keria i te whenua. Ko te raru kē, he iti noa iho te whai whakaaro ki ngā tāngata whenua, ki te horopaki mātai whaipara rānei. Whai muri i ērā rapunga, kāore i āta kimihia mōhiotanga mō te takanga o te wā mō ēnei taonga. He iti hoki te mōhiotanga mō te horopaki o ngā hangarau hou o neherā - ko te mea nui, te mahi kanikani – mō te papori rānei i kawea ai i ēnei tikanga ka taka te wā. Ko te whāinga o tēnei rangahau, kia mōhio ai i tēhea wā, i pēhea hoki i puta mai te whakaaro i ngā iwi Māori ki te tonga he tino taonga te pounamu. Ko te whakaaro, ka oti te mahi nā te whai mātauranga mō te hanga taonga pounamu, mō te rerenga o te wā e pā ana ki tērā, me tētahi āhuatanga whakamātau pūtaio hoki. Me te aha, ka tātaingia ngā mōhiotanga mō te tawhito waro, ahakoa kua mahia kē, he mahi hōu rānei.

The Chronology of Waikato Wetland Pā - preliminary results from excavations at five wetland pā in the central Waikato region."

Rowan McBride, University of Waikato

Over 7,000 pā of varying size and complexity are recorded throughout New Zealand, with most found in the North Island and closely associated with regions supporting horticultural activities. This is particularly true of the Central Waikato basin, where numerous pā are located by rivers, tributaries and peat lakes throughout the region. Both oral traditions and early European observations attest the centrality of pā to Māori economic and political activities; however, despite their importance, their construction, development and spread across the country is poorly understood. Here, I present preliminary results from my PhD research within the Rua Mātītī Rua Mātātā Waikato Pā Research Project, which uses a combination of excavation and high-precision ¹⁴C wiggle-match dating of preserved palisade posts to accurately date the construction, proliferation, and development of wetland pā within the central Waikato region.

Pā tawhito in Waikato at the interface of Mātauranga Māori and Archaeology

Isaac McIvor University of Waikato

Research at the interface of Mātauranga Māori and archaeology is critical to generating new knowledge about Aotearoa New Zealand's past. I use this premise in my PhD research within the Marsden funded Rua Mātītī Rua Mātātā Waikato Pā Research Project, where we explore the question of when and why the phenomenon of pā construction began and continued into the nineteenth century. This presentation introduces my research method of collating Mātauranga Māori to create a relational cultural heritage database *He Kaitaka – a woven cloak*. The database covers the Waikato region and is structured by people, places and events. We argue that whakapapa relationships between people (ngā tūpuna ō ngā kanohi ora) and their relationships to places are foundational to the future of researching the Māori past.

AMS micro dating, shell seasonality and hard water.

Catherine Milson, Fiona Petchey, Te Aka Mātuatua School of Science, University of Waikato Te Whare Wānanga o Waikato

Carbon dating is used widely within archaeology, and while the technique has undergone a myriad of developments in recent years, there is still room for improvement. Sample size requirements have dramatically decreased, but there is still value in going even smaller. As part of my MSc degree at the Waikato Radiocarbon Dating Laboratory, I have been working on redesigning our procedures to enable micro-dating to become a reality. Micro-dating will benefit many applications; however, my goal is to measure seasonal ¹⁴C variation within an archaeological shell from the Mariana Islands affected variably by hard water and ocean waters.

Minds of old: an analysis of archaeological brain material within the New Zealand colonial context.

Brittany Moller¹, Charlotte King¹, Hallie Buckley¹, Peter Petchey²

¹Department of Anatomy, School of Biomedical Sciences, University of Otago

² Southern Archaeology

The preservation of soft tissue in the archaeological record is a rare phenomenon, especially in temperate contexts such as New Zealand. Preserved brain material associated with otherwise skeletonised remains have been discovered in a wide-range of archaeological contexts globally, and has proven to be a useful tool in understanding taphonomic processes, as well as identifying trauma and mode of death. Recent bioarchaeological excavations across Otago, New Zealand have recovered eight individuals with preserved brain material from unmarked colonial burials dating from the mid-to late- 1800s, presenting a unique opportunity for further analysis. This research employs microscopic, histological and chemical analysis of the brain material and surrounding soil matrix with the aims of investigating how the brain material has preserved, identifying remaining structures of the brain, and assessing neurological changes as a result of trauma and disease. Initial results indicate that original brain structures are preserved, with further evidence of taphonomic bacterial inclusions and potential neurological changes. As disease and trauma often affect soft tissue prior to manifestation in the skeletal remains this research may better our understanding of the overall health and wellbeing of these early settlers to Otago.

Sourcing chert: defining artefact distributions in central New Zealand

Phil Moore, Peninsula Research and Canterbury Museum

Since the 1960s, and particularly in the last decade, there has been a strong focus on the analysis of obsidian assemblages, with the aim of identifying trade/exchange patterns and the extent of interaction between indigenous communities. While this has proved reasonably successful, in the meantime the sourcing of other lithic materials such as chert has been largely ignored.

This presentation considers some of the issues associated with the sourcing of chert in New Zealand, and looks at what can be learned from a recent study of chert sources and artefacts from the lower North Island and upper South Island. This study suggests that visual attributes alone may be adequate to characterize some chert types, and determine their archaeological distribution.

‘Wasted Space’ and Cultural Norms at 87 Maitland Street, Dunedin

Jeremy Moyle, Origin Consultants

Halls and parlours are ubiquitous elements of 19th century New Zealand housing, but also arguably represent an inefficient use of interior space. This paper begins to explore the idea of domestic spatial utility and its relationship to cultural norms in colonial New Zealand, with reference to a house investigated at 87 Maitland Street, Dunedin.

Hillforts Studies Group – An overview of Māori pā and British Iron Age hillforts

Heather James, Dr Shelagh Norton, Dr Eileen Wilkes, Hillfort Studies Group.

It has long been recognised that, notwithstanding a temporal difference of 2000 years and a spatial difference of 18000km, New Zealand pā and British Iron Age hillforts share a striking range of architectural and morphological similarities. In 2020, a group of archaeologists from the UK-based Hillfort Studies Group visited North Island New Zealand to learn more about New Zealand archaeology in general and pā sites in particular. Drawing on the experience gained from the field trip and an in-depth knowledge of British and European hillforts, this paper presents a high level comparison of both site types.

Accurately dating the Māori past using marine shell – the needle and the haystack.

Fiona Petchey¹, Atholl Anderson², Bruce McFadgen², James Robinson⁴.

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²*The Australian National University*

³*Victoria University of Wellington*

⁴*Heritage New Zealand Pouhere Taonga*

Archaeological contexts are often radiocarbon dated using marine and estuarine shells. Unfortunately, a detailed regional calibration methodology for marine samples comparable to the highly precise Southern Hemisphere calibration curve is lacking, resulting in a blurring of the chronology. In this presentation, I report on recent work investigating this issue at key archaeological sites around New Zealand.

The Search for Drybread: Investigations at the Drybread Cemetery and Diggings, Central Otago.

Peter Petchey¹, Hallie Buckley², Charlotte King², Annie Snoddy² Jitlada Innanchai.

¹*Southern Archaeology*

²*Department of Anatomy, School of Biomedical Sciences, University of Otago.*

In 2020 and 2021 the Southern Cemeteries Archaeology Project carried out excavations at Drybread in Central Otago. This was a goldrush diggings that was probably first worked in 1862, and while the small settlement was later lost, the cemetery has continued to be used by the local community. The Cemetery Trustees invited the project to Drybread to help locate missing graves as many records had been lost in a fire. The resultant excavations did not just focus on the cemetery, but also sought to

locate the lost town of Drybread and investigate the world that the goldrush miners lived and worked in. This paper describes some of the preliminary results of the (ongoing) excavations.

Archaeological Significance: an example from the Bay of Plenty

Dr Caroline Phillips, Independent Researcher

In the current legislation heritage places are deemed to have significance. Suggested changes to the RMA may accentuate this concept. Various criteria have been used to measure significance - largely based on surface evidence. This paper considers recent work at Pongakawa: where features are seldom visible on the surface, yet many ordinary pits, hangi, houses and gardens, along with unusual or rare features have been found by excavation. Pongakawa is a region where all heritage is being destroyed in the conversion of farmland to kiwifruit orchards. Under these circumstances the question asked is "is the issue of significance even relevant?"

An Intra-Island Social Network Analysis of Obsidian on Ahuahu Great Mercury Island

Patricia Pillay¹, Dion O'Neale¹, Alex Jorgensen², Thegn Ladefoged¹

¹ *Anthropology, School of Social Sciences, The University of Auckland*

² *Auckland Council Te Kaunihera o Tamaki Makaurau*

We use social network analysis to model the distribution of obsidian artefacts from archaeological contexts on Ahuahu Great Mercury Island to explore not only changing temporal patterns in obsidian geochemical source use but also variation in technical attributes. Our analysis of 555 obsidian artefacts are from various geochemical sources around North Island Aotearoa New Zealand and classified the technical attributes from the assemblages into 15 flake classes. Instead of using archaeological sites, we have aggregated artefacts into assemblages based on discrete stratigraphic layers as the analytical unit to investigate the distribution of obsidian based on geochemical source and flake attributes by considering their relationship over space and time. This enables us to model possible archaeological assemblage communities using geochemical source and technological attributes as the nodes for determining similarity and differences between communities with links or edges indicating the relationships between nodes. Our analysis stems from the wider ongoing research project on Ahuahu Great Mercury Island focusing on understanding the long term ecodynamics of complex human-environmental interactions in this case the understanding the behavioural variation across the island in terms of activities, including the use and reuse of obsidian.

The archaeobotany and palaeoecology of leafy green vegetables in Aotearoa

Matiu Prebble (Ngāi Tahu), Te Kura Aronukurangi, Te Whare Wānanga o Aotearoa, School of Earth and Environment, University of Canterbury

Of the commensal plant species introduced prior to European contact, more is known about kūmara and taro than other cultigens. Leafy green vegetable species in the celery, cress and sow-thistle plant families, however, may have constituted a larger proportion of caloric value to Māori communities in the past than has previously been recognised. Fossil materials of many of these plants found in swamps, lakes, plaggen soils, and archaeological sites, including some that may have been introduced to Aotearoa and some that are endemic, indicate that they are commonly associated with human-induced disturbance (e.g. fired vegetation), cultivation contexts and dwellings. Evidence of these

plants from the offshore islands, where they are now absent and regarded as being at risk of extinction, suggests that they may have been translocated from the mainland. It also points to the economic purview of Māori cultivation, aside from not being limited to kūmara and taro, should be reconfigured to consider other crops.

The Chemistry of Glasses and Glazes from Myinkaba, Myanmar, First Recognised Glass-Making Concern in South East Asia

W. R. H. Ramsay¹, D. Hein AM¹

¹Private researcher

Although both monochrome drawn glass beads and glazed tiles have been found in various South East Asian archaeological contexts, to date no site has been shown to have had the necessary furnaces and facilities for glass production. Recent research by one of the authors (Hein) has demonstrated that seven furnaces at Myinkabar, near Bagan, Myanmar were glass furnaces for both the smelting of raw materials from local materials and the manufacture of glass beads of the Indo-Pacific monochrome drawn type. These glasses and associated glazes show a variety of colours and can be chemically subdivided into high-sodium, low lead (17-22 wt% Na₂O) variants through to high-lead types (~66 wt% PbO). Diagnostic chemical features are discussed and comparisons made with other trade glass material found in South East Asian sites. Such chemical differences have been used to help define various trade routes through the region.

Climate Change and Archaeology – Implementing a Strategic Plan

Rebecca Ramsay, Auckland Council Te Kaunihera o Tamaki Makaurau

Natural hazards and risks exacerbated by climate change pose a significant and urgent threat to the longevity of Aotearoa's cultural heritage resources. This requires a coordinated approach from the archaeological community to how we communicate, prioritise, and address these challenges and find opportunities to promote the contribution of cultural heritage to climate action and science.

The NZAA Council have established a Climate Change and Cultural Heritage (CCCH) Portfolio, with the aim of providing national direction, coordination, and advocacy on behalf of the NZAA. In this presentation the CCCH Working Group will share back the finalised strategic plan, nationwide government responses and key action items for the year ahead.

The Queen's Redoubt Project- An Update on Progress

Neville Ritchie, Independent Researcher

The Queen's Redoubt Trust was established in 1999 to acquire the Queen's Redoubt site at Pokeno with the intention of developing a cultural heritage attraction where the story of the NZ Wars and their on-going impacts could be told on a site that played a major role in the Waikato War 1863-64. The property was purchased by the Trust in March 2002. This paper reports on what's happened on the site since then, particularly the earthworks restoration, the excavations, and the establishment of the Education Centre.

The Chronology of Gunfighter Pā in Taitokerau.

James Robinson, Bill Edwards, Heritage New Zealand Pouhere Taonga

Following the Ngapuhi rangatira Hongi Hika's visit to Sandhurst Military Academy during his visit to England in 1818, and his eventual return to Aotearoa with 200 muskets in 1820, the process of learning how to use muskets as an effective means of attack is well documented as occurring early in the 1820s. It is argued here that the development of muskets in defence must have developed in parallel at the same time since traditional pa were no obsolete.

However the first clear historic evidence of Maori defences around European ordinance is found in 1844 at the battle of Ohaeawai and Ruapekapeka in 1844 where specialist flatland pa with an integrated range of encircling gun fighter pits with flanking angles and underground bunkers and tunnels to protect against exploding shells suddenly appear fully formed in the archaeological record.

In the archaeological record there are a number of pa sites in Taitokerau with distinctive gun fighter design elements that reflect the use of muskets in defence. However, these gun fighter pa have not yet been dated and so could have appeared at any time between 1820 when guns first arrived and 1860 when the North was demilitarised.

Recent historical and archaeological research on Wharera Pa in the Whangaroa Harbour indicates that gunfighter pit defences in archaeological sites were in place in 1828. Other historical sources hint that gun fighter pits may have been present at Kororipo Pa in the Kerikeri Basin in the early 1820s.

It is argued here that these 1820s sites are the genesis of the complex pa that were built to fight the British Imperial forces in 1844.

Investigating the Kawhia Museum geological taonga collection using non-destructive pXRF fingerprinting

Karyne M. Rogers¹ Diane Bradshaw¹ John Thomson² Oliver McLeod³ Hamish Campbell¹

¹*GNS Science*

²*Kawhia Museum*

³*University of Waikato*

Stone tools provide sophisticated examples of material culture that required the confluence of geological, chemical, biological and physical knowledge. Geochemical analyses using non-destructive portable X-ray Fluorescence (pXRF) have been previously used to group or classify stone artefacts according to their origin and material properties through understanding their unique elemental compositions to specific geological formations or tool purpose.

We undertake a study using pXRF of 160 indigenous Maori stone artefacts from the Kawhia-Aotea region in the Waikato area, New Zealand, currently housed in the Kawhia museum. A geochemical comparison is made between artefacts from different private collections (now housed in the museum) which were found across the region to understand distribution and domination of specific objects, their origin and their relationship to other artefacts within the collection based on their elemental composition.

The most abundant artefacts were toki (adzes, 80 samples) made of either argillite (48 samples) or basalt (32 samples), but also included obsidian flakes, sinker stones, patu and patu onewa. Key rock types included andesite, argillite, basalt, chert, ignimbrite, limestone, obsidian, pitchstone, pounamu

(or greenstone) and sandstone. The geochemical diversity of materials suggests both local and distant geographical origins of these artefacts, indicating population mobility within the district and regular social interaction with iwi groups residing elsewhere.

Reconstructing the childhood diet and residency of four people who visited the dentist in Invercargill between 1881 and 1894

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In bioarchaeology, the study of deciduous and permanent teeth gives insight into maternal and infant health, childhood diet and feeding practices such as weaning and breastfeeding. The timing of weaning and nutritional value of supplemental foods is mediated by social, cultural and demographic factors. In bioarchaeology, weaning is primarily studied by analysing dietary isotopes from tooth dentine.

In 2019, a cache of over 230 teeth were excavated from the Dee St, Invercargill site where it is known that three dentists occupied an office here between 1881-1894 AD. As these teeth were extracted for dental work whilst these individuals were alive, opposed to the dentition of non-survivors typically seen in skeletal assemblages, we gain a unique insight into health *during life*. Little is known about the life histories of the individuals represented in this unique assemblage.

We use a multi-method approach to reconstruct the early lives of four people using their first molars. There are three objectives to this study: 1) to determine the sex of these individuals using a newly developed method that analyses peptides in enamel; 2) assess childhood diet through dietary isotope analysis; and 3) assess childhood residency using strontium isotope analysis.

For the dietary analyses, we compared two methods of micro sampling: dentine serial sections (DSS) and newly developed dentine micro-punch sampling (DMS). DMS compensates for complexities of dentine formation, unlike DSS, giving better time resolution. Accuracy is essential in generating representative weaning patterns, particularly as this is a destructive form of analysis. To test the accuracy of these two methods we analysed the first molar of a modern individual with a known weaning history. We use the results of our analyses to gain insight into early diet and place of residency of the four people who visited the dentist in Invercargill over 125 years ago.

Same Activities, Different Times: Finds from the Opawa Bridge Replacement, Marlborough

Kirsty Sykes, WSP

This paper outlines the results of recent excavations of the Ōpaoa River banks in Blenheim, Marlborough. The Ōpaoa River bridge is a crucial part of the Picton to Christchurch state highway network and a vital freight link between the North and South Island. Future-proofing this key Marlborough transport route included the instalment of a new bridge, while keeping the current Opawa Bridge, a Heritage NZ Category 1 Heritage Place, to become a pedestrian and cycle facility. While the contemporary bridge was opened in 1917, few details were known about the location of a washed out 1860s bridge and the use of the river banks in the late 19th century. Recent excavations have shed light on this important river crossing and how it's been used historically, including the locating of the 1860s bridge. In addition, we are seeing the repeated, similar, use of the river bank from the late 1800s through until today. This is a great example of how people continue to use an area, in this case, a river crossing, in a very similar fashion over an extended period of time. Now

complete, the project, which has garnered public interest on the history of the area, is a tangle and accessible link to the past for locals and visitors alike.

Microarchaeology and its contribution to understanding our past

Dr. Monica Tromp, Southern Pacific Archaeological Research (SPAR), University of Otago

Over the past decade microarchaeological methods have advanced our knowledge of how people lived and interacted with each other and their environments in the past. In this presentation I will give examples of projects using ancient DNA, proteomics, geological microparticle and plant microparticle analysis. I will discuss how these methods have helped to better understand the lives of the first people to colonise Remote Oceania (3000-2750 BP), a medieval German artist and nun (953–788 BP), and residents of an Irish workhouse during the Great Famine (99-103 BP). Finally, I will discuss how these same methods are being (or will be) applied in Aotearoa New Zealand to enrich our understanding about our own past.

Revisiting Sealers Bay: Rescue and Research on Whenua Hou

Brooke Tucker, University of Otago

Climate change and associated sea level rise is posing an ever more urgent threat to New Zealand's coastal archaeology, particularly to sites representing early indigenous occupation. Coastal inundation adds a new imperative to the existing legislative and financial dichotomy of commercial vs research archaeology. This paper discusses an excavation, undertaken in 2019 on Whenua Hou, that highlights the importance of grounding heritage management responses within research frameworks. The site (D48/5 Sealers Bay Camp) had a complex stratigraphy representing multiple occupation layers, dense and diverse midden deposits and artefactual material sourced from throughout the country. Such sites require considerable investment in post-excavation analysis. This work is ongoing and will contribute to our understanding of Māori lifeways in Foveaux Strait/Te Ara a Kiwa.

How Genealogical Research enabled Identification of Individuals in a Pioneer Cemetery

Shirley Wallace, Wallace Osteoarchaeology

Disinterment of individuals from the private Spickman-Nisbet family cemetery in Kaeo was necessitated due to erosion of the site down onto State Highway 10.

Prior to excavation of the cemetery, I compiled 4 generations of William Spickman's family tree to ascertain possible members not included on the list and their ages, sex, year of death.

This research confirmed several deaths occurred of family members still living in the Kaeo region from possibly as early as 1856 through to 1913 including William Spickman (senior), his second wife Mary Tiki Mangatae and three of their sons. There is no record of them being interned in the public Kaeo Cemetery and so it is thought they may also possibly be buried in the private Spickman/Nisbet Cemetery. Thirteen grave cuts or coffins were excavated. Minimal or no human remains were found apart from some tooth crowns but coffins were often quite well preserved. Child, juvenile and adult burials were identified from coffin size, age using tooth eruption and position in relationship to each other and headstones.

A 14th grave was found on the extreme eastern edge of the cemetery when battering of the site was

undertaken and appears to have been the last person interred in the cemetery after 1914. The 14th individual was presented by a set of vulcanised rubber dentures, cranial bones and large amounts of coiffured hair fragments. These dentures were commonly made in the early 20th century and the size of them and the hair remains suggested this individual was an adult female.

The genealogical research suggested a possible person fitting this description was Sarah Jane Nisbet (nee Hayes) who died in 1915 aged 52 years. A death certificate confirmed she had been buried in Kaeo but there was no record in the Kaeo Public Cemetery. The family were able to supply a photograph of Sarah Jane which confirmed both the wearing of dentures and an abundance of hair. The use of genealogical information with excavation findings enabled identification of specific individuals within a private family cemetery. It also helped with the aging of individuals and the order of burials based on death year registrations.

Just a Fragment of Old Newspaper

Dave Wilton, Independent Researcher

A chance archaeological find of a fragment of newspaper on an internal wall of an old Thames house led to a dating of March 1868 for the newspaper. This indicates the house could date to the first few months of the Thames goldfield.

Historical and genealogical evidence helped identify that the building was used as a shop, by an early Thames family. The history of that family over the next 150+ years was traced, down to current residents of Thames. This is a fascinating *archaeology of identity* story, combining early Thames history, archaeology and genealogy.

The Kaikoura NCTIR Lithics

Dan Witter, Witter Archaeology

Extensive archaeological excavations took place for the restoration of the transport route along the Kaikoura coast after the November 2016 earthquake. This was under the agency of NCTIR (North Canterbury Transport Infrastructure Recovery), an alliance with Waka Kotahi NZ Transport Agency and KiwiRail. There were over 7,000 lithics including microdebitage recovered, and these were mainly made of the local chert. The primary objective of the lithic recording was to provide a rich and comprehensive data base. This was done by attribute recording and microscopic examination of usewear over a two-year period.

In the course of the detailed work, lithic techniques that were little known or unknown in New Zealand emerged. These included bipolar, burin, and the radial and lateral bending techniques. Also present were tool types which appear not to be published for New Zealand, such as the impact flake bone scarfing tool, bec flake tool, dentate flake tool, and submarginal usewear tools.

The combination of reduction sequences and microscopic observations resulted in an extensive lithic classification. This served to assess assemblages as lithic signatures for a behavioural layer on the landscape with spatial partitioning. Analysis indicated assemblages as representing a single event activity, limited activity area, multiple activity accumulation, central places, etc., as well as the presence of particular tool kits.

The geoarchaeological significance of ocean-rafted pumice found in Mesolithic to Medieval contexts in Northern Norway

Anke Verena Zernack^{1,2}, Erlend Kirkeng Jørgensen³, Anthony Newton⁴, Felix Riede²

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Ocean-rafted pumice has been reported from archaeological sites across the North Atlantic, the majority from Mesolithic to Norse-medieval contexts in Scotland. Our study investigates frequently found, yet largely neglected pumice pieces from sites along the coast of Northern Norway and aims at exploring the prehistoric human use of the pumice, its origin, age and spatiotemporal patterns of deposition.

We conducted use-wear and geochemical analysis on 38 samples from 19 well-controlled, spatiotemporally diverse archaeological contexts, dated to between 10,100 to 587 cal. years BP. Most pieces show evidence of being used as an abrasive tool on wood, bone, antler, or hide, with marks ranging from one or more grooves and furrows to flattened, polished surfaces, some creating a faceted appearance. Electron microprobe glass analyses revealed that all but two trachyandesite pieces were produced by silicic eruptions of the Katla Volcanic System in Iceland, similar to most pumice from Scottish sites and raised shorelines in Southern Norway.

Our study provides additional albeit mostly coarse-grained age control for pumice-bearing archaeological contexts in the North Atlantic and sheds new light on the availability, use and curation of natural pumice resources throughout the Holocene. Furthermore, these results contribute to a better understanding of ocean-circulation patterns and the nature, frequency and distal impact of Holocene silicic eruptions from Katla.

POSTER ABSTRACTS

Significance through different eyes: Cultural vs Archaeological

Jennifer Graydon

New Zealand archaeologists often consider site 'significance', but how is significance perceived differently by archaeologists and Maori? In the Heritage New Zealand Pouhere Taonga Act, archaeologists are given a set of criteria to determine what is archaeologically significant which primarily rely on evidence observed on the ground's surface. "The Mataatua Declaration" (1993) was the first Maori declaration advocating for the protection of indigenous property, knowledge, and rights, and to explicitly define what they believe is cultural significance. In this, culturally significant places belong to the indigenous group to revitalise traditional practices and agricultural production. This is not reflected in current legislation. Perspectives of 'significance' should be a collaboration. How can we as archaeologists recover and preserve indigenous knowledge without properly including the indigenous peoples' perspectives?

A Histological Investigation of Childhood Stress in early Otago settlers

Lucy Kavale Henderson

Department of Anatomy, University of Otago

In 2018 archaeological excavations were carried out at the 'new' Gabriel Street cemetery in Lawrence, part of a joint project by the University of Otago departments of anatomy and archaeology. This aimed to elucidate the lived experience of nineteenth century non-Māori settlers of Otago, in particular marginalised individuals. Preliminary bioarchaeological evidence has indicated a more nuanced picture of health than the established historical narrative. Here, I present results of histological analysis of dental enamel disruption that provides evidence for childhood ill-health experiences in origin communities. This allows the establishment of a chronology of non-specific developmental stress events prior to immigration.

Archaeology of Gum Digging

Chris Jennings¹, Richard Walter¹ and Karen Greig¹,

¹Southern Pacific Archaeological Research, University of Otago

Investigations of an unusual pit complex near Kaikohe revealed that it was part of remnant landscape related to gum digging. Extraction of kauri gum formed a major industry in the Auckland-Northland region from the mid-1840s to the 1940s. Archaeological investigation of gum digging is rare, as most large-scale extraction areas have since been rehabilitated for agricultural land. This project details a history of the gum digging industry and how a GIS approach can be used to identify future locations of gum digging sites across northern New Zealand

The Recording of Archaeological Features on Temporary Landscapes

Leteisha Lamb

In the Bay of Plenty, archaeological features are commonly found on high, flat ground, but much of this is being demolished by earthworks. Hilly landscapes are being flattened, pushing cubic metres of earth from the hilltops to fill the valleys. Archaeological investigations carried out prior to earthworks are the only opportunity to record any evidence present. Time, money, and resource limitations only allow for a fraction of the landscape to be excavated. Is this amount of information collected enough where the archaeological landscape will be destroyed? Should more importance be placed on archaeology where landscapes are to be irreparably modified?

Searching for significance

Jennifer Lane

This poster discusses issues in finding significant sites through survey, and the level of investigation required to uncover these places. Aerial and ground level photography are used to indicate the level of visibility in four sites in the central Bay of Plenty, between Paengaroa and Pikowai. Although there are several significant sites in the region which were visible on the surface, this poster focuses on four sites that were not initially visible. These sites were photographed during three phases of fieldwork: survey, initial trench opening, and after full excavation.

Recent advances in the archaeology of coastal Hawke's Bay: Contributions of the Otago field schools 2019-2021

*Tristan Russell, Sabre Baker-Anderson, Robert Henderson, Karen Greig and Richard Walter
University of Otago*

From 2019 to 2021 the University of Otago Archaeology Programme has carried out field schools at Mangakuri Pā, Cape Kidnappers and Ocean Beach in the Hawke's Bay. Despite rich traditional histories and a diverse archaeological record, the archaeology of the region remains relatively unknown. Outcomes from the field schools are highlighting temporal and functional changes relating to spaces, resource procurement and resource management, and contributing to a better understanding of the history of the region. This poster will introduce the initial findings of this ongoing, multi-year research project.

Secrets of the Stool: Investigation of Parasitism in Soil Samples taken from Colonial Central Otago

Bridget Sheehan¹, Monica Tromp¹, Charlotte King¹, Hallie Buckley¹, Peter Petchey²

¹ *Department of Anatomy, School of Biomedical Sciences, University of Otago.*

² *Southern Archaeology*

Evidence of intestinal parasites in historic remains can act as a proxy for past human health and environment. Parasites contaminate soils and drinking water which, when ingested, cause malnutrition and diarrhoeal diseases in hosts. Skeletal examination cannot identify parasitic infection however, parasitic remains can be identified in preserved faeces or pelvic soil samples from excavated graves.

This poster reports on the first paleoparasitological investigation of life in colonial New Zealand. We use pelvic soil samples from individuals excavated for the Southern Cemeteries Project – a project investigating Central Otago goldrush-era settlements. This poster will explain paleoparasitological techniques used, and preliminary findings.

Realising opportunities for transdisciplinary partnerships between archaeology and geosciences.

Chris Twemlow¹; Karoly Nemeth^{1,2}; Ilmars Gravis^{1,3}

¹ *The Geoconservation Trust Aotearoa.*

² *Massey University School of Agriculture and Environment.*

³ *Geosights Aotearoa.*

The Geoconservation Trust Aotearoa is a newly established not-for-profit trust founded to promote scientific and systematic assessment of landscapes, conservation policy, community development, land management, and whakapapa history. Our aim is to develop collaborative partnerships including geoheritage, archaeology, environmental sciences, and local communities.

This poster outlines a potential framework for applying these concepts at a unique location on the East Coast of the North Island.

Pathogen detection in ancient human remains from the Asia-Pacific region: What are the options?

Meriam van Os

Department of Anatomy, School of Biomedical Sciences, University of Otago

Infectious diseases, including treponemal diseases, tuberculosis and malaria, have been plaguing human populations for millennia. New DNA technologies and improved ancient DNA protocols make it now possible to detect and analyse pathogens from skeletal remains, providing information about the pathogen's origin, transmission routes and evolutionary history. However, because previous studies have mainly focused on Europe, Africa and the Americas, there is a gap in our knowledge about disease histories in the Asia-Pacific region. Therefore, we are developing and applying ancient DNA techniques to study diseases in past Asian-Pacific populations.

