RESEARCH IN ANTHROPOLOGY & LINGUISTICS | electronic series 2022

RALe

DEPARTMENT OF ANTHROPOLOGY | THE UNIVERSITY OF AUCKLAND

He Kai Kei Aku Ringa: Resilience, Empowerment, and Hope

Conference Programme and Abstracts

Australasian Society for Human Biology

35th Annual Conference, 6th – 8th December 2021
Waipapa Taumata Rau | The University of Auckland
Auckland, Aotearoa New Zealand

UNIVERSITY OF AUCKLAND
Waipapa Taumata Rau
NEW ZEALAND

Conference Theme

Our conference theme emerges at a time when rapid change in the global situation, in the communities and species we work with, and in our own workplaces and discipline calls on reserves of resilience and efficacy. The Māori proverb: ***He kai kei aku ringa*** (There is food at the end of my hands) speaks to how resilience, empowerment, and hope are central to life beyond bare survival. Coming together in an active conference (even if we are not all in the room) is a time for us to share what has worked, what insights the COVID years have brought, and to generate new ideas, collaborations and hope!

Conference held online via Zoom due to COVID-19 restrictions

Conference Schedule

Sunday 5 December

Drop-In Social Event (*6:00 pm NZT / 4:00 pm AEDT / 1:00 pm AWST*)

Monday 6 December

Welcome and Housekeeping (*12:00 pm NZT / 10:00 am AEDT / 7:00 am AWST*)

KEYNOTE – Dr Amber Aranui, Museum of New Zealand Te Papa Tongarewa (*12:15 pm NZT / 10:15 am AEDT / 7:15 am AWST*)

Titiro whakamuri kia whakairo te huarahi whakamua – reflecting on the past in order to shape our future: Ethics, Covid and meaningful collaboration.

PODIUM 1 – From Little Stuff to Big Things (*1:15 pm NZT / 11:15 am AEDT / 8:15 am AWST*)

A strength of human biology is the capacity to use microscopic data to address larger issues. This group of papers adds to that history.

Chair: Nicholas Malone

1.15**: Unprecedented metal exposures suggest childhood resilience in European Early Industrialists** Tanya M. Smith[1], Manish Arora[2], Maya Bharatiya[1], Robin N M Feeney[3], Andrei Soficaru[4], Christine Austin[2]

1.30: **Mobility in New Zealand: Application of isotope and geospatial analyses in the South Pacific** *R T Kramer[1], R L Kinaston[1], P W Holder[2], K F Armstrong[2], C L King[1], W D K Sipple[3], A P Martin[4], G Pradel[5], R E Turnbull[4], K M Rogers[5], M Reid[6,7], D Barr[6], K G Wijenayake[7], H R Buckley[1], C H Stirling[6,8], C P Bataille[9]

1.45: **Migration, cosmopolitanism, and trade in a land of palm gardens: What do strontium results contribute to our understanding of "locals" and "non-locals" in ancient Bahrain?** *Caitlin Bonham Smith, Judith Littleton

2.00: **Did we get tuberculosis from seals? Using ancient DNA to analyse M. tuberculosis in bioarchaeological remains from the Pacific region** *Meriam van Os[1], Hugh Cross[1], Olga Kardailsky[1], Catherine Collins[1], Kate McDonald[1], Rebecca Kinaston[1], Melandri Vlok[1], Richard Walter[2,3], Greg Cook[4], Htin Lin Aung[4], Lisa Matisoo-Smith[1], Hallie Buckley[1], Michael Knapp[1]

2.15: **Identifying 18th and 19th century fathers of illegitimate children from 21st century DNA** Cathy Day

BREAK: 30 min (*2:30 pm NZT / 12:30 pm AEDT / 9:30 am AWST*)

PODIUM 2 – Sex, Gender, and Identity (*3:00 pm NZT / 1:00 pm AEDT / 10:00 am AWST*)

It's not just self-ascribed identity or possibly lived identity but how we assign identity in its multiple forms that are explored in this group of papers.

Chair: Judith Littleton

3.00**: Estimation of ancestry in the Australasian region utilising variation in the human postcranial skeleton** *C Birkmann-Little, R Griffin, D Donlon

3.15: **Everyday risk-taking behaviour in human males approached from a sexual selection and life history perspective** *Hannah Goodman[1], David Coall[2], Cyril C Grueter[1]

3.30**: Evidence of gender in the Bio-archaeological record at Roonka, Australia** *Matilda McVicar

3.45: **Extracting the Truth: Reconstructing sex, childhood diet and residency of four people who visited the dentist in Invercargill between 1881-1894** Emma Sudron, Siân Halcrow, Rebecca Kinaston, Hayden Cawte

4.00**: Gone but not forgotten: The ongoing story of finding 'Harry'** Anna Willis[1], Zachary Callanan[1], Maddy McAllister[1,2]

BREAK: 30 min (*4:30 pm NZT / 2:30 pm AEDT / 11:30 AWST*)

PANEL 1 Early career perspectives on histology applied to archaeological, historical, and post-mortem samples of human skeletal remains (*5:00 pm NZT / 3:00 pm AEDT / 12:00 pm AWST*)

Panel Organiser & Chair: Justyna Miszkiewicz[1,2]

Panel speakers: Karen Cooke[1], Tahlia Stewart[1], Ariane Maggio[3], Annie Sohler-Snoddy[4]

END OF DAY (*5:30 pm NZT / 3:30 pm AEDT / 12:30 AWST*)

Tuesday 7 December

Welcome and Housekeeping (*11:55 am NZT / 9:55 am AEDT / 6:55 am AWST*)

POSTER SESSION (*12:00 pm NZT / 10:00 am AEDT / 7:00 am AWST*)

Each speaker will address their poster for 5 mins with 2 mins for lively questions. Have a look earlier at the posters (link coming soon) so that you are ready in line with your questions!

Chair: Judith Littleton

Evaluation of sexual dimorphism of 13th-15th century human bones from Clerk's Quarters, Benin, Edo State, Nigeria *Iyunoluwa Ademola-Popoola Jesudemilade[1], Justyna J Miszkiewicz[2,3]

Vertebral osteophytosis at Ban Non Wat *Afua Adjei, Georgia Stannard, Kate Domett

The relationship between zygomatic arch morphology and diet in closely-related primates *Maya Bharatiya[1,2], Hallie M Edmonds[3,4], Gabrielle A Russo[1]

Demographic disparity of the Victoria (Australia) cardiovascular disease population *Alexander Cole

Evidence that mercury treatment leaves an elemental signature in enamel and dentin during dental development Stella Ioannou

Finding the ties that bind: Proposing a more inclusive approach to kinship analysis in bioarchaeology *Shoni Lorimer

Mortality patterns in London versus Soho during the 1854 cholera outbreak *Samantha Maitland

Secrets of the stool: Parasitological analysis of pelvic sediment from Colonial Central Otago *Bridget Sheehan, Charlotte King, Monica Tromp

BREAK: 30 min (*1:00 pm NZT / 11:00 am AEDT / 8:00 am AWST*)

PODIUM 3 – Welfare (*1:30 pm NZT / 11:30 am AEDT / 8:30 am AWST*)

The welfare of humans and animals has been challenged in the past few years. These papers explore impacts and resilience in the face of historic and contemporary change.

Chair: Heather Battles

1.30**: How lemurs weather the storm: Behavioural adaptations to cyclone exposure** Alison M Behie[1], Travis S Steffens[2], Keaghan Yaxley[3], Alan Vincent[4]

1.45**: High Canopy Life: Ape behaviour and space use in an innovative captive setting** *H Steiner, N Malone, H Battles

2.00**: Dental practices and oral health in historic Invercargill, Aotearoa New Zealand** *Kathryn King[1], Siân Halcrow[2], Rebecca Kinaston[2], Hayden Cawte[3], Emma Sudron[2]

2.15**: Predictors of perceived stress in women pregnant during tropical cyclones in Queensland, Australia: Preliminary findings** *Cynthia Parayiwa, Alison Behie

2.30**: Did bigger kids get fatter during New Zealand's COVID lockdown?** B Floyd[1], H Battles[1], G McFarlane[2], D Guatelli-Steinberg[3], C Loch[4], S White[4], P Bayle[5], P Mahoney[2]

BREAK: 30 min (3:00 pm NZT / 1:00 pm AEDT / *10:00 am AWST*)

PODIUM 4 – Interpretation: What Does This Mean? (*3:30 pm NZT / 1:30 pm AEDT / 10:30 am AWST*)

We all struggle with identifying the gaps between the event or the life and the production of data and its interpretation. These papers from forensics and bioarchaeology face those issues from a variety of perspectives.

Chair: Nicholas Malone

3.30**: Humans as taphonomic agents: Intervention versus non-intervention in forensic data collection from Australian field-based skeletal remains** Jennifer Menzies, Sarah Croker, Denise Donlon

3.45**: Revisiting assemblages in the too hard basket: Burned bone from Jericho** *Ashley McGarry

4.00**: Human femur microstructure changes with chronology at Bakr Awa, Iraqi Kurdistan** Justyna Miszkiewicz[1,2], Rafał Fetner[3]

4.15**: How to analyse skeletal trauma patterns in the Eastern Eurasian Steppe, from the Late Neolithic Period to the Early Iron Age** *Yan Liu

4.30: **The pattern of vertebral osteophyte formation in a Late Iron Age population from northeast Thailand** *Lucille T Pedersen, Kate Domett, Anna Willis

BREAK: 15 min (*5:00 pm NZT / 3:00 pm AEDT / 12:00 pm AWST*)

PANEL 2 Improving maternal health research by increasing interdisciplinary collaborations (*5:15 pm NZT / 3:15 pm AEDT / 12:15 pm AWST*)

Panel chair: Alison Behie[1]

Panel members: Justyna Miszkiewicz[1,2], Sian Halcrow[3], David Coall[4]

END OF DAY (*5:45 pm NZT / 3:45 pm AEDT / 12:45 pm AWST*)

Wednesday 8 December

PODIUM 5 – Living with Disease *(12:00 pm NZT / 10:00 am AEDT / 7:00 am AWST*)

From ancient to historic to contemporary populations, all of these papers explore the effect of disease in its multiple forms on human experience.

Chair: Heather Battles

12.00**: Histology of a caries sicca lesion from 'Atele, Tonga (~460ybp)** *Karen M Cooke[1], Hallie Buckley[2], Justyna J Miszkiewicz[1,3]

12.15**: Infancy, disability and care during the Edo Period of Japan** Melandri Vlok, Hallie Buckley

12.30**: Nostalgia for the Old Country: A histological investigation of childhood stress in early non-Māori settlers of Otago, New Zealand** *Lucy Kavale Henderson, Annie Sohler-Snoddy, Hallie Buckley

12.45**: Impoverished and infected: The curious cases of COVID-19 in Barangay Krus Na Ligas, Quezon City** *Maria Margarita Magbuhos[1], Precious Pantoja[1], Richard Jonathan Taduran[1,2]

1.00**: Sex difference in susceptibility to COVID-19 in the Philippines: A preliminary study** Maxine Allyson B Castro*, Jewelyn Marie R Tabion, Richard Jonathan O Taduran

BREAK: 15 min (*1:15 pm NZT / 11:15 am AEDT / 8:15 am AWST*)

PODIUM 6 Part 1- Old Data, New Data, New Realities (*1:30 pm NZT / 11:30 AEDT / 8:30 AWST*)

This final group of papers (split into two parts of four then two papers) hopefully sound a note of resilience as we revitalise old data, old debates, face new ethical issues, dance on the spot and pivot our research and our teaching.

Chair: Judith Littleton

1.30**: Exploring ethical and pedagogical best practice in biological anthropology throughout the COVID-19 research 'pivot'** S M Ward[1, 2], K L Balolia[1], A M Behie[1], S J Dennis[1], S E Halcrow[2], R Shoocongdej[3], N Wangthongchaicharoen[3], L A B Wilson[1, 4]

1.45**: The proposed reburial of the World Heritage ancestral remains and the case for the keeping place** Michael Westaway

2.00**: Histomorphometry of paired secondary osteons and Haversian canals in modern human femoral cortical bone** *Tahlia J Stewart[1], Eline M J Schotsmans[2], Justyna J Miszkiewicz[1,3]

BREAK: 30 min (*2:15 pm NZT / 12:15 pm AEDT / 9:15 am AWST*)

PODIUM 6 Part 2, and an Open Discussion about Resilience in Research and Teaching (*2:45 pm NZT / 12:45 pm AEDT / 9:45 am AWST*)

A mark of ASHB over the years has been openness of ideas, sharing of experience and a few good laughs. So here's the space for that burning thing you have been wanting to float all conference.

2:45: Preliminary thoughts on the death of the modern zoo Nicholas Malone

3.00: Cleverman, Kow Swamp, and a "robust" debate Phillip Roberts

3.15: The Roonka Project: Pivoting to place and persistence Judith Littleton[1], Harry Allen[1], Joshua Emmitt[1], Sarah Karstens[1], Fiona Petchey[2], Keryn Walshe[1], the River Murray and Mallee Aboriginal Corporation

BREAK: 15 min (*3:45 pm NZT / 1:45 pm AEDT / 10:45 am AWST*)

ANNUAL GENERAL MEETING (*4:00 pm NZT / 2:00 pm AEDT / 11:00 am AWST*)

Includes the award of student prizes

CONFERENCE CLOSE (*5:30 pm NZT / 3:30 pm AEDT / 12:30 pm AWST*)

Abstracts

Panel Abstracts

Improving maternal health research by increasing interdisciplinary collaborations

Panel chair: Alison Behie[1]

Panel members: Justyna Miszkiewicz[1,2], Sian Halcrow[3], David Coall[4]

[1] School of Archaeology and Anthropology, The Australian National University, Canberra, Australia

[2] University of Queensland

[3] University of Otago

[4] Edith Cowan University

This panel will explore the benefits of how increasing the interdisciplinary nature of studies of the mother-infant nexus can improve our overall understanding of the risks, challenges and lives of mothers in both the past and present. The panel will start with short presentations (approximately 4 minutes) from each panel member about how including different perspectives of maternal and/or infant biology into their own discipline specific studies has helped them to see past what they initially knew. This will then be followed up by a 15 minute Q&A moderated by the panel chair about how other conference attendees see the future of maternal health developing through the development of more synergies. In combination, this panel will serve to start to develop a more holistic picture of how we can study maternal health and how we can move the study area forward to obtain more accurate records of mothers and children in the past and understand mothers and children into the future.

Early career perspectives on histology applied to archaeological, historical, and post-mortem samples of human skeletal remains

Panel Organiser & Chair: Justyna Miszkiewicz[1,2]

Panel speakers: Karen Cooke[1], Tahlia Stewart[1], Ariane Maggio[3], Annie Sohler-Snoddy[4]

[1] Australian National University

[2] University of Queensland

[3] University of Western Australia

[4] University of Otago

The ethics and standards in practice of applying invasive techniques, particularly stable isotope analysis and ancient DNA, to human skeletal remains from a range of temporal and spatial contexts, have received increased attention in recent peer reviewed and popular science literature. Thin sectioning for histology, which is also a destructive technique, has received comparably less attention. In this session, early career hard tissue histologists who work with human skeletal samples from a range of contexts (archaeological, historical, and post-mortem), will discuss their experience: 1) training in histology, 2) methodological issues, 3) good practice approaches to ethics and seeking permissions for access to samples, 4) and future methodological considerations.

This topic should be of interest to the ASHB community given the increase in popularity of invasive techniques applied to skeletal material, offering other early career researchers an opportunity to consider histology. The session will also be of relevance to broader conversations surrounding the ethics of destructive sampling within biological anthropology, and advancement of skeletal biology knowledge by going beyond macroscopic methods alone. The 30-minute session will feature 20 minutes of panel speaker discussing the above four points. Approximately 5 minutes will be spent discussing one point. The remainder of the session (10 minutes) will be left for audience Q & A.

Listed in alphabetical order by first author surname
Presenting author underlined
An asterisk (*) indicates a student presentation eligible for the ASHB Student Prize

Evaluation of sexual dimorphism of 13th-15th century human bones from Clerk's Quarters, Benin, Edo State, Nigeria

*Iyunoluwa Ademola-Popoola Jesudemilade[1], Justyna J Miszkiewicz[2,3]

[1] University of Ibadan

[2] Australian National University

[3] University of Queensland

A commingled human skeletal assemblage dated to 13th -15th century AD was uncovered at Clerk's quarters in Benin, Edo State, Nigeria. These remains are curated at the University of Ibadan, Nigeria, yet limited bioarchaeological research has been conducted on this collection. The present study aimed to undertake an assessment of the available sexually dimorphic skeletal elements and bones (pelvis, femur, skull) to attempt a sex estimation of the individuals represented by this assemblage.

Using standard morphometric methods, a total of 73 bones were studied. Using the femur alone, it is possible to infer that a minimum of 15 males and 5 females, and a maximum of 35 males and 10 females, are represented by this assemblage. Multiple techniques of sex estimation were applied. The resulting sex estimates were evaluated for consistency. We found that, depending on which method used, a different male and female sex category was determined for the assemblage. For example, using the femoral circumference, there were 22.22% females and 77.78% males. When using the skull, a result of 55.56% males and 44.44% females was obtained. However, using the pelvic bones, 15.79% males and 84.21% female results were obtained.

The results of this study provide initial insights into skeletal sexual dimorphism at this site, allowing us to better understand aspects of the demographic composition of a sample of this past Nigerian community. Further, this study raises technical considerations for sex estimation methods applied to commingled human skeletal remains and the currently available sex estimation methods more generally.

Vertebral osteophytosis at Ban Non Wat

*Afua Adjei, Georgia Stannard, Kate Domett

La Trobe University

This paper will present recent research on the rates of the pathology vertebral osteophytosis (VOP) at the site of Ban Non Wat (3, 764 BP Œ 1, 786 BP), a prehistoric moated site in Northeast Thailand. The research aimed to provide the first interpretations for the changing rates in VOP at Ban Non Wat between sex, age, time period, and vertebral region, with reference to palaeopathological and bioarchaeological theoretical methodologies, modern clinical literature, and the implications of analysing skeletal assemblages.

This study suggests a sexual division of labour (supplemented by comparative sites and other bioarcheological avenues of evidence) at Ban Non Wat, supported by higher rates of VOP in males within each variable explored. There were a high proportion of young adult individuals with VOP during the Bronze Age, suggested to relate in part to intensive physical activity from a younger age. The aetiology of VOP was found to be multifactorial, so physical activity was only used as a supplementary

aetiology to other possible variables (e.g., genetics, body mass, etc.) Overall rates of VOP increased through time, which is suggested to be correlated to the wider social, environmental, and economic changes that altered the frequency and intensity of daily activity at Ban Non Wat from the Neolithic into the Bronze.

Titiro whakamuri kia whakairo te huarahi whakamua - reflecting on the past in order to shape our future: Ethics, Covid and meaningful collaboration [KEYNOTE]

Amber Aranui
Museum of New Zealand Te Papa Tongarewa

Significant change over the past two years has made the world stop, contemplate, reflect and for some, reprioritise life and reconsider what is ethical or whose ethics are important to consider. This paper reflects my own work in repatriation, current museology and those who work with ancestral remains. I ask, what does our future hold with a new pandemic, how did our ancestors fear in the last one? And how might this allow us to rethink our own practices and relationships.

How lemurs weather the storm: Behavioural adaptations to cyclone exposure

Alison M Behie[1], Travis S Steffens[2], Keaghan Yaxley[3], Alan Vincent[4]

[1] School of Archaeology and Anthropology, The Australian National University, Canberra, Australia

[2] Department of Sociology and Anthropology, University of Guelph, Guelph, Ontario, Canada.

[3] Leverhulme Centre for Human Evolutionary Studies, University of Cambridge, Cambridge, UK

[4] Research School of Biology, The Australian National University

It is widely known that Madagascar has a uniquely harsh and stochastic climate because of regular exposure to cyclones. This history of regular cyclones is suspected to have directed evolutionary changes to lemur behaviour and morphology, including small group sizes, high degrees of energy-conserving behaviours (including torpor/hibernation), and a limited number of species that are dedicated frugivores. To date, however, no one has tested how uniform cyclone exposure is on lemurs across Madagascar and if these behavioural features actually occur more frequently in species whose ranges have been more impacted by cyclones. In this study, we attempt to answer this question by first conducting a literature search to quantify variation in such traits across lemur species. We then create a cyclone impact index map using Koppen-Geiger climate class, historical cyclone tracks, the Saffir Class of cyclone and hurricane intensity, and precipitation data. By overlaying lemur ranges with this cyclone impact map and comparing to the traits pulled from the literature (controlling for phylogenetic non-independence and spatial autocorrelation) we will be able to determine how cyclone exposure is related to the presence of these traits across lemurs. Results of this study will allow us to better understand how natural disasters influence behavioural evolution in primates, and may provide hints to future vulnerability of different lemur species in the face of climate change.

The relationship between zygomatic arch morphology and diet in closely-related primates

*Maya Bharatiya[1,2], Hallie M Edmonds[3,4], Gabrielle A Russo[1]

[1] Department of Anthropology, Stony Brook University, Stony Brook, New York, USA, 11794

[2] Griffith Centre for Social and Cultural Research, Griffith University, Southport, Queensland, Australia, 4222

[3] Department of Biological Sciences, Northern Arizona University, Flagstaff, Arizona, USA, 86011

[4] Center for Evolution and Medicine, Arizona State University, Tempe, Arizona, USA, 85281

Comparative studies have shown that primates known to consume biomechanically tough and/or hard foods have larger temporal fossae than primates that consume biomechanically softer foods. The former group also possesses relatively more robust zygomatic arches and exhibits increased cortical bone relative to total subperiosteal bone in the anterior zygomatic root to facilitate efficient mastication. However, less is known about potential phylogenetic constraints on the internal and external morphology of the zygomatic arch. This study builds on previous work by evaluating if closely-related primates that differ in diet toughness and hardness diverge in functionally informative aspects of zygomatic arch morphology. Species from three genera were analyzed: 1) *Gorilla gorilla* and *Gorilla beringei*, 2) *Pongo pygmaeus* and *Pongo abelii*, and 3) *Macaca* spp. (seed eating macaques, non-seed eating macaques, and bamboo eating macaques). External and internal zygomatic arch morphology was quantified from linear

measurements derived from 3D landmarks and cross-sectional data obtained from CT scans. Metrics did not statistically differ between species of *Gorilla* or *Pongo*, which might be explained by dietary variation among populations within each of these species. Seed eating macaques possess relatively more robust zygomatic arches with larger temporal fossae than other macaque groups. Relative cortical area distributions were highest in macaques that consume bamboo, and lowest in seed eating macaques, suggesting that loading regimes vary within biomechanically challenging diets. These results support the utility of external zygomatic arch morphology as an indicator of diet type that may be informative for interpreting the primate fossil record.

Estimation of ancestry in the Australasian region utilising variation in the human postcranial skeleton

*C Birkmann-Little, R Griffin, D Donlon

University of Sydney

The assessment of ancestry is important in creating a biological profile for skeletal remains allowing forensic investigators to narrow possible identifications. Research has focused on cranial measurements or morphology. However, in cases where the skull may be absent or damaged it is necessary to find an alternative.

The principal aim of this research is to investigate size and shape differences in the postcranial skeleton of ancestral groups from the Australasian region. These include European Australian (CT scans only), Australian Aboriginal, and Thai. Also included were European American and African American to link the research with global studies. The European American group also provides a comparison with the geographically separate European Australian group to determine the reliability of using American data in Australasian based research. Length and width measurements were taken from the clavicle, humerus, radius, ulna, femur, tibia and fibula of ≥100 individuals from each group.

Principal component analyses found the main differences between the groups were the width and length of the bones. Discriminant function analysis (DFA) and Random Forest (RF) were used to classify individuals into their correct ancestral group. DFAs correctly allocated 58-97.5% skeletons, RF correctly allocated 67.1-98.5% skeletons. Best results were found when multiple bones were included in a single analysis.

This study takes a crucial step towards improving contemporary practices in ancestry estimation. The use of CT scans allows access to previously unavailable groups and removes reliance on physical skeletal collections. This study may provide new tools for forensic anthropologists that may assist in investigations.

Sex difference in susceptibility to COVID-19 in the Philippines: A preliminary study

Maxine Allyson B Castro*[1],Jewelyn Marie R Tabion[1], and Richard Jonathan O Taduran[1,2]

[1] University of the Philippines Diliman, Quezon City, Philippines

[2] University of the Philippines Mindanao, Davao City, Philippines

Biological sex and sociocultural factors have been interrelated in epidemiological studies and clinical care. This study aimed to assess sex differences in susceptibility to COVID-19 in the Philippines. COVID-19 numbers of cases until February 28, 2021 were collected from the Philippines' Department of Health (DOH). Student's t-test was used to analyze the data per administrative region and age group. News articles were collected from reputable media outlets in the Philippines. Biological and sociocultural differences were considered. There was a significant sex difference ($p \leq 0.05$) observed in the age groups of 30 to 39, 40 to 49, and 50 to 59 years old, which indicates that males in the said age clusters in the Philippines are more susceptible to COVID-19. Sex-specific mechanisms that may disproportionately affect either sex were associated with differences in immune responses, hormones, and underlying medical conditions. Furthermore, gendered lifestyles in the Philippines that involve social gathering such as cockfighting, gambling, and boxing are dominated by the male population and could result in direct transmission of the disease. Sex disparities linked to the susceptibility of COVID-19 emphasize the importance of gender-based research for risk-reduction strategies and effective public health measures in the Philippines.

Demographic disparity of the Victoria (Australia) cardiovascular disease population

*Alexander Cole

Victoria University

There is a wealth of data available including government agencies like The Australian Bureau of Statistics (ABS). Using ABS data, we can explore and describe the demographics of Victoria. Cross referencing this data with The Australian National Health Survey we can understand where diseases appear, who they affect and when. An important tool in understanding where CVD occurs, what impact interventions have, where more attention is needed and how we can try to improve health outcomes.

Cardiovascular disease is the most prevalent non-communicable disease in Australia. There are 1.2 million Australians (4.8% of Australia's population) with 1 or more diagnoses related to CVD.

Nationally CVD kills 19,077 people a year. This 6% of the population with CVD accounts for 14% of the total burden of disease in Australia.

Past research has found a 33% lower life expectancy in regional populations. Other research has found similar patterns of diminishing quality of life and longevity with distance to major cities. We investigated this in the context of Victoria, Australia.

The trend in Australian CVD diagnosis indicates an increasing patient population. We observe a small but constant increase in the number of patients in each survey of health. This increases with distance to major metropolitan cities. The most impacted are remote and very remote communities.

This research highlights a disparity in health outcomes that needs to be addressed.

Histology of a caries sicca lesion from 'Atele, Tonga (~460ybp)

*Karen M Cooke[1], Hallie Buckley[2], Justyna J Miszkiewicz[1,3]

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[2] Department of Anatomy, University of Otago, Dunedin 9016, New Zealand

[3] School of Social Science, University of Queensland, St Lucia, Australia

Histological analysis of bone has, broadly, been underutilised within palaeopathology, particularly in its application to cranial bone due to the invasive nature of this methodology. However, the microstructure

of pathological bone can reveal insights into the biological processes which create these lesions, and assist in the understanding of disease pathophysiology. This study aimed to serially section a cranial caries sicca lesion, to further understand the internal microstructural changes that occurred in response to advanced stages of treponemal infection.

A caries sicca lesion was extracted from a cranial fragment of individual 1/26 from ‘Atele, Tonga (460-0ybp). The sample was serially sectioned histologically in both longitudinal and transverse planes, and assessed using polarized light microscopy. Within the sample, three distinct abnormal morphologies were observed: the lesion floor, its lip, and the surrounding tissue which appeared non-pathological on macroscopic inspection. The sample showed much higher density of the diploe throughout than would be expected in healthy samples of cranial tissue, even in the surrounding tissue thought to be unaffected. Additionally, superficial layers of woven trabecular bone were present within the lip and floor of the lesion itself. However, these changes did not permeate the inner table of the cranial sample, which is consistent with the classic descriptions of caries sicca lesions by Hackett (1976). That being said, the alteration of bone surrounding the lesion indicates that pathophysiological changes may permeate the bone microstructure beyond the discrete lesions. Our study demonstrates the value of histological investigation into pathological lesions on ancient bones.

Identifying 18th and 19th century fathers of illegitimate children from 21st century DNA

Cathy Day

The Australian National University

This paper describes a method of identifying fathers of illegitimate children who lived in the 18th and 19th centuries from the DNA of their 21st century descendants. It focuses on fathers of children born in England, but the descendants can live anywhere in the world and the techniques can be applied in any country in which consumer DNA testing is common, such as those in Europe and North America.

The process of identification using consumer DNA testing is described. Through examples, the paper demonstrates how DNA can supplement documentary sources and validate, or disprove, assumptions about illegitimate paternity.

Finally, it suggests potential other uses to which consumer DNA testing can be put, in the field of human biology.

Did bigger kids get fatter during New Zealand’s COVID lockdown?

B Floyd[1], H Battles[1], G McFarlane[2], D Guatelli-Steinberg[3], C Loch[4], S White[4], P Bayle[5], P Mahoney[2]

[1] Anthropology, The School of Social Sciences, University of Auckland, New Zealand

[2] School of Anthropology and Conservation, University of Kent, Canterbury, UK

[3] Department of Anthropology, The Ohio State University, Columbus, Ohio, USA

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We use evidence from a longitudinal study accomplished in Dunedin in 2019 and 2020 to address three closely related questions. First, as compared to similar periods before and after, did juvenile and adolescent students tend to increase BMI (kg/m2) in response to the comparatively severe COVID-19 lockdown implemented in New Zealand? Second, was sex/gender and/or body size significantly associated with BMI gain during the lockdown? Finally, does how we measure body size make a difference? We examine these issues using repeated measures analysis of 63 female and 43 male students. Our criteria were changes in BMI during the three periods. Our predictors were sex/gender and body size, assessed as log-transformed weight, height, or lower leg length measured before the beginning of the first period. Results indicate that individuals increased BMI significantly more during

lockdown (Δ = 0.76) than before (Δ = 0.06) or after (Δ = 0.20) (Huynh-Feldt Adjusted P-values ranged from 0.010 to 0.021). For all three measures of body size, larger individuals increased in BMI more during the lockdown period (H-F Adjusted P-values ranged from 0.004 to 0.009), but not the other two periods. Females gained more than males (BMI Δ, 0.89 vs. 0.57), but the interaction between period and sex/gender was not statistically significant (P > 0.22). Why larger boys and girls tend to become fatter during the lockdown cannot be answered with available data, though an hypothesis is offered. Steps to mitigate impacts of future lockdowns are suggested while recognising challenges in their implementation.

Everyday risk-taking behaviour in human males approached from a sexual selection and life history perspective

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Sexual selection theory predicts that males, especially in prime reproductive condition, will be more risk-prone than females. Risk-taking is seen as a means to convey mate quality or “good genes” to members of the opposite sex or competitive ability to members of the same sex. Therefore, risk-taking should be more common in the presence of potential mates (intersexual selection or female choice) or in the presence of male competitors (intrasexual selection or male-male competition). Risk-taking can also be situated within a life history/ecological perspective, according to which environmental unpredictability can promote more present-oriented and risky behavioral strategies. Therefore, people living in areas of low socioeconomic status are predicted to be more risk-prone. We conducted an observational study on risk-taking in two everyday situations: crossing a road and riding a bike. 906 road-crossers and 124 cyclists were recorded at various locations around the Perth metropolitan area. These comprised traffic intersections in suburbs of differing socioeconomic status. In line with predictions from sexual selection, males were more likely to cross a road in high-risk conditions and ride a bicycle without a helmet. These behaviours were also most commonly seen in younger males. Female and male onlookers had no effect on male risk-taking, which suggests that norm adherence can be a more powerful force than sexual selection. Area-level socioeconomic status was strongly associated with the frequency of risk taking, implying that environmental stressors can affect risk attitude. As risk-taking can lead to serious injury and death, providing an explanation of the ultimate drivers behind its presence in everyday behaviour has important practical implications.

Nostalgia for the Old Country: A histological investigation of childhood stress in early non-Māori settlers of Otago, New Zealand

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Recently, archaeological excavations of three cemeteries in Milton (2016) and Lawrence (2018) were undertaken, part of a joint research project between 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 such as women, children and non-Europeans. Children are a valuable and widely used indicator of population health as they are more sensitive to stress events due to the demands of growth, however their life experiences are frequently excluded from the historic record. Preliminary bioarchaeological evidence has indicated a more nuanced picture of health than the established historical narrative. Here, we present results of histological analysis of dental enamel disruption that provides evidence for childhood ill-health experiences in early non-Māori

residents of Aotearoa/New Zealand. Dental samples were sectioned and prepared according to established methods, and light microscopy was used to create composite digital images. These images were analysed using FIJI™ software to identify potential 'Wilson bands', internal indicators of disruption to enamel secretion during formation of the teeth during early childhood. Teeth develop in a predictable and well-established sequential pattern, and this allows the establishment of a chronology of non-specific developmental stress events during the period of enamel formation. Preliminary results indicate multiple incidents of childhood growth disruption in many early settlers, consistent with difficult childhood circumstances.

Evidence that mercury treatment leaves an elemental signature in enamel and dentin during dental development

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Archaeological studies have used chemical analysis on human remains to evaluate possible exposure to heavy metals and the use of heavy metal treatments. Mercury was used to treat venereal disease prior to the introduction of penicillin, including in Australia.

This study investigates whether mercury leaves an elemental signature within enamel and dentin in those who demonstrate dental abnormalities associated with mercury treatment used to treat congenital syphilis.

The individual in this study is a male subadult aged between 8 to 10 years who was uncovered from St Marys cemetery in Adelaide, Australia, dating from the mid-19th to early 20th century. The individual demonstrates dental signs attributed to congenital syphilis and mercury treatment. Laser ablation was conducted on four areas of the right mandibular first permanent molar to detect levels of mercury.

Elemental signatures of mercury were detected, ranging between 2.89ppm to 9.84ppm in the dentine in comparison to 0.03ppm to 0.92ppm in the enamel. High levels of arsenic were also detected in the dentine, ranging between 1.35ppm and 6.27ppm.

Elements leave a signature within enamel and dentin during dental development. It is not surprising to find levels of mercury and arsenic in the same location as both were often used in conjunction with each other to treat congenital syphilis. Mercury treatment ranged from two to ten grains (= 129598µg to 647989µg), which exceeds the tolerable intake of methylmercury for children, 1.6µg (= 1.6ppm) per kilogram of bodyweight per week. This supports that toxic levels of mercury produce specific dental abnormalities.

Dental practices and oral health in historic Invercargill, Aotearoa New Zealand

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The aim of this study is to investigate the oral health experiences and dental practices through a macroscopic analysis of an assemblage of 291 teeth deposited by a dentist between 1881-1894 in Dee Street, Invercargill. Dental caries, calculus, and tooth wear were analysed to study oral health and dental care experiences. The high rates of caries suggested this was the main complaint for visiting the dentist, and the severity of many caries suggests a delay in receiving treatment. There were some examples of fillings using materials such as metal amalgams and white composites. A modified

Bioarchaeology of Care model was used to place results within the social, historical, and dental care context. Care consisted primarily of extractions of pathological teeth, which may have then been replaced with dentures. Restorative treatments like fillings may also have been used. The cost of these treatments may have limited some individuals from accessing a dentist, suggesting those represented in this assemblage may have been Invercargill residents who could afford primarily extractive dental care. The individuals in the Dee Street assemblage were likely colonial settlers or first-generation New Zealanders, suggested through examination of advertisements in Papers Past which showed that two of the dentists operating here had trained overseas before immigrating to New Zealand. This study allows for historical dental practices in New Zealand to be studied for the first time, contributing to our understanding of past lives in colonial Southland.

Mobility in New Zealand: Application of isotope and geospatial analyses in the South Pacific

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Bioavailable stable and radiogenic isotopes of strontium are ubiquitous markers of provenance that are increasingly used to trace the origin of animals and plants as well as products, but currently a baseline map across Aotearoa is lacking, preventing use of this technique. Here, we have improved an existing methodology to develop a regional bioavailable strontium isoscape using the best available geospatial datasets for Aotearoa. The resulting strontium isoscape explains 53% of the variation present in environmental samples (primarily, plants and soils) collected across the country (R2 = 0.53 and RMSE = 0.00098). Then, we tested the potential of this model to determine the origin of cow milk produced across Aotearoa. Predictions for cow milk (n=33) highlighted all potential origin locations that share similar strontium values, with the closest predictions averaging 7.05 km away from their true place of origin. These results demonstrate that this bioavailable strontium isoscape is effective for tracing locally produced agricultural products in Aotearoa. Finally, we share origin predictions for archaeological kurī (*Canis familiaris*) from multiple archaeological sites across Aotearoa to show the potential of using the strontium isoscape to study migration in the past.

The Roonka Project: Pivoting to place and persistence

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In COVID times we all need to re-focus our research. This is not new, but previously the need to pivot and scramble has been an individual experience. The Roonka project which is a collaboration with the First Nations People of the Murray River and Mallee began in 2014. The goal was to re-examine the

mortuary record and human remains from the largest excavated Aboriginal burial site in Australia. A central tenet of the project was to not assume that the site represented a single function or that the remains represented a population. We had planned to rely upon extensive radiocarbon dating to assist in that goal but institutional changes and delays made that impossible. Instead we have turned to 3D reconstruction of the burials and detailed analysis of taphonomy to establish site formation. Our results show both continuity and gaps in the record, a pattern of burial that changes over time in terms of who is represented, and the processes that create a persistent place of burial despite change. Persistence of place, people and project has become a central practical but also theoretical orientation.

How to analyse skeletal trauma patterns in the Eastern Eurasian Steppe, from the Late Neolithic Period to the Early Iron Age

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This presentation introduces a bioarchaeological model about how to analyse skeletal trauma patterns in the eastern Eurasian Steppe. It is organised into two parts. The first part talks about what people know about the region, including the natural environment, subsistence and conflicts. The steppe region tends to be dry and cold, with distinct seasons. Meanwhile, it could be divided into three subareas with devious geographic features. From the early second millennium BCE, people in the steppe region depended on both farming and animal husbandry, with sedentary life. Then, the extent of the animal herding and movement broadly tended to increase, but it was not a linear process. The conflicts between central states and northerners were dated back to the late second millennium BCE, and enlarged and accelerated.

The second part explains how to analyse trauma which may be impacted by these factors. 1. observe each injury, record its location, mechanism and healing phase. 2. analyse all of the injuries one individual accumulated over the life, and assess what risky events the individual experienced. 3. at the population level, compare trauma within one site, between sites within each subarea, and between subareas within the steppe region, assess what variables could result in differences in trauma patterns.

Human remains are direct evidence of ancient people's lived experiences. The bioarchaeological model allows us to switch the focus from the natural environments and dynamic sociocultural changes to humans, reconstructing how they lived and what risks they faced in the eastern Eurasian Steppe.

Finding the ties that bind: Proposing a more inclusive approach to kinship analysis in bioarchaeology

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This thesis explores how kin relationships are identified and interpreted within bioarchaeology. Social anthropology recognises kinship as a flexible and socially constructed system for organising familial relationships. Despite this, bioarchaeological research often implements a genealogical, procreation-based kinship model, potentially representing a form of cultural colonialism which overlooks the variability of kinship systems within and between cultures. Developments in ancient DNA sequencing have provided a useful technique increasingly used in bioarchaeology for local-level kinship analysis. Underpinning the application of this technique is the prioritisation of genetic data. This implicitly supports the idea that kinship relationships are formed solely through biogenetic links, with little regard to social processes which form familial relationships.

This thesis uses a systematic review to examine the concepts and data previously used as the basis for kinship reconstruction. The review empirically establishes the disconnect between social anthropology and bioarchaeology and makes recommendations for future research. The findings indicate that the variability of kinship systems is frequently unrepresented, and that the validity of ancient DNA results can frequently be questioned. These findings highlight the need to move away from the essentialist argument about the role of DNA and kinship towards a more integrated, biosocial approach. This thesis provides recommendations for how future research can incorporate both biological and archaeological data for interpreting kinship. It demonstrates how an inclusive approach might more effectively use the available bioarchaeological data to, hopefully, provide more comprehensive, culturally sensitive reconstructions of relationships in past populations.

Impoverished and infected: The curious cases of COVID-19 in Barangay Krus Na Ligas, Quezon City

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Cities have been major contributors to COVID-19 cases in the Philippines, thus illustrating the urban dimension to the pandemic in developing countries. It is then imperative that urban areas like Krus Na Ligas, an area with disadvantaged socioeconomic background and a notable rise in COVID-19 cases, be studied closely. Quezon City Government case counts from March 2020 to December 2020, and 2015 Census data from the Philippine Statistics Authority were supplemented with key interviews to study Krus Na Ligas' lifestyle and response to protocol. From two months with zero COVID-19 cases, Krus Na Ligas soon recorded one of the highest overall cases among the selected barangays (268) and frequently recorded the highest number of active cases per month. The barangay is also set apart in terms of socioeconomic background: census data shows that there are as many as 9,616 working residents in Krus Na Ligas. Many hold typically frontline jobs and/or jobs with lower salaries compared to adjacent barangays. Lack of resources and government assistance also implied there was more incentive to venture into exposure in spite of quarantine ordinances. Such findings demonstrate that differential socioeconomic background necessarily results in the differential effect of COVID-19 for a breadth of reasons including access to resources, health issues due to undernutrition & sudden sedentism, and nature of work. Based on the findings of this research, analyzing health crises such as the COVID-19 pandemic must also consider socioeconomic conditions, especially on the level of the small governing units such as the barangay.

Mortality patterns in London versus Soho during the 1854 cholera outbreak

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The macro-scale demographic and epidemiological transition models have a long history of explaining why particular mortality patterns are observed. However, limited studies have examined how accurately they reflect what occurs in a specific place at the micro-level. To test these macro expectations, I investigate the mortality patterns at the micro-level during the 1854 Soho cholera outbreak compared to that of wider London (macro-level). An epidemic at the micro-level has been chosen for this study as arguably a reduction and decrease in the severity of epidemics of infectious diseases is one of the main contributors to the overall decline in mortality over time. Unlike most studies that have examined this renowned cholera outbreak in the past, I apply a biocultural theoretical framework. This allows for the concepts of embodiment, culture, and human agency to be treated seriously. By looking at the mortality patterns at the micro-level, local contextual considerations are actively included, and a more

nuanced picture of what shapes these patterns emerges. This poster highlights the preliminary findings surrounding the differences between cholera mortality patterns observed in Soho versus London as a whole. It specifically examines the increased mortality seen among adults aged 40-54 years in Soho. These observations give rise to further questions around the factors shaping these micro-level mortality patterns in Soho. These questions will later be investigated by examining the population composition and the social and public health responses as part of the wider examination of the representativeness of the macro-scale demographic and epidemiological transition models.

Preliminary thoughts on the death of the modern zoo

Nicholas Malone

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The birth of the modern zoo can be traced to the turn of the twentieth century and Hagenbeck's vision for a more 'naturalistic' exhibition of exotic animals. Today, zoological gardens the world over are epicentres of animal representation and host to millions of visitors annually. Despite further innovations in husbandry practices and enclosure designs, the underpinning aesthetics of displaying and observing animals against more naturalistic backdrops is a relatively stagnant feature of the contemporary zoo experience. Zoos endeavour to develop a public appreciation of natural biotas and the plight of endangered species, achieved via their educational and recreational opportunities. Additionally, the best zoos become conscientious conservation participants by providing research opportunities, maintaining an ex-situ gene pool and through fundraising in support of conservation activities. However, zoos can also be critiqued as institutions that both reinforce and reflect an unhealthy relationship between humans and other animals, which is based on power and exploitation. For primatologists, research in captive settings brings additional issues of external validity into the foreground. This presentation will interrogate the justifications for the perpetuation of ex-situ populations of endangered primates, especially amidst the additional challenges posed by the pandemic. I conclude by sketching-out a vision for the role of zoos in a world embroiled in multiple, inter-related crises.

Revisiting assemblages in the too hard basket: Burned bone from Jericho

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Mortuary data are key to understanding how people “negotiate, manipulate, contest, compete, or negate biosocial realities” (Klaus, 2021:197). Within the realm of bioarchaeology, analysis of mortuary data is often limited to discrete, unburned bodies and their life histories. Burned bone assemblages represent a significant portion of the mortuary record and yet their analytical potential has been overlooked. Some of the reasons for this include the perceived challenges in identifying discrete individuals, the time-intensive nature of analysis, and the difficulty in gleaning other types of information typically sought from unburned remains. This presentation will provide an overview of the potential contribution of burned human remains to bioarchaeological research problems, and share some preliminary results from the analysis of remains from the variably burned Early Bronze Age tomb,Tomb A94, from Jericho. Overall, this presentation argues that analysis of burned bone assemblages is needed to help fully understand the complex and varied biosocial worlds of past peoples.

Evidence of gender in the bio-archaeological record at Roonka, Australia

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Evidence of gendered behaviours in the past is difficult to discern, including behaviours among pre-colonial Aboriginal peoples. Historic anthropological sources in Australia are limited and sometimes biased by western perspectives. This study evaluates whether patterns of gender may be found among the 90 adults at Roonka who have evidence of at least one skeletal marker of osteoarthritis. Roonka is among the largest burial sites in Holocene Australia, used from about 7000 B.P. to 150 B.P. It is located near the Murray River in South Australia. It has been theorised that lifelong experiences of gender are embodied through patterns of activity. By analysing such patterns as reflected in the location and severity of markers of osteoarthritis, variation in gendered activity may potentially be identified. Osteoarthritis is selected because it is among the most common methods of assessing habitual activities in skeletal remains. This selection acknowledges that osteoarthritis has a complex aetiology with many contributing factors. Along with habitual activities, these include age and gender (as indirect inferred from anatomical features associated with sex). I attempt to discern through blockcluster analyses whether osteoarthritis presence and rank-order severity across individuals allows clustering that examines the relationship between estimated sex and inferred gender. I will report preliminary results, including challenges reflected from the relative infrequency of osteoarthritic markers in the adults buried at Roonka.

Humans as taphonomic agents: Intervention versus non-intervention in forensic data collection from Australian field-based skeletal remains

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From 2013 to 2019 a PhD project investigated the improvement of post-mortem interval estimation for human skeletal remains and compared aspects of deterioration between human, kangaroo and pig bones in consideration of possible proxies for human bones in forensic research. Defleshed human, kangaroo and pig bones were placed on the ground surface in Australian bushland to collect empirical data relating to deterioration over time. Macroscopically visible changes were recorded. Specifically, these were surface cracking, exposure of trabecular bone, algal growth, plant growth, bleaching, colour changes and remnant soft tissue decay. Some specimens were regularly handled in order to photograph changes and record weights. It has been surmised that the actions of researchers collecting data in forensic fieldwork may impact on the nature of the data. The opportunity was therefore taken to conduct an intervention versus non-intervention study with metacarpals and metatarsals from all three species. One hundred and eighteen bones in total were included, with 70 bones moved on a roughly monthly basis for data collection and 48 bones left undisturbed, in situ, for the duration of the project. No differences were identified in macroscopically visible changes. The percentage of weight lost over 68 months was also examined. There was no pronounced difference in the degree of weight loss between disturbed and undisturbed metacarpals and metatarsals of the same species. In this study human intervention did not appear to affect the data being collected.

Human femur microstructure changes with chronology at Bakr Awa, Iraqi Kurdistan

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Excavations at Bakr Awa (BA), a historically significant archaeological mound in Iraq, have uncovered a rich source of material and skeletal evidence for human occupations dating back to the third millennium BC. We examined BA human remains from a chronological cross-section to test whether behavioural changes through time can be detected in femoral bone tissue microstructure. With

permissions from local Iraqi heritage authorities, posterior femur midshaft cortical bone samples (1 x 2 cm) were extracted and processed into thin sections for n = 13 individuals. The represented time periods were Middle Bronze Age (MBA, n = 4), Iron Age (IA, n = 4), and the Islamic Period (IP, n = 5). Cortical bone Haversian canal geometric properties were collected for a minimum of 86 completed secondary osteons, further corrected by cortical thickness and femoral midshaft circumference. Out of all three periods, the IA samples showed the smallest Haversian canals in combination with the largest femoral midshafts. The MBA samples had the thinnest midshafts with largest Haversian canals. This was consistent when age-at-death and sex were considered. Results indicate that quicker bone remodelling events characterised the IA femora, possibly due to higher mechanical demands associated with farming behaviours at BA. Slower bone remodelling in the MBA samples could relate to more sporadic physical regimes. More recent IP physical activities might have been variable in nature as is reflected in the intermediate bone histology. Confounding factors, including dietary and environmental, are not excluded.

Mighty Minds of Old: An analysis of archaeological brain material in the New Zealand colonial context

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University of Otago

The preservation of soft tissue in the archaeological record is a rare phenomenon, especially in temperate contexts such as New Zealand. Nonetheless, preserved brain material associated with otherwise skeletonized remains has been discovered across a wide range of archaeological contexts globally. 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-nineteenth century. As disease and trauma often affect soft tissue prior to manifestation in the skeletal remains, analysing preserved brain material has potential to better our understanding of the overall health and wellbeing of these early settlers to Otago. In this paper we present the results of macroscopic, microscopic, and chemical analyses used to investigate how well brain material was preserved, identify if there were any indicators of pathology or heavy metal toxin exposure, and understand the taphonomic factors promoting selective brain preservation in Otago, New Zealand.

Predictors of perceived stress in women pregnant during tropical cyclones in Queensland, Australia: Preliminary findings

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Pregnant women are vulnerable to prenatal stressors experienced during severe weather events with an increased risk of preterm births and their children having later life health complications. We assessed predictors of perceived stress in 90 women pregnant during cyclone events affecting Queensland, Australia. Data were captured using an online questionnaire. Perceived stress was measured using the 10 item Perceived Stress Scale while objective hardship and maternal characteristics were captured using validated questions. Hierarchical linear regression was used to introduce predictors across three analysis blocks: sociodemographic factors, mediating factors, and objective hardship. Interactions between predictors were also tested both within and between analysis blocks. No significant association was supported between individual predictors and perceived stress. However, controlling for all main predictors, significant interactions were supported between maternal country of birth and experiences of cyclone ($p = 0.016$) and non-cyclone ($p = 0.021$) objective hardship such that perceived stress increased for mothers not born in Australia who also reported objective hardship. These preliminary findings would support further investigating the role of local history,

knowledge, and experiences in buffering the level of maternal perceived stress. Implementors of disaster risk management strategies, health personnel and researchers need to carefully consider predictors of maternal stress to support the development of targeted research, informed risk reduction protocols, and interventions tailored to the needs of the mothers in areas prone to severe weather events.

The pattern of vertebral osteophyte formation in a Late Iron Age population from northeast Thailand

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This study aims to address the current dearth of research on the impact vertebral osteophytes have on health and mobility of prehistoric people from Southeast Asia. The spinal columns of seventy adults from the late Iron Age (A.D. 300 - 800) site of Non Ban Jak in northeastern Thailand were analysed for the prevalence and severity of osteophytes. Thirty-one adult burials had sufficiently complete spinal columns to be included in the analysis, and of these, nineteen were observed with some degree of osteophytosis. None of the young adults (22.6 % of the sample) showed any signs of osteophytosis. Sixty-nine percent of mid-aged adults were recorded with severity ranging from barely discernible osteophyte development to extensive spicule formation. As expected, prevalence and severity increased with age, with ninety-percent of the older-aged adults showing involvement, and the majority of advanced and severe osteophytosis was experienced in the lower thoracic and lumbar vertebrae. Female vertebrae were more significantly affected by osteophytes than those of males. Males show a regular increase in severity from the cervical region to the lumbar region, with severe grading only seen in lumbar vertebrae, whereas female cervical and lumbar vertebrae are affected by severe osteophytosis. Only one adult, an older aged male, showed the beginnings of ankylosis between several lower thoracic vertebrae. These results provide information on the pattern of osteophytic development that contributes to the overall picture of physical health and lifestyle of prehistoric Southeast Asian populations.

Cleverman, Kow Swamp, and a “robust” debate

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Between 2016 and 2017 the ABC ran a drama series, driven by Aboriginal community members, called Cleverman. The story included a group called ‘hairy people’ who were described as a different species “stronger and hardier than humans, covered in thick facial and body hair, and have tough, sharp fingernails. They also have much longer lifespans.” Inspiration for the ‘hairy people’ is reportedly come from Dreaming Stories.

The idea of a second hominin species being present on the Australian continent is not new to science. It was first suggested in the early 1970s with the hominin remains from Kow Swamp being described as ‘robust’ which were seen to differ from ‘gracile’ remains from Mungo and Keilor. Through the 1990s and early 2000s this idea was dismissed by numerous researchers.

More recently, however; Denisovan, *H. erectus* and/or *H. ergaster* occupation of Indonesia has been found to 117,000 and 108,000 years ago, *Homo floresiensis* has shown another hominin did cross the Wallace Line, further ‘robust’ remains have been identified at Willandra Lakes, there have been claims of human occupation of Australia to 120,000 thousand years ago, further research on mtDNA of Austronesian people, and, as pointed out above, Aboriginal Dreaming Stories being made public by the Cleverman TV show regarding a second hominin species being present in Australia in the past.

This presentation briefly summaries the state of this debate with the new evidence from the last decade, not to form conclusions, but to reignite a discussion on the topic.

Secrets of the stool: Parasitological analysis of pelvic sediment from Colonial Central Otago

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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 easily identify parasitic infection; however, parasitic remains can be identified in preserved faeces or pelvic soil samples using light microscopy. An excavation of Drybread Cemetery in Central Otago has provided an opportunity to undertake the first paleoparasitological analysis on human samples from a New Zealand context. Pelvic sediment samples taken from excavated burials at Drybread Cemetery were analysed for the presence of intestinal parasites. The results of this study suggest that individuals from Drybread may have received treatment for worms in their lifetime, or perhaps that parasitological techniques in New Zealand need to be improved.

Migration, cosmopolitanism, and trade in a land of palm gardens: What do strontium results contribute to our understanding of "locals" and "non-locals" in ancient Bahrain?

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Insight into the movement of peoples, animals, and goods across long-established regional trade networks in the Arabian Gulf has relied on strontium isotope analysis of human and faunal bones and teeth. These data have been used to test hypotheses regarding changing social organization and the increasing movement of people related to the intensification of trade activities. While Bahrain was a part of this pan-Gulf trade network for thousands of years, only a few strontium samples from Bahrain have been analysed as comparative material for other studies in the Gulf. We use strontium analysis to investigate childhood residence in several different communities in Bahrain, spanning 4,000 years and from different urban and rural contexts.

We analysed 74 human and 7 faunal teeth from Bahrain, including multiple teeth for 17 human individuals. While most of the individuals analysed were born and interred in Bahrain, over a third of the individuals (n=13) analysed from the Islamic site of Qal'at al-Bahrain (QAB) had spent at least part of their childhood elsewhere. All were male. Despite the movement of these men to Bahrain during childhood or young adulthood, they were buried in the local village cemetery with no difference in burial style to the other occupants. We argue that this movement of young men reflects the active role of the harbour and trade outposts at QAB, the gendered nature of mobility, and the rise of cosmopolitanism which historically has been a defining characteristic of the Bahrain Islands.

Unprecedented metal exposures suggest childhood resilience in European Early Industrialists

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Assessments of elemental chemistry in teeth using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) provide longitudinal developmental records of dietary behavior, health, and environmental metal exposure [1]. Here we document a remarkable record of trace metals barium, lead, strontium, and uranium in the enamel, dentine, and cementum of five individuals' molars. These 11 – 50 year-old Romanian and Hungarian individuals died in a Bucharest Hospital in the 1930s, after which their skeletal remains were housed in an institute established by the pioneering anatomist and anthropologist Francisc Rainer. All individuals showed variable elevated calcium-normalized barium (Ba/Ca) bands for several years beyond likely weaning ages, which may relate to regional petroleum mining and/or enriched drinking water. Elevated lead exposures were common in the first ~10 – 15 years of life for all individuals, with higher concentrations in cementum formed at later ages. Calcium-normalized strontium (Sr/Ca) patterns were more variable among individuals, but a hypothesized decrease in strontium absorption due to gastrointestinal maturation was not evident in first or second molar roots. Finally, we report the first biogenic patterns of the naturally radiogenic element uranium in tooth dentine, occurring prior to the era when the deleterious effects of radiation were broadly understood. Individuals' low socioeconomic status may have contributed to heightened exposures to industrial or metallurgical pollutants, although this was not evident from the morphology of their teeth.

[1] Smith, T. M. et al. (2021). Teeth reveal juvenile diet, health and neurotoxicant exposure retrospectively: What biological rhythms and chemical records tell us. BioEssays, e2000298.

High Canopy Life: Ape behaviour and space use in an innovative captive setting

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In March 2020, apes at Auckland Zoo were introduced to an innovative new enclosure designed to improve their welfare and encourage species-typical behaviours. Over time, it will be important to monitor the efficacy of the enriched habitat and evaluate the apes' use of the enclosure's innovative features, including a network of 20-25m high aerial rope pathways. The goal of my research was to create a behavioural baseline for three orangutan - two Bornean (*Pongo pygmaeus*) and one Sumatran/Bornean hybrid (*Pongo pygmaeus x abelii*) - and two siamang gibbon (*Symphalangus syndactylus*) housed within this new enclosure. I used a mix of focal animal follows and scan sampling to create activity budgets and space use profiles by recording individual and social behaviours, as well as patterns of space use. Overall, when compared with wild conspecifics, the apes at Auckland Zoo spent increased time resting and decreased time eating and travelling. The observed patterns align more closely with other highly managed environments than with patterns of ape behaviour found in non-captive settings. Space use profiles for both species reflect preference for the lower levels of the enclosure (ground and low canopy), and/or a sensitivity to human-centred elements. Comparisons with data from wild-counterparts are still prevalent in the literature. However, benchmarking behaviour in this way misses important nuances of the captive environment, including husbandry routines and stable social compositions. Given that all apes demonstrate a degree of behavioural flexibility, the activity levels and space-use preferences of captive individuals may not signal reduced welfare in all instances.

Histomorphometry of paired secondary osteons and Haversian canals in modern human femoral cortical bone

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Previous histomorphometric research found relationships between paired secondary osteons and Haversian canals in the human rib cortex. However, to what extent these histology measures reflect remodeling in the femur, a biomechanically variable bone, has not been investigated. We tested for links between secondary osteon area (On.Ar), perimeter (On.Pm), Haversian canal area (H.Ar), perimeter (H.Pm), and bone area (B.Ar = On.Ar–H.Ar). Indices of (1) H.Pm/B.Ar ratio, (2) fraction of H.Ar (H.Ar/On.Ar), and (3) fraction of B.Ar (B.Ar/On.Ar) were then calculated.

Samples were taken from the anterior right femur of 16 individuals donated to the Australian Facility of Taphonomic Experimental Research, and made into thin sections. Four regions of interest (ROI) totaling 7.88mm2 of cortical bone were observed for each individual. A total of 397 paired intact secondary osteons and their paired Haversian canals were measured and analysed using ImageJ. Bonferroni corrections to multiple testing were applied.

We found (1) a large variation in On.Ar (0.003-0.129mm2), but lesser variation in B.Ar/On.Ar (0.434-0.997), (2) positive relationships between On.Ar and H.Ar ($r=0.598$, $p<0.001$) and H.Pm ($r=0.610$, $p<0.001$), (3) but negative relationships between On.Ar and the H.Pm/B.Ar ratio ($r=-0.504$, $p<0.001$), and (4) that 89.4% of the observed osteons fall into the average range of 0.02-0.07mm2.

Our results agree with similar research on human rib cortical bone, despite known differences in stimulation from biomechanical loading and rates of bone metabolism. This could imply that despite these differences, constraints on secondary osteon and Haversian canal size in human cortical bone are similar. Further research is required.

Extracting the Truth: Reconstructing sex, childhood diet and residency of four people who visited the dentist in Invercargill between 1881-1894

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The study of teeth can help determine sex and provides insight into mobility, maternal and infant health, and aspects of weaning and childhood diet. In 2019, a cache of more than 230 teeth was excavated from Dee Street, Invercargill, where four dentists were known to practice between 1881-1894. As these teeth were dental extractions during life, these give us unique insight into the health, diet and childhood place of residence of living people at the time of tooth extraction. The aim of this study is to understand life histories of people who underwent dental extractions in colonial Southland. A multi-method approach was used to reconstruct four peoples' early lives from analyses of their first molars, an early forming tooth. There are four objectives to meet this aim: 1) determine sex through analysing enamel peptides; 2) assess childhood diet through dietary isotope analysis; 3) compare two micro-sampling methods: dentine serial sections and newly developed dentine micro-punch sampling, as it may be a more accurate and less destructive method; and 4) assess childhood residency using migratory isotope analysis. Of the four historic individuals, three were male, and one was female, with their diet predominately C3, with evidence for weaning identified in one historic individual. All individuals had isotopic signatures suggesting childhood residence in Aotearoa. Through comparison of isotopic dietary and migratory data of previous bioarchaeological studies of Victorian era South Island, a picture of these individuals as lower-class members of a growing colonial centre emerges.

Did we get tuberculosis from seals? Using ancient DNA to analyse *M. tuberculosis* in bioarchaeological remains from the Pacific region

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Despite the antiquity of tuberculosis, many questions about its evolutionary history remain unanswered. One of these questions is how and when tuberculosis arrived in the Pacific. Historical records and extant tuberculosis strains in the Pacific indicate that tuberculosis was introduced by Europeans in the 18th-19th centuries. However, pre-European skeletal evidence from several archaeological sites across the Pacific challenges this theory. A new hypothesis suggests that early tuberculosis was introduced by pinnipeds and subsequently jumped host. Both modern and ancient cases of seal-to-human transmission are known, and archaeological evidence shows us that people were processing seals in the Pacific, where they were present. How tuberculosis would have spread across the wider Pacific is unclear.

With advanced DNA technologies, this study attempts to confirm the presence of *Mycobacterium tuberculosis* in pre-European Pacific populations. Human bone samples were selected based on the presence of tuberculosis-like skeletal lesions, and originate from three different localities (Papua New Guinea, Vanuatu, and Aotearoa New Zealand), and represent a variety of ages (new-born, subadult, and adult), sex, and time periods (2800 - 750 BP). We use different approaches to screen for tuberculosis, including PCR assays, metagenomic shotgun sequencing, and hybridization capture. The authenticity of ancient tuberculosis DNA is assessed with bioinformatic tools using three criteria, including evenness of coverage, percent identity and haploidy. We will discuss our preliminary results that indicate highly fragmented bacterial DNA resembling tuberculosis species in some of the individuals.

Infancy, disability and care during the Edo Period of Japan

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The Edo Period (17th-19th Century) was the last samurai period of Japan. This period was one of strict hierarchy and increased urbanization with detrimental effects to the health of the lower classes. Historical references to the lower classes tend to be biased by Buddhist thought that poverty was brought upon by ill acts and was therefore deserved. Additionally, very little is written about childhood in this period. This research presents a case study of an infant (~6 months old) from Ikenohata, Edo (modern day Tokyo) with disability to investigate social contexts of care in Edo Period common townsfolk. While we do explore possible diagnosis, in this research we emphasise the infant's impairment and the subsequent accommodation required for their survival to this age. Skeletal evidence for severe congenital abnormality includes combination of brachio- and macrocephaly, hydrocephaly, diffuse osteosclerosis, growth stunting and fusion of the occiput to the C1. The abnormalities would have been strikingly clear at birth. The partial atlanto-occipital fusion in association with their enlarged head would have made breastfeeding and handling of the infant difficult. While the infant's small size would have made carrying easier in comparison to a disabled adult, the osteosclerosis and poor mineralisation of their bones may have been exceptionally painful, and fractures would have occurred relatively easily. Nevertheless, this child was kept alive and buried with

care in the Ikenohata cemetery. This infant's survival stands as a stark contrast to an overstated emphasis in the historical field on infanticide in the Edo lower classes.

Exploring ethical and pedagogical best practice in biological anthropology throughout the COVID-19 research 'pivot'

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Biological anthropological research is typically conducted through the in-person study of humans and their ancestors. This research is crucial for addressing questions around human biology, society, and culture. However, the ongoing COVID-19 pandemic has resulted in unprecedented difficulties in conducting practical research, inspiring researchers to turn inwards and explore fundamental elements of our discipline including ethical and educational best practice. Although ethical best practice forms the basis of how we interact with the world while conducting research, and education underpins the future of discipline, these areas of our practice have typically been neglected in favour of novel data production. The disruption created by COVID-19 can therefore be seen as a time of reflection and renewal, allowing us to consider where we have been and where we are going, and permitting us to adjust our 'settings' for practice accordingly. We introduce three projects that have formed during this 'pause and reset' space. The first is the 'Gendering the Dead' Project, which aims to explore the ethics of applying gender to the dead. The second project focuses on educational enhancement by rethinking perceptions around online practical laboratory practicals. The third case study, the 'Living on the Edge Thai Bioarchaeology' project, fuses both an educational and ethical focus by exploring areas for improvement in online teaching via an educational outreach programme. Through harnessing the COVID-19 research 'pivot' and repurposing it towards reflexivity, these projects demonstrate resilience and adaptation in anthropology. The findings of these projects may empower researchers in the future.

The proposed reburial of the World Heritage ancestral remains and the case for the keeping place

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The Willandra Lakes ancestral remains represents the largest series of modern people dating to the Pleistocene period outside of Africa. The story of these ancient people played a key role in the Willandra's inscription as Australia's first World Heritage site in 1981. The ancestral remains represent a significant part of the Outstanding Universal Values of the World Heritage Area.

The NSW government in recent years has pushed for the reburial of the ancestral remains through a process that many Aboriginal people have claimed in the national press has not enabled proper consultation with Traditional Owners. Expertise in biological anthropology has not been incorporated in the workshops that discussed the reburial. The Federal Minister for the Environment did not approve the State's proposal to rebury the ancestral remains and requested further consultation be undertaken. The State Minister for the Environment in his latest call for public comment has once again raised the keeping place as an option to be considered.

It is difficult to calculate the potential loss if the ancestral remains are reburied and the keeping place obviously provides a future for the ancestors to continue to inform the Willandra story. As one

prominent Elder put it the keeping place will allow us to 'explain to the rest of the world ...how long they have been there'. I will highlight what could be gained from research from the ancestral remains of the Willandra, particularly if research is undertaken in a collaborative nature that engages with Traditional Owners and helps build capacity for Traditional Owners to be the primary storytellers of this narrative.

Gone but not forgotten: The ongoing story of finding 'Harry'

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The sinking of HMS *Pandora* occurred in 1791 after striking a coral reef off the northern coast of Australia, but the wreck and its contents remained suspended in time until its discovery in 1977. Over the course of the last few decades the historical research and archaeological investigations of Pandora have provided a wealth of information and artefacts providing insight into the vessel's historical journey, and the crew and mutineers on board. One of the most intriguing and unexpected discoveries during the excavations were the skeletonised remains of three individuals found below the deck, who were subsequently nicknamed 'Tom', 'Dick' and 'Harry'. An osteological evaluation of the remains was published by Steptoe and Wood in 2002,

which mentioned several infectious and nutritional diseases the individuals may have suffered. This presentation focuses on one of the three individuals, a young man with very distinctive facial features.

Following a re-examination of the remains, which are housed at the Museum of Tropical Queensland (MTQ) in Townsville, a differential diagnosis was developed exploring possible explanations for the condition and diseases he may have suffered as comorbidities. This process has led us one step closer to identifying which of the crew the individual may have been, and hopefully future avenues of research focusing on strontium isotopes ($^{87}Sr/^{86}Sr$) in his enamel may be able to narrow down and identify who he really was and his real name.