Please note: This event should be referred to as the 1st eCAPA-ACAP annual meeting.

This change has been made since the initial publication of the program. Older versions of the program may refer to this event, the 2020 annual meeting, as the 48th.

Complications arising from the Covid-19 pandemic caused consecutive meeting numbers to only apply to in-person and hybrid events. The 2019 annual meeting was the 47th, the 2020 virtual meeting was the "1st eCAPA-ACAP", the 2021 meeting was the 48th, and the 2022 annual meeting will be the 49th

eCAPA-ACAP 2020

NOVEMBER 4-6, 2020

CONFERENCE PROGRAM

Welcome

It is our great pleasure to welcome you to the 1st virtual Annual Meeting of the Canadian Association for Physical Anthropology / L'Association Canadienne d'Anthropologie Physique. This is the first virtual annual meeting in our history. It's been an unprecedented year of change for all of us, and we are delighted to have this opportunity to come together to support one another as scholars and friends.

At last count more than 250 of you have registered for this year's conference, including many students who are experiencing the science and collegiality of our annual meeting for the first time. We gratefully acknowledge the organizers of the Undergraduate and Graduate Student Luncheons and, in particular, the generosity of the luncheon speakers who have taken time from their busy schedules to contribute to these events.

We are pleased to present a program of 8 symposia, 79 podium presentations and 24 poster presentations representing the breadth and innovation of Canadian research in biological anthropology. This year we also feature a special symposium focusing on actions to advance equity and inclusivity within our organization and in society as a whole.

We hope you enjoy this Annual Meeting and we look forward to an exciting and informative event!

- The Organizing Committee for eCAPA-ACAP 2020

Acknowledgement of Lands

While we meet today on a virtual platform, we would like to take a moment to acknowledge the land which we each call home. We do this to reaffirm our commitment and our responsibility to improving relationships between nations and to improving our own understandings of Indigenous peoples and their cultures.

From coast to coast to coast, we acknowledge the ancestral and unceded territory of the Inuit, Metis and First Nations peoples that call this land home. Please take a moment of reflection to acknowledge the harms and mistakes of the past and to consider how we can each, in our own way, try to move forward in a spirit of reconciliation and collaboration.

(Adapted from A Guide to Acknowledging First Peoples and Traditional Lands, Engineers Canada, June 2020. https://engineerscanada.ca/sites/default/files/diversity/land-acknowledgements-guide.pdf)

GETTING AROUND THE VIRTUAL CONFERENCE EVENTS

PLEASE NOTE THAT THE PROGRAM IS SET IN CENTRAL STANDARD TIME. A TIME ZONE CALCULATOR CAN ASSIST YOU TO FIND THE CORRECT TIME TO SIGN ON TO CONFERENCE SYMPOSIA AND EVENTS.

One way to participate in this year's conference is through **A ZOOM ACCOUNT.** Those of you with existing accounts or educational licenses through your home institutions can log on through those accounts. Those of you without can sign up for a free account here. **Use your full name** so that meeting hosts can identify you as registered conference attendees and admit you to and from waiting and breakout rooms. Please ensure your version of the Zoom software is the latest available.

If you haven't participated in a Zoom meeting before, some basic best practices for meeting participants include:

- Please join synchronous meetings 10-15 minutes early, to give hosts time to admit you from waiting rooms.
- Keep yourself on mute, and un-mute yourself only when you are speaking
- Enable video during discussions to help give a 'face to face' interaction, though you may wish to turn your video off if you need to step away from your computer
- Familiarize yourself with Zoom features such as the Chat, Polling, Thumbs Up, Raise Hand, and Lower Hand options.

Another way to participate in conference activities is by using **GATHER.** Here is the link to the conference's custimized Gather space. The password to enter the space is "eCAPA". *Remember, since the intellectual property of conference participants is shared in this space, the conference Gather space is for Registered Attendees only.* Please do not share login and passwords with people who are not registered attendees. Use your full name so that other conference-goers can identify you and choose your favorite avatar. Use the arrow keys on your device to move around and explore the conference! Gather works best on Chrome or Firefox.

Gather town enables social interaction that is much different than the more formal structure of Zoom meetings. Here's a short video so you can see how it works. Gather will be used for many of the conference's social events, including the opening and closing receptions and the much-awaited Trivia Event, sure to be a highlight of the meeting. Plus, all of the asynchronous presentations can be viewed on Gather and the various synchronous sessions can be accessed using the specified Zoom links on the site. Feel free to also explore the Bar, the Lounge, and the Beach when you need a break from the conference.

SYNCHRONOUS SYMPOSIA will proceed according to the timetable provided in the program. Zoom meeting links will be provided for each symposium. You may enter and leave the Zoom meeting space at any time, or join available breakout rooms to discuss topics or presentations as they arise. **Conference presenters and participants should be aware that all symposia Zoom meetings will be automatically recorded.** Live links to the recordings will remain available for 30 days after the event, to permit registrants to view any synchronous content they missed.

ASYNCHRONOUS PODIUM PRESENTATIONS AND POSTERS will become available through live links once the program is finalized. These will remain live for the duration of the conference and for 30 days after the event.

TECHNICAL SUPPORT for all conference functions is available from 9:00 am to 5:00 pm Central Time and on an on-call basis after-hours. To access technical support for Zoom meetings:

- If you experience sudden interruptions or termination of a Zoom meeting, simply login again using the same link. Live links will be updated regularly within the conference program posted on the CAPA-ACAP website. Login regularly to ensure you are using the latest version of the program.
- Contact one of the meeting Co-hosts listed in the conference program using the Chat function on Zoom.
- Contact Lead Technician Scott Reynolds (s.reynolds@utoronto.ca), or Muzammal Kharal (muzammal.kharal@utoronto.ca) via email.
- Users affiliated with the University of Toronto can contact Lead Technician Scott Reynolds or Technician Muzammal Kharal using the chat function of Microsoft Teams.
- To access technical support with Gather functions, contact support@gather.town.
- For other questions or concerns, you may contact tracey.galloway@utoronto.ca at any time during the conference.

CHILD CARE COSTS: We are also pleased to offer support for child care costs during the conference in the amount of $50/day to registered participants who provide receipts for formal or informal child care services. Funds will be provided on a first-come, first-served basis until the pool of funds is exhausted. Please contact tracey.galloway@utoronto.ca for more information on child care support.

PRIVACY, INTELLECTUAL PROPERTY, AND ONLINE SAFETY: Please be aware that online meeting software such as Zoom uses participants' cameras and therefore may disclose personal information about the user's home environment. Please be conscious of this and take measures such as disabling your video and microphone functions prior to entering the meeting. CAPA-ACAP member Katie Brent, talented designer of the conference logo, has provided Zoom meeting backdrops for conference participants wishing to use them.

PLEASE BE AWARE THAT, AS IN ALL SCHOLARLY CONFERENCE SETTINGS, POSTERS, SLIDE SHOWS AND RECORDINGS ARE INTELLECTUAL PROPERTY OF THE PRESENTER AND SHOULD NOT BE DISTRIBUTED WITHOUT THEIR PRIOR CONSENT AND APPROVAL. Please do not distribute the conference program or live links through personal email or social media. This protects conference meeting hosts and participants from unwanted intrusions or disruptions.

Please treat online interactions with the same courtesy you would an in-person interaction. All online behaviour should be aligned with the CAPA-ACAP Code of Ethics. Conference attendees wishing to report safety concerns may contact one of our ***eCAPA-ACAP 2020 Safety Volunteers***, who will report your concerns anonymously to conference organizers:

eCAPA-ACAP 2020 SAFETY VOLUNTEERS Dr. Laure Spake laure.spake@otago.ac.nz
Lisa Semchuk lisa.semchuk@gmail.com

A virtual conference can be a learning curve for everyone - we understand if there are unforeseen technical difficulties, glitches, or guest appearances from family, pets, or other members of your household on screen.

THE ORGANIZING COMMITTEE FOR ECAPA-ACAP 2020

CO-CHAIRS

Tracey Galloway, Laure Spake

SCIENTIFIC PROGRAM COMMITTEE

Mirjana Roksandic, Chair
Katherine Brent
James K. Gibb
Courtneay Hopper
Florence Landry
Linda Larcombe
Andrew Nelson
Elizabeth Hydesmith
Elizabeth Sawchuk
Rachel Simpson
Matt Tocheri

PLANNING COMMITTEE

Katherine Brent
David Cooper
Sandra Garvie-Lok
James K. Gibb
Lesley Harrington
Courtneay Hopper
Elizabeth Hydesmith
Helen Kurki
Florence Landry
Ming Fei Li
Anureet Lotay
Alexandra Mackay
Alison Macintosh
Madeleine Mant
Andrew Nelson
Joseph Parish
Mirjana Roksandic
Elizabeth Sawchuk
Lisa Semchuk
Rachel Simpson
Treena Swanston
Matt Tocheri
Tamara Varney
Bence Viola

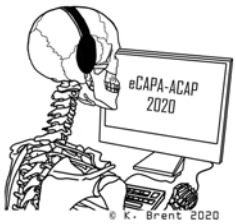
SPONSORS

Office of the Vice-Principal Research, University of Toronto Mississauga
Department of Anthropology, University of Toronto Mississauga
Collaborative Digital Research Space, University of Toronto Mississauga
Faculty of Social Sciences, Western University
Faculty of Science & Environmental Studies, Lakehead University
Dr. Andrew Nelson, Department of Anthropology, Western University
Dr. Mirjana Roksandic, Department of Anthropology, University of Winnipeg
Dr. Matt Tocheri, Department of Anthropology, Lakehead University
Dr. Tracey Galloway, Department of Anthropology, University of Toronto
Members of the CAPA/ACAP
Registrants of eCAPA/ACAP 2020

eCAPA-ACAP 2020

PROGRAM-AT-A-GLANCE

PLEASE NOTE: ALL TIMES ARE IN CENTRAL STANDARD TIME



eCAPA-ACAP 2020
PROGRAM

PLEASE NOTE: ALL TIMES ARE IN CENTRAL STANDARD TIME. PRESENTATIONS MARKED WITH AN ASTERISK* ARE ENTERED IN THE STUDENT AWARDS COMPETITION.

WEDNESDAY, NOVEMBER 4TH

9:00 AM - 12:00 PM SESSION 1 – INVITED SYMPOSIUM: HOLOCENE BIOARCHAEOLOGY AT LIANG BUA (FLORES, INDONESIA): WHEN AND HOW PAST MODERN HUMAN POPULATIONS SHIFTED FROM FORAGING TO FARMING IN EASTERN INDONESIA [GATHER]

Palaeoanthropological Society of Canada
Société canadienne de paléoanthropologie

SPONSORED BY SSHRC INSIGHT GRANT TO M. TOCHERI (NO. 435-2017-1234) AND PASC/SCPA

ORGANIZER AND CHAIR: DR. MATT TOCHERI

Liang Bua is best known as the type site of *Homo floresiensis*, an extinct hominin species that vanished from the cave's archaeological record ~60 to 50 thousand years ago. However, Liang Bua also preserves a rich and relatively complete Holocene archaeological sequence that offers an unprecedented opportunity to examine modern human *(Homo sapiens)* cultural change through time, particularly the timing and nature of the complex transition of subsistence patterns from foraging to farming. The origins and spread of agriculture in Island Southeast Asia have been a source of longstanding inquiry and debate, but Liang Bua is relatively unique in that it preserves evidence before, during, and after this transition.

This session will bring together researchers whose work explores various aspects of this body of archaeological and bioarchaeological evidence at Liang Bua and its implications for understanding human dispersals and cultural diffusion throughout Island Southeast Asia during the Holocene.

ASYNCHRONOUS 5-MINUTE PRESENTATIONS

- Julianto IMA, Sutikna T, Jatmiko, Faith JT, Tocheri MW. The temporal distribution of pottery and aquatic shellfish in the Holocene deposits at Liang Bua indicates major shifts in modern human behaviour through time. [Abstract] [Presentation]
- Oliveira S, Pugach I, Hubner A, Essel E, Hajdinjak M, Jatmiko, Sutikna T, Wahyu Saptomo E, Tocheri MW, Meyer M, Stoneking M. Human genetic variation across the Holocene at Liang Bua. [Abstract] [Presentation]
- Tocheri MW, Sutikna T, Faith JT, Jatmiko, France C, Dupras TL. The onset of farming on Flores by at least ~2,700 years ago and the implications for Austronesian cultural history and dispersal. [Abstract] [Presentation]

- Sutikna T, Faith JT, Jatmiko, Wahyu Saptomo E, Tocheri MW. Faunal change through the Holocene at Liang Bua: Endemic versus introduced mammals. [Abstract] [Presentation]
- Evans BJ, Gansauge M-T, Tocheri MW, Schillaci MA, Sutikna T, Jatmiko, Wahyu Saptomo E, Klegarth A, Tosi AJ, Melnick DJ, Meyer M. Comparative mitogenomics of prehistoric longtail macaques (*Macaca fascicularis*) from Liang Bua (Flores, Indonesia): Implications for understanding of past modern human dispersals. [Abstract] [Presentation]
- Alamsyah N, Munizzi JS, Tocheri MW, Metcalfe J, Dupras TL. Nitrogen stable isotope analysis of Holocene pigs and modern humans from Liang Bua. [Abstract] [Presentation]
- Meijer HJM, Walker SJ, Jatmiko, Wahyu Saptomo E. Have fowl, will travel: Chickens and the transition to farming at Liang Bua, Flores. [Abstract] [Presentation]
- *Eber A, Veatch EG, Tocheri MW. 2D geometric morphometrics analysis of Liang Bua rat taxa. [Abstract] [Presentation]
- Veatch EG, Jatmiko, Wahyu Saptomo E. Zooarchaeology at Liang Bua: Anthropogenic traces of human subsistence on small mammals. [Abstract] [Presentation]
- Lin SC, Jatmiko, Julianto IMA, Ferdianto A, Sutikna T. Stone artefact assemblage composition as a proxy for changing Holocene land use practices at Liang Bua. [Abstract] [Presentation]

12:00 – 1:00 PM UNDERGRADUATE STUDENT LUNCHEON [ZOOM]

CHAIRS: DR. SANDRA GARVIE-LOK, DR. TREENA SWANSTON, KATIE BRENT, LAURE SPAKE, MING FEI LI

12:00 - 1:00 PM HEALTH BREAK [GATHER]

12:00 – 12:15 PM STUDENT PRESENTATION JUDGING [ZOOM]

CO-HOSTS: CARLY CHECHOLIK, DARCI BELMORE

- *Eber A, Veatch EG, Tocheri MW. 2D geometric morphometrics analysis of Liang Bua rat taxa. [Abstract] [Presentation]

1:00 - 5:00 PM SESSION 2 – INVITED SYMPOSIUM: PALEOANTHROPOLOGICAL SOCIETY OF CANADA / SOCIÉTÉ CANADIENNE DE PALÉOANTHROPOLOGIE (PASC/SCPA) [ZOOM]

Palaeoanthropological Society of Canada
Société canadienne de paléoanthropologie

SPONSORED BY NSERC DISCOVERY GRANT TO M. ROKSANDIC (RGPIN-2019-04113) AND PASC/SCPA

ORGANIZER AND CHAIR: DR. MIRJANA ROKSANDIC

Update on research projects by Canadian scholars, members of the Palaeoanthropology Society of Canada/ Société canadienne de paléoanthropologie (PASC/SCPA) and their students. This forum is meant for the exchange of ideas by scholars and students of human evolution in its most encompassing meaning: including the study of primates, environment, tools, morphology and ancient DNA. In addition to presentations and posters, the forum will feature short research updates.

Synchronous Presentations

Co-hosts: Dr. Mirjana Roksandic, Josh Lindal

1:00 - 1:15 pm — Dewar G, Stewart BA, Zhao Y, Mitchell PJ, Gleason JD, Blum JD. Ostrich eggshell bead strontium isotopes reveal persistent macroscale social networking across late Quaternary southern Africa. [Abstract]

1:15 - 1:30 pm — Mercader J, Akuku P, Boivin N, Bugumba R, Bushozi P, Camacho A, Carter T, Clarke S, Cueva-Temprana A, Durkin P, Favreau J, Fella K, Haberle S, Hubbard S, Inwood J, Itambu M, Koromo S, Lee P, Mohammed A, Mwambwiga A, Olesilau L, Patalano R, Roberts P, Rule S, Saladie P, Siljedal G, Soto M, Umbsaar J, Petraglia M. Hominin Ecology of the Early Oldowan 2 Ma. [Abstract]

1:30 - 1:45 pm — Nowell A, French JC. Adolescence and innovation in the European Upper Paleolithic. [Abstract]

1:45 - 2:00 pm — Riel-Salvatore J, Lythe A. New data on Early Holocene funerary practices at Ganj Dareh (Iran). [Abstract]

2:00 - 2:30 PM — Health Break [Gather]

2:00 – 2:30 PM — Student Presentation Judging [Zoom]

Co-Chairs: Carly Checholik, Darci Belmore

- *Appelt CM, Van Ankum EM, Marchiori DF, Boughner JC. Cell processes underpinning the evolution of primate dental form and formula. [Abstract] [Presentation]
- *Friesen SE, Knigge RP, Tocheri MW. Three-dimensional geometric morphometric analysis of talar and medial cuneiform shape variation in chimpanzees and bonobos. [Abstract] [Presentation]
- *Nelson J, Holland E, Harrington L, Cardoso HFV. Do the regions of the spinal column record stress differently? An analysis of growth stunting in the vertebral neural canal. [Abstract] [Poster]

Synchronous Presentations (continued)

Co-hosts: Dr. Mirjana Roksandic, Josh Lindal

2:30 - 2:45 pm — Schroeder L, Scott JE, Robinson CA, von Cramon-Taubadel N. The evolution of the human chin: A quantitative genetics perspective. [Abstract]

2:45 - 3:00 pm — Komza K, Viola TB, Netten T, Schroeder L. Morphological integration in the hominoid midfoot. [Abstract]

3:00 - 3:15 pm — Willoughby PR. The Stone Age archaeology of Iringa Region, southern Tanzania. [Abstract]

3:15 - 3:30 pm — Boughner JC, Marchiori DF, Packota GV. Unexpected variation in molar size patterns in contemporary humans, including among wisdom teeth regardless of impaction. [Abstract]

3:30 – 4:00 PM — Health Break [Gather]

Synchronous Presentations (continued)

Co-hosts: Dr. Mirjana Roksandic, Josh Lindal

4:00 – 4:15 pm — Duke H, Feibel C, Sonia Harmand S. Bifacial strategies before the Early Acheulean: new evidence from Kokiselei 6, West Turkana, Kenya 1.8 Ma. [Abstract]

4:15 – 4:30 pm	Chazan M. If not base camps then what? Perspectives on *Homo erectus* mobility/territoriality and social organization from Wonderwerk Cave and the Kathu Complex [Abstract]
4:30 - 4:35 pm	Roksandic M, Lindal J, Radović P, Mihailović D. New hominin finds from Velika Balanica and Kozja Cave, Serbia. [Abstract]
4:35 - 5:00 pm	Discussion

Asynchronous 15-minute Presentations

- *Appelt CM, Van Ankum EM, Marchiori DF, Boughner JC. Cell processes underpinning the evolution of primate dental form and formula. [Abstract] [Presentation]
- Vallerand A. L'organisation spatiale: Analyse quantitative et comparative des *Homo sapiens* et des Néandertaliens au site de Riparo Bombrini (Ligurie, Italie). [Abstract] [Presentation]
- Brun C, Riel-Salvatore J, Gravel-Miguel C. Les pratiques funéraires durant le Mésolithique ancien: l'exemple de la sépulture de l'enfant de l'Arma Veirana. [Abstract] [Presentation]

Asynchronous 5-minute Presentations

- *Friesen SE, Knigge RP, Tocheri MW. Three-dimensional geometric morphometric analysis of talar and medial cuneiform shape variation in chimpanzees and bonobos. [Abstract] [Presentation]

Asynchronous Poster Presentation

- Mackereth EM, Tocheri MW. 3D geometric morphometric analysis of the trapezoid in extant great apes and humans as well as fossil hominins. [Abstract] [Poster]

5:00 - 6:00 PM Health Break [GATHER]

6:00 - 10:00 PM Opening Night Social Time [GATHER]

Thursday, November 5th

9:00 AM - 12:00 PM Session 3 – Invited Symposium: Lessons from Yesterday: Incorporating the Past into Understandings of the Present [ZOOM]

Organizers and Chairs: Dr. Madeleine Mant, Dr. Alyson Jaagumagi Holland

What lessons from the past persist into our understanding of the present? When the COVID-19 outbreak was first declared a pandemic, media outlets repeatedly asked: what can we learn from the past? Comparisons were made to the 1918 influenza pandemic and polio, where the specters of these "forgotten" pandemics were repeatedly raised in an effort to reduce fear, disseminate coping mechanisms, and learn from past events. What has emerged from this attempt to contextualize and normalize this seemingly unprecedented event are wide spread discussions of collective remembering and forgetting. As anthropologists, our focus often turns to the past, studying traces of past lives found in skeletons, archival records, and oral histories. This focus places our discipline in an important position to understand how past interactions with disease and illness, movement and occupation, can influence our understanding of current and future events.

The proposed presentations delve into the potential lessons to be learned about current health and illness from genetics and life history theory with the specific example of smallpox vaccine strains sequenced from American Civil War-era vaccination kits. The session will ask: what can present-day trauma registries learn from

bioarchaeological trauma research? What are the effects on living descendants when a fallen soldier ancestor is identified through forensic anthropology? How does the legacy of the Indian Hospital System in Canada affect the health of Indigenous people today? This session will also use COVID-19 as a framing device as presenters consider education in eras of infection, historical precedents for the public health measures being invoked in New Zealand, young adult perceptions of disease risk and health behaviours, and the daily operations of paramedics –front line workers in the fight against the current pandemic.

This session aims to bring together researchers whose work explores how the past comes to influence our understanding of the present. We will highlight the perspectives of students of anthropology and medicine, emerging researchers, and established scholars from institutions across Canada. Our goal is to engender discussion surrounding what lessons from the past persist in the present and how we can best engage with varied stakeholders to amplify previously marginalized voices.

Synchronous Presentations

Co-hosts: Dr. Madeleine Mant, Dr. Alyson Jaagumagi Holland, Elizabeth Hydesmith

9:00 - 9:15 am	Duggan AT, Poinar HN, Klunk J, Porter AF, Dhody AN, Hicks R, Smith GL, Humphreys M, McCollum AM, Davidson WB, Wilkins K, Li Y, Burke A, Polasky H, Flanders L, Poinar D, Raphenya AR, Lau TTY, Alcock B, McArthur AG, Golding GB, Holmes EC. Lab coats amongst the archives: Genomic resuscitation of Civil War vaccine strains from historical artefacts. [Abstract]
9:15 - 9:30 am	Stock JT. Skeletal phenotypes and life history theory: Ancient clues to interpret modern health and disease. [Abstract]
9:30 - 9:45 am	*Hogan JL, Mant M. Broken record: Informing contemporary trauma registries by asking questions of the past. [Abstract]
9:45 - 10:00 am	Lockyer S. The legacy of Canadian soldiers killed in action during the First and Second World Wars. [Abstract]

10:00 - 10:30 AM Health Break [GATHER]

Synchronous Presentations (Continued)

Co-hosts: Dr. Madeleine Mant, Dr. Alyson Jaagumagi Holland, Elizabeth Hydesmith

10:30 - 10:45 am	Mant M, Abonyi S, Hackett P. Dynevor Indian Hospital (1908-1934): Historical trauma, tuberculosis, and persistent colonial legacy. [Abstract]
10:45 - 11:00 am	Burke S. Apples, oranges, and lunch boxes: Education in eras of infection – the case of tuberculosis versus COVID-19. [Abstract]
11:00 - 11:15 am	Holland AH, Prine A, Mant M. Unprecedented? Young adult conceptions of COVID-19. [Abstract]
11:15 - 11:30 am	Oliphant A, Nouvet E, Faulds C, Bengall S. Paramedics, power, politics and precaution: Lessons from SARS and COVID-19. [Abstract]
11:30 am - 12:30 pm	Discussion

Asynchronous 15-minute Presentations

- Battles H. Historical touchstones during COVID-19 in Aotearoa New Zealand. [Abstract] [Presentation]

12:30 - 1:30 PM Health Break [GATHER]

1:30 - 3:00 PM SESSION 4 – GENERAL SESSION: RESEARCH IN HUMAN BIOLOGY [ZOOM]

CHAIR: JAMES K. GIBB

SYNCHRONOUS PRESENTATIONS

CO-HOSTS: DR. LINDA LARCOMBE, JAMES K. GIBB

1:30 - 1:45 pm	Gibb JK, Shattuck EC. Sexual orientation-based disparities in bone health among American adults. [Abstract]
1:45 - 2:00 pm	Tripp L, Sawchuk LA. The 1918/19 pandemic influenza: Hidden heterogeneity in an island population. [Abstract]
2:00 - 3:00 pm	Discussion

ASYNCHRONOUS 15-MINUTE PRESENTATION

- *McKinnon L, Samson DR, Nunn CL, Rowlands A, Salvante KG, Nepomnaschy PA. The influence of developing technological infrastructure on sleep and circadian rhythm in a community of Guatemalan Kaqchikel Maya. [Abstract] [Presentation]

ASYNCHRONOUS 5-MINUTE PRESENTATIONS

- *Elshahat S, Newbold B, Moffat T. Physical activity practices amongst Arab newcomers in Western societies: A need for equitable and culturally sensitive physical activity opportunities. [Abstract] [Presentation]
- Spake L, Shaver J. Kin-like bonds: Allocare between co-religionists increases when kin are less available. [Abstract] [Presentation]

ASYNCHRONOUS POSTER PRESENTATIONS

- *Checholik C, Galloway T. An analysis of the Nutrition North Canada subsidy program in Northern Ontario from 2011 to 2019. [Abstract] [Poster]
- Rowlands A, Salvante KG, McKinnon L, Samson D, Prescivalli AP, Nepomnaschy PA. The hypothalamic-pituitary-adrenal axis and sleep as modulators of metabolic energy across the adolescent transition in a group of Mayan girls. [Abstract] [Poster]
- Parish J. The influenza pandemic of 1918-1919 in Cape Breton Island, Nova Scotia. [Abstract] [Poster]
- Woodley C. Syphilis, blame, and stigma across the centuries. [Abstract] [Poster]

3:00 - 3:30 PM HEALTH BREAK [GATHER]

3:00 – 3:30 PM STUDENT PRESENTATION JUDGING [ZOOM]

CO-HOSTS: TBA

- *McKinnon L, Samson DR, Nunn CL, Rowlands A, Salvante KG, Nepomnaschy PA. The influence of developing technological infrastructure on sleep and circadian rhythm in a community of Guatemalan Kaqchikel Maya. [Abstract] [Presentation]
- *Elshahat S, Newbold B, Moffat T. Physical activity practices amongst Arab newcomers in Western societies: A need for equitable and culturally sensitive physical activity opportunities. [Abstract] [Presentation]
- *Checholik C, Galloway T. An analysis of the Nutrition North Canada subsidy program in Northern Ontario from 2011 to 2019. [Abstract] [Poster]

3:30 – 5:00 PM SESSION 5 – GENERAL SESSION: RESEARCH IN PRIMATE ECOLOGY AND CONSERVATION [ZOOM]

CHAIR: FLORENCE LANDRY

SYNCHRONOUS PRESENTATIONS

CO-HOSTS: FLORENCE LANDRY, MING FEI LI

3:30 - 3:45 pm	*Bouarab M, Rissling T, Sicotte P, Melin A, Bădescu I. Description of fecal stable isotope ($\delta^{13}C$:$\delta^{15}N$, %N) methods to track infant feeding transitions in wild primates. [Abstract]
3:45 - 4:00 pm	*Stewart BM, Turner SE, Matthews HD. Climate change impacts on potential future ranges of non-human primate species based on cumulative CO_2 emissions and the resulting surface temperature increase. [Abstract]
4:00 - 4:15 pm	Joyce MM, Teichroeb JA, Turner SE. Spatial movement foraging strategies among free-ranging Japanese macaques (*Macaca fuscata*) at the Awajishima Monkey Center, Japan. [Abstract]
4:15 - 5:00 pm	Discussion

ASYNCHRONOUS 15-MINUTE PRESENTATIONS

- Anderson KA, Stead SM, Teichroeb JA. Preferential handling of infants by adult males in *Colobus angolensis ruwenzorii*. [Abstract] [Presentation]
- Behie AM, Pavelka MSM, Notman H, Hartwell K. Secondary sex ratios in primates following hurricanes. [Abstract] [Presentation]
- Bolt LM, Cavanaugh MN, Schreier AL. Lone males: Solitary and group-living male howler monkey (*Alouatta palliata*) behavioural ecology in a Costa Rican rainforest. [Abstract] [Presentation]
- Frappier-Brinton T. The relative effectiveness of different protected area types at reducing forest fire frequency in Madagascar. [Abstract] [Presentation]
- Ramsay MS, Ramilison ML, Andrinambinina G. Origin myths of critically endangered Coquerel's Sifaka. [Abstract] [Presentation]
- *Reyes KR, Samson DR, Nunn CL, Patel UA. Lunar and meteorological variables influence sleep in diurnal gibbon (*Hylobates moloch* and *Hylobates pileatus*). [Abstract] [Presentation]
- Teichroeb JA, Vasey EN, Arseneau-Robar TJM. The impact of handling time and food quality on vervet monkey foraging decisions. [Abstract] [Presentation]

ASYNCHRONOUS 5-MINUTE PRESENTATIONS

- Ramilison ML, Andriatsitohaina B, Chell C, Rakotondravony R, Radespiel U, Ramsay MS. Occurrence of the critically endangered Coquerel's Sifaka (*Propithecus coquereli*) across a fragmented landscape in Northwestern Madagascar. [Abstract] [Presentation]
- Turner SE, Fedigan LM, Moriarity RJ, Matthews HD, Shimizu K. Female dominance rank and having a disabled infant predict fecal cortisol levels in free-ranging female Japanese macaques. [Abstract] [Presentation]

ASYNCHRONOUS POSTER PRESENTATIONS

- *Gaudreault M, Landry F, Curteanu C, Desruelle K, Badescu I. The influence of infant age, sex, and maternal parity on infant carrying in wild chimpanzees. [Abstract] [Poster]

- Britton TL. Understanding socio-ecological preferences in substrate-use to inform corridor planning: Preliminary observations of *Alouatta palliata* and *Cebus capucinus* at the La Suerte Biological Field Station. [Abstract] [Poster]
- Desruelle K, Curteanu C, Badescu I. Ontogeny of social grooming in wild infant chimpanzees (*Pan troglodytes schweinfurthii*) at Ngogo, Uganda. [Abstract] [Poster]
- *Schmidt Z. White faced capuchins across environments: Captive, wild and urban. [Abstract] [Poster]

5:00 – 6:00 PM HEALTH BREAK [GATHER]

5:00 – 5:30 PM STUDENT PRESENTATION JUDGING [ZOOM]

CO-HOSTS: CARLY CHECHOLIK, NEDA MAKI

- *Reyes KR, Samson DR, Nunn CL, Patel UA. Lunar and meteorological variables influence sleep in diurnal gibbon (*Hylobates moloch* and *Hylobates pileatus*). [Abstract] [Presentation]
- *Gaudreault M, Landry F, Curteanu C, Desruelle K, Badescu I. The influence of infant age, sex, and maternal parity on infant carrying in wild chimpanzees. [Abstract] [Poster]
- *Schmidt Z. White faced capuchins across environments: Captive, wild and urban. [Abstract] [Poster]

6:00 - 7:00 PM TRIVIA EVENT [GATHER] [ZOOM]

CO-HOSTS: DR. MADELEINE MANT, DR. TRACY PROWSE, KATIE BRENT, RACHEL SIMPSON, COURTNEAY HOPPER

All are welcome to come play trivia via Zoom! No pre-registration is required. You may play as an individual or as a team (up to six members). If you're teaming up, we suggest meeting with your group in Gather so you can talk over your answers. The questions will be delivered via Zoom, so make sure to join the waiting room so your hosts can let you in at 6 p.m. (Central Standard Time).

7:00 - 10:00 PM EVENING SOCIAL TIME [GATHER]

FRIDAY, NOVEMBER 6TH

9:00 AM - 3:00 PM SESSION 6 – GENERAL SESSION: SKELETAL BIOLOGY, FORENSICS, AND BIOARCHAEOLOGY [ZOOM]

CHAIRS: DR. ANDREW NELSON, DR. LINDA LARCOMBE, DR. AMY SCOTT, DR. ANGELA LIEVERSE, DR. BENCE VIOLA

SYNCHRONOUS PRESENTATIONS

CO-HOSTS: DR. AMY SCOTT, ALEKSA ALAICA, MALCOLM RAMSAY

9:00 - 9:15 am *Alaica AK, González La Rosa LM. Cut human cranial fragments from North Coast Peru: Understanding the taphonomy, life history and ceremonial use of osseous artifacts among the Moche. [Abstract]

9:15 - 9:30 am *Bourgeois RL, Lieverse AR, McKenzie H, Clark TN, Bazaliiskii VI. A multi-method approach to re-associating fragmented and commingled human remains: An example from the Cis-Baikal Region of Siberia, Russia. [Abstract]

9:30 - 9:45 am Chinique de Armas Y, Laffoon J, Buhay W, Reyes I, Skelton S, Rodríguez Suarez R, González Herrera UM, Roksandic M. Multiproxy reconstruction of dietary practices of the 'Archaic Age' populations of Playa del Mango site, Granma, Cuba. [Abstract]

9:45 - 10:00 am *Hyland C, Millaire J-F, Szpak P. A warrior, a pregnancy and a Highlander on the North Coast: Interpreting life events using multi-tissue stable isotope analysis, Virú Valley Peru. [Abstract]

10:00 – 10:30 AM HEALTH BREAK [GATHER]

10:00 – 10:30 AM STUDENT PRESENTATION JUDGING [ZOOM]

CO-HOSTS: DARCI BELMORE, NEDA MAKI

- *Avery LC, Brickley MB, Prowse TL. Investigating dietary stable isotope changes in childhood and early adolescence as a proxy for social age changes. [Abstract] [Presentation]
- *Ghalem Y (1), Ribot I (1). Re-examining human variation in Equatorial Africa from the Late Stone Age to modern times: a 3D analysis of the temporal bone. [Abstract] [Poster] [Dynamic Poster]
- *Poeta LS, Nelson AJ, Fornier E. Multi-resolution scanning of a shrunken head. [Abstract] [Poster] [Dynamic Poster]
- *Sierra E, Albanese J. Intra-observer reproducibility test of age-related features on the auricular surface. [Abstract] [Poster]
- *Simpson R, Cooper DML, Coulthard I, Swanston T, Grimes V, Munkittrick TJA, Jankauskas R, Varney TL. Mapping biogenic and diagenetic lead exposure in experimentally altered bone. [Abstract] [Poster]
- *Tait V, Grogan T, Szpak P. Assessment of optimal methods for the demineralization of bone for stable isotope analyses. [Abstract] [Poster]

SYNCHRONOUS PRESENTATIONS (CONTINUED)

CO-HOSTS: DR. ANGELA LIEVERSE, DR. ANDREW NELSON, LAUREN MICHELMAN

10:30 - 10:45 am Mackay-Brown A, Holland E. Discrete vs. descriptive: Examining sexual dimorphism in the juvenile pelvis. [Abstract]

10:45 - 11:00 am *Motley J, Nelson AJ, Watson L, Poeta L, Hopkins Barriga A. 2D taphonomy: Reconstructing the taphonomic histories of Andean funerary bundles with conventional radiography. [Abstract]

11:00 - 11:15 am Gooderham E, Cardoso HFV. Separating the illness from the individual: using bioarchaeology of disability to understand how tuberculosis impacted life. [Abstract]

11:15 - 11:30 am *Kennedy D, *Nichols K, Holland E, Albanese J, Reder D, Yang D, Cardoso H, Yellowhorn E. Addressing the legacy of residential school cemeteries: Exploring the important role of a Community Liaison. [Abstract]

11:30 - 11:35 am Sawchuk EA, Prendergast ME. Confronting new mysteries and old problems: Ancient DNA and legacy skeletal collections. [Abstract]

11:35 - 11:40 am *Tratch ML, Roksandic M. Tattoo or post-mortem markings? An experimental approach to analyzing skull markings from Muge Valley (Portugal). [Abstract]

11:40 - 11:45 am Wilson T, Szpak P. Examining the impact of demineralization methods on the stable isotope composition of bone collagen. [Abstract]

11:45 am - 12:00 pm Discussion

ASYNCHRONOUS 15-MINUTE PRESENTATIONS

- *Avery LC, Brickley MB, Prowse TL. Investigating dietary stable isotope changes in childhood and early adolescence as a proxy for social age changes. [Abstract] [Presentation]

- Bleuze M. Logistical mobility and female labour investments in a Middle Period Chumash sample near Point Sal, California. [Abstract] [Presentation]
- *Brent KE, Chizmeshya SQ, Gilmour RJ. Building on the bioarchaeology of care: Suggestions from the case of Khuyankh. [Abstract] [Presentation]
- Szpak P, Guiry EJ. Are a third of archaeological bone collagen stable isotope measurements unreliable? [Abstract] [Presentation]
- Baliso A, Finaughty C, Heathfield LJ, Gibbon VE. Identification of the deceased: Use of forensic anthropology at Cape Town's busiest medico-legal laboratory. [Abstract] [Presentation]

Asynchronous 5-minute Presentations

- Cameron ME. New investigations using spatial approaches in Holocene Later Stone Age southern African bioarchaeology. [Abstract] [Presentation]
- Rangel-de Lázaro G, Martínez-Fernádez A, Rangel-Rivero A, Benito-Calvo A. Application of 3D scanning techniques for the digitalization of pre-Columbian crania collections. [Abstract] [Presentation]

Asynchronous Poster Presentations

- *Ghalem Y (1), Ribot I (1). Re-examining human variation in Equatorial Africa from the Late Stone Age to modern times: a 3D analysis of the temporal bone. [Abstract] [Poster] [Dynamic Poster]
- *Poeta LS, Nelson AJ, Fornier E. Multi-resolution scanning of a shrunken head. [Abstract] [Poster] [Dynamic Poster]
- *Sierra E, Albanese J. Intra-observer reproducibility test of age-related features on the auricular surface. [Abstract] [Poster]
- *Simpson R, Cooper DML, Coulthard I, Swanston T, Grimes V, Munkittrick TJA, Jankauskas R, Varney TL. Mapping biogenic and diagenetic lead exposure in experimentally altered bone. [Abstract] [Poster]
- Teeter MA, Szpak P. Standardization of NaOH treatment for the removal of humics from archaeological bone collagen. [Abstract] [Poster]
- *Tait V, Grogan T, Szpak P. Assessment of optimal methods for the demineralization of bone for stable isotope analyses. [Abstract] [Poster]
- Wollmann J, Cameron M. Variation in the cross-sectional geometry of the first metatarsal and therelationship with the femur and tibia. [Abstract] [Poster]
- Dolphin AE, Meijer J, Coffin J, Adams RB. Preliminary insights from the Grave 5 charnel house at Wadi Faynan 100, Jordan. [Abstract] [Poster]

12:00 – 1:30 PM Graduate Student Luncheon [ZOOM]

Co-hosts: Laure Spake, Lisa Semchuk

12:00 – 1:30 PM Health Break [GATHER]

Synchronous Presentations (Continued)

Co-hosts: Dr. Linda Larcombe, Dr. Bence Viola, Elizabeth Hydesmith

1:30 - 1:45 pm	*Rand A, Freiwald C, Grimes V. Ancient Maya catchment use: Stable sulphur isotopic evidence from Caledonia, Cayo District, Belize. [Abstract]
1:45 - 2:00 pm	Munkittrick TJA, Scott A, Grimes V. Childhood lead exposure in 18th-19th century North Atlantic fisheries. [Abstract]

2:00 - 2:15 Weerasinghe P. Skeletons in wells: Post-mortem treatments in Roman Eretria, Greece. [Abstract]

2:15 - 3:00 pm Discussion

ASYNCHRONOUS 15-MINUTE PRESENTATIONS

- *Berezowski V, Mallett X, Moffat I, Ellis J. The application of geophysical techniques to clandestine gravesite discovery. [Abstract] [Presentation]
- Finaughty DA, Gibbon VE. Terrestrial Forensic Taphonomy in Cape Town, South Africa. [Abstract] [Presentation]
- French G, Spies MJ, Gibbon VE, Finaughty DA. Eating the evidence: first documentation of forensically significant consumption of carrion entomofauna by the Cape grey mongoose (*Gaerella pulverulenta*). [Abstract] [Presentation]
- *Bigué R-A, Ribot I, Roberts C. Palaeopathological analysis of an historic urban population from Montreal: exploring interactions between vitamin D deficiency and other diseases. [Abstract] [Presentation]
- Dinkele E, Ballo R, Fredlund V, Gibbon VE. Geographically isolated Mseleni joint disease: Using a biocultural framework to assess onset and aetiology. [Abstract] [Presentation]

ASYNCHRONOUS 5-MINUTE PRESENTATIONS

- *Ross JB, Varney T. Investigating origins of individuals from a British Royal Navy Hospital Cemetery, English Harbour, Antigua: A multi-isotopic analysis. [Abstract] [Presentation]
- *Van Ankum EM, Majcher KB, Dolovich AT, Johnston JD, Boughner JC. Vitamin D deficiency and soft diet alters mandible morphology and size: implications for archaeological human populations from a mouse model system. [Abstract] [Presentation]
- *Bernard M. Bone elemental age-at-death estimation of adult females: a pilot study. [Abstract]
- *Hider J, Duggan A, Klunk J, Eaton K, Long G, Fornaciari G, Golding B, Prowse T, Poinar H. How to know you've 'caught' a pathogen: exploring *Brucella melitensis* presence in a medieval monk. [Abstract] [Presentation]

ASYNCHRONOUS POSTER PRESENTATIONS

- Brickley MB. Paget's disease of bone: Increasing reporting through consideration of non-pathognomonic lesions. [Abstract] [Poster]
- *Lamer M, Veselka B, Hoogland MLP, Brickley MB. The effects of growth rates on rachitic porotic lesion expression and the consideration of the medial clavicle in active rickets. [Abstract] [Poster]
- *Nelson J, Holland E, Harrington L, Cardoso HFV. Do the regions of the spinal column record stress differently? An analysis of growth stunting in the vertebral neural canal. [Abstract] [Poster]
- *Doucette RG, Merrett DC. Don't you misdiagnose me: Actinomyces spp. and the issues surrounding misdiagnosis in archaeological and clinical populations. [Abstract] [Poster]
- Kilburn NN, Gowland RL, Halldórsdóttir HH, Williams R, Thompson TJU. X-citing Bones: An investigation of the use of portable X-ray fluorescence (pXRF) in the identification of scurvy, rickets, and cribra orbitalia in archaeological bone. [Abstract] [Poster]
- *Nguyen Y. Syphilis in antiquity: Examination of paleopathological presentation and its history. [Abstract] [Poster]

3:00 – 3:30 PM HEALTH BREAK [GATHER]

3:00 – 3:30 PM STUDENT PRESENTATION JUDGING [ZOOM]

CO-HOSTS: DARCI BELMORE, NEDA MAKI

- *Brent KE, Chizmeshya SQ, Gilmour RJ. Building on the bioarchaeology of care: Suggestions from the case of Khuyankh. [Abstract] [Presentation]
- *Berezowski V, Mallett X, Moffat I, Ellis J. The application of geophysical techniques to clandestine gravesite discovery. [Abstract] [Presentation]
- *Bigué R-A, Ribot I, Roberts C. Palaeopathological analysis of an historic urban population from Montreal: exploring interactions between vitamin D deficiency and other diseases. [Abstract] [Presentation]
- *Hider J, Duggan A, Klunk J, Eaton K, Long G, Fornaciari G, Golding B, Prowse T, Poinar H. How to know you've 'caught' a pathogen: exploring *Brucella melitensis* presence in a medieval monk. [Abstract] [Presentation]
- *Van Ankum EM, Majcher KB, Dolovich AT, Johnston JD, Boughner JC. Vitamin D deficiency and soft diet alters mandible morphology and size: implications for archaeological human populations from a mouse model system. [Abstract] [Presentation]
- *Bernard M. Bone elemental age-at-death estimation of adult females: a pilot study. [Abstract]

3:30 - 5:30 PM SESSION 7 - SPECIAL SESSION: EQUITY, DIVERSITY AND INCLUSION IN CAPA/ACAP [ZOOM]

CHAIRS: DR. ELIZABETH SAWCHUK, DR. MADELEINE MANT

As the flagship professional organization for biological anthropology in Canada it is paramount that the Canadian Association for Physical Anthropology /L'Association Canadienne d'Anthropologie Physique (CAPA-ACAP) be an inclusive and welcoming space for members of our diverse society. To ensure that CAPA-ACAP's goals of inclusivity are met, the Equity, Diversity, and Inclusion (EDI) Subcommittee designed a survey to assess the current environment within CAPA-ACAP.

From 2019-2020, a digital survey was utilized to collect data concerning: CAPA-ACAP members' self-reported sociodemographic data, members' past experiences with discrimination and exclusion as part of CAPA-ACAP, current perceptions of CAPA-ACAP's inclusivity, and suggestions on how to improve equity, diversity, and inclusion within the organization.

Sociodemographic data indicates that the majority of participating CAPA-ACAP members (n = 167) identify as white (80%), female/women (74%), non-disabled (92%), heterosexual (74%), between the ages of 18-35 (49%), and are trainees or special members (62%). Human skeletal biology (25%) and bioarchaeology (28%) were the most common research specialties. The majority of CAPA-ACAP members are the first in their family to attend or finish graduate school or to both finish college and graduate school (60%). The majority of survey participants were satisfied with the overall environment at CAPA-ACAP (86%) and felt safe during the annual meetings (85%), although some incidents of exclusion, bullying, harassment, or discrimination were reported (12%). In general, members indicated positive feelings (mean = 81%) about CAPA-ACAP while negative experiences (mean = 9%) were uncommon. However, 45% of participants felt that CAPA-ACAP was homogenous and 29% did not consider CAPA-ACAP to be diverse. The free-form responses focused primarily upon the experiences of student and early career members, with cost and accessibility of the annual meeting raised as major barriers to full participation.

Our findings highlight the need for CAPA-ACAP to prioritize considerations of EDI into its professional mandate, planning of annual meetings, and recruitment of new members.

Synchronous Presentations

Co-hosts: Dr. Madeleine Mant, Dr. Elizabeth Sawchuk, Ellie Gooderham, Florence Landry, Ming Fei Li, James Gibb

3:30 – 4:00 pm Equity, Diversity and Inclusion Presentations [Link to Presentation Slides]

4:00 – 4:30 PM Health Break [Gather]

4:00 – 4:30 PM Student Presentation Judging [Zoom]

Co-chairs: Carly Checholik, Neda Maki

- *Ross JB, Varney T. Investigating origins of individuals from a British Royal Navy Hospital Cemetery, English Harbour, Antigua: A multi-isotopic analysis. [Abstract] [Presentation]
- *Lamer M, Veselka B, Hoogland MLP, Brickley MB. The effects of growth rates on rachitic porotic lesion expression and the consideration of the medial clavicle in active rickets. [Abstract] [Poster]
- *Doucette RG, Merrett DC. Don't you misdiagnose me: Actinomyces spp. and the issues surrounding misdiagnosis in archaeological and clinical populations. [Abstract] [Poster]
- *Nguyen Y. Syphilis in antiquity: Examination of paleopathological presentation and its history. [Abstract] [Poster]

Synchronous Presentations (Continued)

Co-hosts: Dr. Madeleine Mant, Dr. Elizabeth Sawchuk, Ellie Gooderham, Florence Landry, Ming Fei Li, James Gibb

4:30 – 5:30 pm Equity, Diversity and Inclusion Presentations [Link to Presentation Slides]

5:30 – 6:30 PM Health Break [Gather]

6:30 – 7:30 PM CAPA/ACAP Business Meeting [Zoom]

Chair: Dr. Ian Colquhoun, President

Co-hosts: Dr. Lesley Harrington, Secretary-Treasurer; Dr. Tina Moffat, Past President, Dr. Laure Spake, James K. Gibb, Florence Landry

The annual CAPA/ACAP Business Meeting is an opportunity to conduct business relating to the organization. For this reason, and in accordance with the CAPA-ACAP Constitution, **only CAPA-ACAP Members in good standing will be admitted to the meeting**. Other registered attendees of eCAPA-ACAP 2020 are invited to visit the Gather space to view posters, asynchronous presentations, and engage in networking and social time.

7:00 - 10:00 PM Closing Night Social Time [Gather]

eCAPA-ACAP 2020 ABSTRACTS

PLEASE NOTE: ABSTRACTS MARKED WITH AN ASTERISK ARE ENTERED IN THE STUDENT AWARDS COMPETITION.*

Cut human cranial fragments from North Coast Peru: Understanding the taphonomy, life history and ceremonial use of osseous artifacts among the Moche

*Alaica AK (1), González La Rosa LM (2)
1. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada
2. Archaeology Centre, University of Toronto, Toronto, Ontario, Canada

Moche funerary practices involved the revisiting of mortuary contexts, where community members moved and modified human remains before reburying the dead. Sacrificial deposits at Moche sites have uncovered commingled male remains with healed injuries and peri-mortem trauma, signaling recent combat. Niches in the Urban Complex of Huacas de Moche yielded curated human crania that mimic the iconographic depictions of human skull cups. These osseous artifacts are missing the calotte with the remaining cranium and mandible present. The removed calottes were not found in these niche contexts or in middens, indicating that the production of these osseous human artifacts was done elsewhere. Excavations of Huaca Colorada in the Jequetepeque Valley, north of Huacas de Moche, have uncovered seven curated and heavily cut human cranial fragments. They are human parietals with one example of an almost complete human calotte. Several fragments have signs of sun bleaching that indicates these remains were deposited on the surface. Human cranial fragments from Huaca Colorada are distinct from Huacas de Moche not only in their anatomical segments but in their taphonomy. These fragments are heavily cut along the exterior of each fragment, attesting to repeated post-mortem trauma to these skeletal remains. Parallel and diagonal lines are found along the transverse axes of parietal fragments with deep incisions made along the curvature of the calotte fragment. The repetitive incising of these cranial fragments and the worn edges of these objects attests to their curation for a period after the death of the individuals to which they belonged. The human cranial fragments from Huaca Colorada were recovered from midden contexts on the northern edge of the ceremonial sector. Two fragments have red pigment embedded within the diploë bone that may relate to the use of these objects in ceremonial activities. Interestingly, red pigment is found on the zygomatic of two interred human burials at Huaca Colorada. The use of pigment on the faces of elites and warriors is attested to by iconographic depictions. This presentation will explore the stages of human cranial fragment extraction, use and deposition at Huaca Colorada on the North Coast of Peru.

Nitrogen stable isotope analysis of Holocene pigs and modern humans from Liang Bua

Alamsyah N (1,2), Munizzi JS (3), Tocheri MW (1,4,5), Metcalfe J (1), Dupras TL (6)
1. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada
2. Pusat Penelitian Arkeologi Nasional, Jakarta, Indonesia
3. Stable Isotope Geochemistry Laboratory, University of Kentucky, Lexington, Kentucky, USA
4. Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington DC, USA
5. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia
6. Department of Anthropology, University of Central Florida, Orlando, Florida, USA

At the archaeological site of Liang Bua, stable isotope analysis of carbon from Holocene pigs and modern humans reveal an abrupt shift to more C_4 plants in their diets beginning at ~2.7 thousand calibrated radiocarbon

years before present (ka cal. BP). In the present study, we explore whether the nitrogen stable isotope values for these taxa show a corresponding shift in values that may also reflect dietary or environmental changes related to the transition to farming on Flores. In our pig sample (N = 59), 15 specimens are between ~4.3 and 3.1 thousand years (ka) old and occur in the stratigraphic sequence prior to the appearance of pottery at ~3 ka. Together, these oldest samples yielded a mean $\delta^{15}N$ value of 8.5, ranging from 7.5 to 9.4. In comparison, eleven specimens are between ~2.7 and 2.0 ka, have a statistically significant lower mean $\delta^{15}N$ value of 6.9 ($p < 0.01$), and range from 3.8 to 8.4. Interestingly, the mean $\delta^{15}N$ value of samples dated to between 1.7 and 1.2 ka is 8.1 (6.2–9.3), returning to pre-3 ka levels, whereas those dated to between 960 and 430 years ago significantly decrease to 6.8 (4.2–8.3) ($p < 0.01$). These observed changes in mean $\delta^{15}N$ values for pigs through time are due to the presence of multiple specimens from the past 1 ka and from 3–2 ka that are approximately one trophic level below the rest of the sample. A possible explanation for these changes is that after the transition to farming occurs ~3 ka ago, humans are controlling the diet of some of these pigs through domestication, resulting in a reduced amount of protein in the pig diet relative to that of other pigs that likely remain wild and/or more free-ranging. In contrast, $\delta^{15}N$ values for humans (N = 3) at Liang Bua before and after ~3 ka do not show any change (~10.0) but remain about one trophic level above the mean values for pigs.

Preferential handling of infants by adult males in *Colobus angolensis ruwenzorii*

Anderson KA (1), Stead SM (1), Teichroeb JA (1,2)
1. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada
2. Department of Anthropology, University of Toronto Scarborough, Toronto, Ontario, Canada

Infant handling by adult males is a rare behaviour in mammals, yet it occurs in several primate species. Infant handling may serve a direct fitness benefit when paternity certainty is high, and males are likely to be caring for their own offspring. We tested this hypothesis with the Rwenzori Angolan colobus multi-level society at Lake Nabugabo, Uganda who form core units composed of one-male and multiple females, and multiple males and multiple females. We predicted that males in the one-male core units would exhibit greater handling (holding and carrying) and babysitting behaviour than males in multi-male core units as they can be more certain of their paternity. We also predicted that handling would be non-random, with males preferentially handling certain infants. We conducted scans every 15-minutes (n=2,104) on 16 infants from September 2019 to March 2020 and calculated rates of infant handling and babysitting by adult males. Controlling for the number of males and number of infants available, we found that there were no significant differences between handling rates of the one-male and multi-male core units. We found that babysitting behaviour differed significantly between core unit types. Adult males in the one-male units exhibited significantly more babysitting behaviour than adult males in the multi-male units ($p<0.01$). We found that handling rates by each male differed significantly ($p<0.0001$). Each male handled a maximum of two infants, and each infant was handled by a maximum of two males. These findings provide partial support for our hypothesis. While handling rates did not differ between the one-male and multi-male core units, males were not handling infants randomly. The preferential handling of some infants over others may be a result of paternity certainty, or a method of bond formation with the mothers of those infants. Future genetic work on the colobus at Lake Nabugabo will confirm kinship in the band and paternity for some infants. This work will identify if the preferential handling reported here is a result of discriminatory handling of genetic offspring, or if the males are engaging in handling behaviour to form friendships with specific adult females and increase their future reproductive success.

Cell processes underpinning the evolution of primate dental form and formula

*Appelt CM (1), Van Ankum EM (1), Marchiori DF (1), Boughner JC (1)
1. University of Saskatchewan, Saskatchewan, Canada

Primate dentitions develop and evolve under the regulation of cell processes to generate different dental formulae, asymmetry between upper and lower formulae, and specialized tooth forms. Here we explore and theorize about these underlying cellular and developmental processes. Our interdisciplinary meta-analysis

integrated data and literature across physical anthropology, cellular biology, and evolutionary developmental biology, including our own research using a mouse mutant for the p63 gene. We found that prosimians show more variation across dental formulae compared to anthropoids. Also, across primates, lower teeth appear more labile in number and form, and morphology appears more varied in ante-molar teeth versus molars. We posit that primate dental formula evolves via changes in the odontogenic homeobox code that patterns the nascent lamina of the deciduous dentition. These changes implicate tooth signaling centres as well as differentiation, proliferation, migration and compaction of odontogenic cells. Referring back to the p63 mouse model of craniodental development, our results in primates generally support the hypothesis that stronger developmental and functional integration of the midface constrains dental macroevolution in the upper dentition compared to the lower dentition. We propose the Linchpin Hypothesis, that deciduous precursors are requisite for the formation of permanent successional (ante-molar) teeth but not additional (molar) teeth. Evolutionary losses in the dental formula likely occur via more than one type of change in the cellular dynamics of odontogenesis. More studies of diphyodont, heterodont animal models are needed to clarify the cell processes evolving under strong selection for diet and other para-functions in primates including humans and fossil relations.

Investigating dietary stable isotope changes in childhood and early adolescence as a proxy for social age changes

*Avery, LC (1), Brickley MB (1), Prowse TL (1)
1. McMaster University, Hamilton, Ontario, Canada

Dietary stable isotope analyses using incremental sections of tooth dentine provide a way to analyze individual diet and dietary change over time. Prior dietary isotopic studies using incremental analysis focused on patterns of weaning in past populations, leaving the period of childhood and early adolescence unexplored. This study examines 30 second permanent molars (217 dentine sections) to identify dietary changes for males and females between the ages of 2.5 and 15 years, buried at the Imperial Roman Michelet Necropolis in northern France (c. 350-450 CE). We investigate the hypothesis that social age change (differentiated by gender in Roman Gaul) may also be reflected in gendered diets, by incorporating ancient literary sources, pubertal data, and stable isotope evidence. In doing so, we investigate gendered patterns of consumption and how diets may have changed in the important transition from childhood to adolescence. Our results show that $\delta^{13}C$ values were not significantly different between males and females ($p > .050$) for the entire sample, nor when subdivided by age category. However, males exhibited significantly lower $\delta^{15}N$ values than females at age 15 ($p = .008$; other age categories were not significantly different between males and females). The lower nitrogen values for males at age 15 may be reflective of dietary changes as they entered apprenticeships or the general workforce around this age. Thus, this shift in $\delta^{15}N$ may reflect a social change as they transitioned from childhood to adolescence. These changes may also reflect the beginning of gendered dietary treatments following the onset of puberty and pubertal development, which occurs around the same point. The results of this study help to further understand the important social and biological transition from childhood to adolescence in the Roman Empire and gendered experiences within the life course.

Identification of the deceased: Use of forensic anthropology at Cape Town's busiest medico-legal laboratory

Baliso A (1), Finaughty C (1), Heathfield LJ (2), Gibbon VE (1)
1. Division of Clinical Anatomy and Biological Anthropology, Department of Human Biology, University of Cape Town, Observatory, Cape Town, South Africa
2. Division of Forensic Medicine and Toxicology, Department of Pathology, Faculty of Health Science, University of Cape Town, South Africa

South Africa is faced with a serious issue of unidentified human remains, made more difficult when bodies are decomposed, skeletonised, or burnt. Salt River Mortuary is one of the busiest medico-legal laboratories in the country and investigates approximately 4000 cases per year. This represents roughly half of all medico-legal autopsies across the City of Cape Town. When cases involve decomposed, skeletal or charred remains, they may

be referred to the Forensic Anthropology Cape Town (FACT) laboratory at the University of Cape Town (UCT). The aim of this study was to assess the impact of anthropological analyses on local medico-legal death investigations. Cases which FACT analysed from Salt River Mortuary between the years 2008 – 2018 were retrospectively evaluated. Over the 11 year period, FACT was consulted in 73 cases of medico-legal significance. Most decedents were found in high crime areas or rural sparsely populated areas. Biological profile estimations were impacted by fragmentation and incomplete skeletal recovery. A total of 75 individuals were examined, with males (61%) making up the majority and exhibiting more trauma. Pathologies, associated evidence (such as clothing, jewellery), individualising features (like tattoos, dental features), and ante-mortem trauma were important for identification. Police case outcomes were known in 51% (37/73) of all cases, and of those, 76% (28/37) were closed and 24% (9/37) were open at the time of this research. Information pertaining to whether a decedent was identified or not was available for 45 individuals and of these, 47% (21/45) were positively identified. Only 57% (12/21) of the positively identified individuals had ante-mortem records available. The sex, age-at-death and stature estimations were correct in all of these cases, whereas ancestry estimations were correct in 89%. This study highlighted that communication between different stakeholders is poor and that forensic anthropology is underutilised. Despite these challenges, the high accuracy of the biological profiles showed that the methodology utilised by FACT performed well for the South African population. When used forensic anthropology in South Africa has the potential to assist with case resolution, victim identification and social/criminal justice.

Historical touchstones during COVID-19 in Aotearoa New Zealand

Battles H (1)
1. Anthropology, School of Social Sciences, The University of Auckland, Auckland, New Zealand

Researchers who study disease in the past often hope that their work will inform understanding of events today and in the future. Furthermore, there is broad interest in understanding which particular histories come to serve as touchstones and why, as these may shape people's understandings and responses with consequences for official policy, community action, and public behaviour. This research asks, what past epidemics have been invoked in New Zealand's public media during COVID-19, what aspects of those epidemics, and in what contexts? Does this analysis suggest reasons as to why certain past epidemics are invoked, and can this offer any 'lessons'? Here I present the results of preliminary content and thematic analysis of media stories (articles and radio segments with associated text) in Aotearoa New Zealand (NZ) over the first 9 months of the COVID-19 pandemic (Jan-Sept 2020). Stories were gathered via the Google News search engine and the Newztext database, and information entered into an Excel spreadsheet. Criteria for inclusion were that the stories were published in an NZ-based media outlet or clearly intended for an NZ audience. For an epidemic to be coded for this analysis, it needed to be more than only a passing mention and discussed in relation to COVID-19. Of the 32 stories eligible for analysis, the historical epidemics or diseases most frequently invoked were the 1918-19 influenza pandemic (n=17) and various 20th-century polio epidemics (n=13). Others included smallpox, tuberculosis, plague, leprosy, and the general influx of European diseases during colonization. Most stories focused on past epidemics within NZ, but the Pacific Islands were also discussed in the context of the 1918 flu. Six stories specifically focused on impact on Māori.

Secondary sex ratios in primates following hurricanes

Behie AM (1), Pavelka MSM (2), Notman H (2,3), Hartwell K (2)
1. School of Archaeology and Anthropology, The Australian National University, Canberra, Australia
2. Faculty of Arts, The University of Calgary, Calgary, Ontario, Canada
3. Anthropology, Athabasca University, Athabasca, Alberta, Canada

It is generally thought that in humans less male offspring are born under stressful conditions with a reduction in the number of males born relative to females following economic crises and natural disasters. While this is assumed to be due to increased stress, it is hard to isolate stress from cultural influences in humans. This study

thus explores the sex ratio at birth, or secondary sex ratio (SSR) of two non-human primate species following hurricanes to better isolate the role of the environmental change itself. Birth patterns and SSRs of black howler monkeys (Alouatta pigra) and Yucatan spider monkeys (Ateles geoffroyi yucatanensis) are reported both before and after two separate hurricanes in Belize. Neither species had any births in the year following each hurricane. In the first three years after this, howler monkeys showed a sex ratio not different from expected at 1:0.85 (7/13 infants born were male) while spider monkeys showed a largely male biased SSR at 11:1 (11/12 infants born were male). This was a significant deviation from the 1:1.6 pre-hurricane SSR in the same population. Infant mortality was 61.5% in howler monkeys and only 9% in spider monkeys, with a tendency for more male infants to die in the first year of life than females. While preliminary, results show the opposite SSR skew that is expected in humans, with more males being born in the aftermath of a natural disaster. This suggests no uniform response to sex ratio skew in primates following natural disasters.

The application of geophysical techniques to clandestine gravesite discovery

*Berezowski V (1), Mallett X (1), Moffat I (2,3), Ellis J (1)
1. School of Humanities and Social Sciences, University of Newcastle, Newcastle, New South Wales, Australia
2. McDonald Institute for Archaeological Research, Cambridge University, Cambridge, United Kingdom
3. College of Humanities and Social Science, Flinders University, Adelaide, South Australia, Australia

Death is a universal part of the human experience and retaining one's identity in death is seen as a fundamental human right. Following certain criminal acts, victims are sometimes buried in covert graves, which can be very difficult to detect months or years later. In missing persons investigations, the importance of detecting these clandestine graves cannot be overestimated as it can provide closure to the family, as well as allowing the authorities to prosecute the individual(s) responsible. The location of unmarked graves is one of the key challenges for forensic science, cultural heritage management and archaeological communities as conventional excavation techniques are overly invasive, expensive and time consuming. The purpose of this presentation is to introduce two geophysical techniques, ground penetrating radar (GPR) and electrical resistivity tomography (ERT), outline their effectiveness and significance in locating clandestine burials and discuss their use in a live forensic case in Australia, known as the Beaumont Investigation. This case is one of Australia's most well-known cold cases, wherein Jane, Arna, and Grant Beaumont went missing on 26 January 1966. In January 2018, a geophysical survey was undertaken at a site of interest wherein both GPR and ERT were used to locate the grave of the Beaumont siblings. Of note, this was the first time that ERT was applied in a forensic capacity in Australia. Unfortunately, the soil was not conducive to a GPR survey, which resulted in limited depth and penetration. The ERT survey however, highlighted a rectangular area that was 2m long x 1m wide x 2m deep that correlated with a potential burial. An excavation was undertaken with a large digger, as the anomaly was 1.5m deep, as well as trained police personnel for the hand excavation, which only uncovered rubbish and animal bones. Although this result was negative for the Beaumont investigation, it highlighted the effectiveness of using ERT for locating covert burials.

Bone elemental age-at-death estimation of adult females: a pilot study

*Bernard M (1)
1. Département d'anthropologie, Université de Montréal, Montréal, Québec, Canada

Common age-at-death estimation methods rely on macromorphology of the skeleton, such as dental development and long bone length for juvenile individuals and teeth or bone wear for adult individuals. Health, biomechanical stress, socioeconomic status, sex, are factors amongst other which can affect bone ageing and the appearance of wear. To mitigate these biological variations between individuals, common macromorphological methods provide a wide range of estimated age-at-death which can span 15-20 years or more for the elderly population. Developing a more precise age-at-death estimation method could help reduce those age ranges in adult individuals and better address demographic questions. Studies showed that in healthy individuals, the inorganic osseous component consists primarily of Calcium and Phosporus with a high molar

ratio during fetal development and skeletal growth, that gradually declines to a plateau at a ratio of 1.67 when reaching skeletal maturity (Hancock et al. 1987). Almeida and colleagues (2017) hypothesized that natural ageing processes impact levels of sex hormones, causing osseous Ca levels to decrease and Ca:P ratios to decline in the elderly population. A pilot study on 9 adult males demonstrated a linear relationship between declining Ca:P ratios and age-at-death at the midshaft of the femur (Clayton 2016). To control for sexual variation in bone ageing and provide missing data on Ca:P ratios, the present pilot study investigated Ca:P ratios in relation to age-at-death of 16 adult females aged 49 to 101 years. Specimens were harvested from the femoral midshaft; a cross-section was observed and analyzed using a Scanning Electron Microscope with an Energy Dispersive X-rays. Ten fields of view of secondary osteons were selected and analyzed elementally using backscatter electron to determine Ca:P ratios which were averaged per individuals. The resulting 16 averaged Ca:P ratios were analyzed with and without outliers to identify possible disparities due to biological variations within and between individuals. The results of this pilot study were inconclusive, another study with a larger sample size of individuals representing all adult age categories is necessary before evaluating if Ca:P ratio is a viable alternative method for age-at-death estimation in adult individuals.

Palaeopathological analysis of an historic urban population from Montreal: exploring interactions between vitamin D deficiency and other diseases

*Bigué R-A (1), Ribot I (1), Roberts C (2)
1. Anthropology, Université de Montréal, Montréal, Québec, Canada
2. Durham University, Durham, United Kingdom

Vitamin D occupies many functions in the regulation of the whole body. A deficiency of this hormone thus affects many essential systems (e.g. skeletal, dental, immune) and can leave visible lesions on the skeleton and teeth. During the Industrial Revolution, various environmental factors probably contributed to an increase in vitamin D deficiency. Therefore, most studies on vitamin D deficiency have been conducted on European skeletal samples dated to the 19th century. So far, in Canada and for the same period, the frequency of metabolic diseases has not been explored extensively. Furthermore, in paleopathology, the possible interactions between vitamin D deficiency and other diseases have been poorly explored. To fill this gap, the analysis of a historic Euro-Quebecois population concentrates on the following research questions: Does the frequency of lesions associated with vitamin D deficiency and other diseases vary according to demographic (sex, age-at-death) and environmental parameters (urban)? It is possible that industrializing Montreal underwent sanitary deterioration which increased the prevalence of vitamin D deficiency episodes. Are the individuals affected by vitamin D deficiency during infancy more prone to health deterioration later in life? Clinical studies seem to indicate a link between vitamin D deficiency and compromised immunity. The studied sample is constituted of 54 individuals from the Saint-Antoine urban cemetery in Montreal (1799-1854). The methodology is composed of a basic skeletal inventory, macroscopic and radiographic observations of the pathological lesions on the skeleton and an histologic examination of selected teeth to assess the presence of interglobular dentin (IGD). The results indicate a high prevalence of vitamin D deficiency during infancy, i.e. 57.4% (excluding degree 1 of IGD) to 79.6% (including degree 1 of IGD) according to the presence of interglobular dentin (IGD). The majority of these episodes occurred at 6-12 months-old and 2.5 years-old, which raises questions about weaning age and diet. Vitamin D deficiency during infancy was not correlated with biological parameters and health status deterioration later in life. However, the frequency of vitamin D deficiency cases during infancy seems to increase as the period of use of the cemetery progresses, which might be linked to industrial development.

Logistical mobility and female labor investments in a Middle Period Chumash sample near Point Sal, California

Bleuze M (1)
1. Department of Anthropology, California State University, Los Angeles, California, USA

Archaeological evidence from a number of Late Holocene (beginning ca. 3500 cal BP) Chumash sites suggest population pressure, climatic fluctuations, and environmental changes affected the availability of food

resources, which motivated a variety of adaptive responses to the changing resource landscape. The expansion of diet breadth is one of the many responses to resource stress observed at several Middle Period (ca. 2440–570 cal BP) Chumash sites. Archaeological and stable isotope evidence indicate the Middle period inhabitants of the G-1 site near Point Sal, California, exploited a diversity of local and distant resources. Sex-specific logistical mobility may have allowed this group to enjoy a mixed subsistence. Femur midshaft shape, an indicator of logistical mobility, and femur midshaft robusticity, a proxy for relative femur strength, were assessed using external bone measurements. Comparisons were made between the sexes to test the hypothesis that females and males engaged in sex-specific, non-overlapping foraging strategies. If the sexes had different foraging strategies, then sex differences in skeletal indicators of mobility should be apparent. Femur midshaft shape was significantly different between the sexes. Although both sexes were highly mobile, males may have engaged in foraging forays more frequently and/or may have engaged in more long-distance foraging forays than females. Relative femur strength was not significantly different between the sexes, suggesting they may have traversed over similar types of terrain, different types of terrain that yielded similar loading patterns on the femur, and/or engaged in a similar level of intensity of activities impacting the lower limbs. Females were actively involved in foraging, and foraging spheres were likely non-overlapping between the sexes. Adopting behavioral patterns where female and male foraging patterns were complementary may have helped this group maximize land-use strategies.

Understanding socio-ecological preferences in substrate-use to inform corridor planning: Preliminary observations of Alouatta palliata and Cebus capucinus at the La Suerte Biological Field Station

Britton TL (1,2)
1. Department of Anthropology, Western University, London, Ontario, Canada
2. Maderas Rainforest Conservancy, La Suerte Biological Research Station, Costa Rica

This study investigates how two sympatric primate species Alouatta palliata and Cebus capucinus at La Suerte Biological Research Station in northeastern Costa Rica (10°26′N, 83°46′W) share and shape their arboreal niches through their structural and social ecologies. It is hypothesized that both species will share overlapping and interacting ecologies but will differ in the overall frequency of specific substrate use during ecological and social behaviours. This study utilizes two-minute interval point sampling every 30 minutes to investigate interconnections between substrate use (branch width, tree preference, and distance from trunk) and both social (play, and social grooming) and ecological behaviours (feeding, resting and locomotion). Data collection occurred over an eight-day period during the rainy season in the month of July, for a daily average of eight observational hours between 0500-0630, 0800-1130 and 1400-1700. A total of twenty-five hours and seventeen minutes of behavioral substrate use was documented between both species, with sixteen hours and thirteen minutes observed for C. capucinus, and nine hours and four minutes for A. palliata. Both adults and juveniles were included as sample animals for each species, however sex was not included as a variable based on the inconsistency of visual conformation of genitalia for capuchins. The results indicate that across socio-ecological behaviours species share more similarities than differences in substrate preference for thin and medium width branches and middle parts of the tree than previously hypothesized. While these primates do not compete directly over food resources, in fragmented habitats they may compete for space. Thus, including La Suerte as part of the reforestation of a biological corridor would help to reduce habitat pressure on each species for competition over niche preference. Results also indicate that both primates showed preference for tree species in anthropogenic areas, indicating their resilience and adaptability to manipulate their environments to meet their needs. This study indicates that researching substrate use has the potential to inform corridor policy and planning.

Lone males: Solitary and group-living male howler monkey (Alouatta palliata) behavioural ecology in a Costa Rican rainforest

Bolt LM (1,2), Cavanaugh MN (3), Schreier AL (2,3)
1. Department of Anthropology, University of Waterloo, Waterloo, Ontario, Canada

2. The Maderas Rainforest Conservancy, Miami, Florida, USA
3. Department of Biology, Regis University, Denver, Colorado, USA

Many group-living primate species have evolved the capacity for some individuals to live alone for part of their lives, but this solitary life stage has rarely been the subject of focused research. The mantled howler monkey (Alouatta palliata) is a social primate species with bisexual dispersal that lives in mixed-sex groups with low male-to-female sex ratios. Consequently, males often spend a long period of their lives as solitary individuals. This study compares the tree use, feeding, and long-distance vocalization behaviour of solitary and group-living mantled howler monkey males living within a fragmented rainforest in Costa Rica, La Suerte Biological Research Station. Based on differences in competitive ability between solitary and group-living males, we predicted that lone males would be found in significantly smaller feeding and resting trees, consume more low-quality foods, and produce shorter howling bouts made at lower rates than group-living males. We collected data on tree use and feeding during 30-minute focal samples on male focal animals, recording data at 2-min intervals. We measured the trees in which the monkeys fed and rested for two or more intervals, and recorded the plant parts consumed. We recorded howling behaviour using all-occurrences sampling. Lone males used significantly smaller feeding and resting trees, consumed more low-quality foods, and howled at lower rates but had longer howling bouts triggered by anthropogenic noise more than group-living males. Our results demonstrate that lone males differ in their behavioural ecology compared to group-living males, thus improving understanding of the solitary male life stage in primates.

Description of fecal stable isotope ($\delta^{13}C$:$\delta^{15}N$, %N) methods to track infant feeding transitions in wild primates

*Bouarab M (1), Rissling T (2), Sicotte P (2,3), Melin A (2), Bădescu I (1)
1. Université de Montréal, Department of Anthropology, Montréal, Québec, Canada
2. University of Calgary, Department of Anthropology and Archaeology, Calgary, Alberta, Canada
3. Concordia University, Department of Biology, Montréal, Québec, Canada

Identifying the timing of feeding transitions, including the ages at which infants start consuming adult foods and at weaning, are key biomarkers used to distinguish species-specific life histories. Determining feeding transitions from observations in wild primates is challenging and probably imprecise. The use of fecal stable isotope ($\delta^{13}C$:$\delta^{15}N$, %N) methods can help mitigate these limitations. Here, we report new methodological modifications that improve the precision and usability of the relatively new approach first developed by Reitsema (2012) and Bădescu et al. (2017) using fecal stable isotopes to track infant diets and feeding transitions. We also adapted the methods to a new species, the ursine colobus (Colobus vellerosus), an arboreal ruminant. Our recommendations for other researchers to apply this method follow. Opportunistically collected samples of 2-4 g of feces from infants must be matched to samples collected from their mothers the same day, as maternal samples provide an isotopic baseline from which to infer infant diets. For storing in the field, feces should be frozen, or dried and stored in vials with silica. We recommend autoclave sterilization, which permits processing of the samples in Canadian laboratories without biosafety levels. After autoclaving, we recommend re-drying samples in a dehydrator and crushing them with a mortar and pestle. We recommend using an anti-static gun to remove static electricity; this decreases sample loss and maximizes the amount of fecal matter for analysis. Samples are passed through a 75 µm coarse sieve to obtain a homogenous powder. In a stable isotope laboratory, samples are weighed (1.2-1.6 mg) and analyzed using an Isotope Ratio Mass Spectrometer and Elemental Analyzer. Stable carbon ($\delta^{13}C$ = permil (‰) deviation of the ratio of ^{13}C:^{12}C relative to standard) and nitrogen ($\delta^{15}N$ = ‰ deviation of ^{15}N:^{14}N relative to air) isotopes, and nitrogen content (%N), are measured. These methods are non-invasive, require basic equipment, and increase the feasibility of obtaining import permits, as isotopic integrity is maintained with heat sterilization. Analyses are cost effective at isotope labs found in most North American cities. The novel methods described will help to systematize measurements of infant feeding and lactation lengths in wild mammals.

Unexpected variation in molar size patterns in contemporary humans, including among wisdom teeth regardless of impaction

Boughner JC (1), Marchiori DF (1), Packota GV (2)
1. Department of Anatomy, Physiology & Pharmacology, College of Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, Canada
2. College of Dentistry, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

The inhibitory cascade model (ICM) is a tenet of mammalian molar morphogenesis that predicts that the larger the first molar (M1) is relative to the size of adjacent molars (M2 and M3), the smaller the M3 and the later its initiation. Worldwide, contemporary modern humans frequently present with impacted M3s that, for unclear mechanisms, are at higher risk of impaction when they develop later. Unexpectedly, our radiographic sample of 323 oral quadrants from 99 dental patients presents 13 molar size ratio patterns at different frequencies (e.g., M1>M2>M3 in only 31.6% of cases) that reflect the maxilla versus the mandible. This pattern diversity includes non-linear size progressions (e.g., M1>M2<M3), and up to four patterns in the same person's mouth. Further, we report that M3 size is predicted not by M1 size but by M2/M1 ratio and absolute M2 size. We also report that M1 size does not predict early versus late M3 development, or proper M3 emergence versus impaction. Our findings that contemporary modern humans do not show one stereotypic molar size ratio pattern indicate that molar size is genetically softwired in recent humans, and subject to oral quadrant-specific and jaw-specific effects. This divergence from the ICM implies relaxed selection pressures leading to weaker developmental integration, stability, and canalization of *Homo sapiens* molar sizes and molar proportions that nonetheless does not impact M3 eruption. Our work suggests that ICM predictions of molar sizes may only be conditionally applied, with caution, across humans including fossil anatomically modern H. sapiens. The lack of one stereotypical molar size pattern for contemporary humans may confound predictions of molar size in fragmented fossil human specimens.

A multi-method approach to re-associating fragmented and commingled human remains: An example from the Cis-Baikal Region of Siberia, Russia

*Bourgeois RL (1), Lieverse AR (2), McKenzie H (3), Clark TN (2), Bazaliiskii VI (4)
1. Department of Anthropology, University of Alberta, Edmonton, Alberta, Canada
2. Department of Archaeology and Anthropology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada
3. Department of Anthropology, Economics and Political Science, MacEwan University, Edmonton, Alberta, Canada
4. Scientific Research Centre, Irkutsk State University, Irkutsk, Irkutsk Oblast, Russia

Bioarchaeological methods are limited in their ability to re-associate fragmented and commingled human remains from disturbed cemetery sites. Although there are many commonly employed methods that successfully re-associate commingled human remains, most are ineffective when the level of fragmentation is high. As a part of the Baikal Archaeology Project, this study seeks to extend and develop existing bioarchaeological, forensic anthropological, and zooarchaeological methods to identify discrete individuals from commingled and fragmented human remains. Building on preliminary results previously presented in a poster at CAPA 2019, this presentation will showcase new, more detailed results founded on further analysis done during the refinement of our methodology. It focuses on the Early Neolithic cemetery site of Moty-Novaia Shamanka, situated in the Cis-Baikal region of Siberia, Russia, which was bulldozed in the 1990s during land development, destroying the graves within it. By using a four-stage approach which tests qualitative associations (visual pair matches based on morphological and surface observations) with quantitative data (osteometric pair matching and GIS), we were able to identify five discrete individuals and make eight other groupings of elements from the same individual. Through a process of elimination, we determined that these groupings represented at least seven people. The entirety of the collection contained 1245 human bone fragments of varying degrees of preservation, from which we were able to refit 202 (16.23%) and calculate an MNI of nine based on femoral fragments. These results were contrasted with the only other bioarchaeological account of these remains (a population size estimate without reported methods) to show that they provided more information on life history. This was also true when we compared our four-stage approach to the MNI estimate.

Building on the bioarchaeology of care: Suggestions from the case of Khuyankh

*Brent KE (1,2), Chizmeshya SQ (1), Gilmour RJ (1,3)
1. Department of Anthropology, McMaster University, Hamilton, Ontario, Canada
2. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada
3. Department of Sociology and Anthropology, Mount Royal University, Calgary, Canada

In the last decade, examining care in the archaeological record re-emerged as a topic of importance to bioarchaeologists. In particular, Lorna Tilley's 'Index of Care' framework has allowed bioarchaeologists to assess paleopathological case studies to interpret care an individual may have required or received. As part of our research, we applied Tilley's Index of Care to the case study presented in Eugene Strouhal's 1993 paper "Physical Features and Disease of a Middle Kingdom Official". In light of this experience, we provide three concrete recommendations to expand upon the Index of Care framework. Our goal is to further enhance the Index's biocultural considerations, which we argue are foundational to care provision. First, we propose a revision in the terminologies used in categorization within the Index. This involves eliminating 'lumped categories,' i.e. those that equate and conglomerate phrases such as "little or no impact" and "impossible to tell". Furthermore, referring to a condition as “resolved” or “unresolved” in a purely pathological sense divorces the morphological manifestation of the pathology from the individual’s experiences with it; while a pathological condition may ‘resolve,’ its experience may not. Second, we suggest that the Index implement a line of questioning that more actively considers evidence of personal agency. Our intention here is to examine the opportunities of autonomy the individual may have had over their illness and disease states, including through the use of mobility aids or prostheses. Finally, we propose that the Index makes stronger connections between how the individuals of study 'fit' into their society's general lifeways and how care may have been afforded or provisioned. By highlighting the important connections between these factors, researchers are given insights into how socioeconomic status, for example, has the propensity to affect the need for care or the availability of care for a specific individual. We propose specific ways to implement these three recommendations into Tilley's Index of Care in order to bolster the already bioculturally robust Index and derive more nuanced connections between pathological conditions and individual experiences of care.

Paget’s disease of bone: Increasing reporting through consideration of non-pathognomonic lesions

Brickley MB (1)
1. Department of Anthropology, McMaster University, Hamilton, Ontario, Canada

Paget’s disease of bone (PDB) is a disorder that results in localized disruptions of bone remodeling with affected bones going through three phases of change. Over the last twenty years the number of reported cases of PDB in archaeological human remains has grown, but most have featured pathognomonic lesions found in phases two and three. This study aims to review the development of earlier phase, and non-pathognomonic lesions, and set out approaches that assist in evaluation of such lesions. The comparative approach to paleopathological diagnosis, in which comparisons are made to a known reference group, has considerable strengths in confirming cases of PDB with pathognomonic radiographic and histologic lesions. To date, however, few cases of PDB with non-pathognomonic lesions have been suggested but there is potential to do so using a biological approach. In the first phase of PDB osteoclastic activity predominates, with a move to an increase in both osteoclastic and osteoblastic activity in phase two. Aspects of phase one osteoclastic activity are discernable radiographically, with lesions such as osteoporosis circumscripta occurring in the cranial bones. The ‘mosaic’ appearance of bone, observed via histology in the later stages of phase 2 onwards is pathognomonic, but regions of woven bone that develop in earlier stages of phase two could be diagnostic in combination with other lesions. A framework for lesion evaluation and examples of both pathognomonic and earlier stage lesions will be presented enabling a biological approach to be considered in potential earlier stage cases. Taking a biological approach to diagnosis offers the potential to consider earlier stage lesions. Consideration of non-pathognomonic lesions in a biological framework would contribute to understanding disease development. There is much that remains to be learned regarding PDB and there is considerable potential for paleopathological investigations to contribute to the understanding of current health questions linked to this condition.

Les pratiques funéraires durant le Mésolithique ancien : l'exemple de la sépulture de l'enfant de l'Arma Veirana

Brun C (1), Riel-Salvatore J (1), Gravel-Miguel C (2)
1. Département d'anthropologie, Université de Montréal, Montréal, Québec, Canada
2. School of Human Evolution and Social Change, Arizona State University, Tempe, Arizona, USA

La découverte en 2017 de la tombe d'un nouveau-né daté du Mésolithique ancien (10000-9000 avant aujourd'hui [AA]) est très importante, tant par la rareté d'une telle sépulture que par la richesse et la diversité du mobilier funéraire qui l'accompagnait. Ces parures sont composées de différentes espèces de coquillages perforés et incorporés dans des ornements complexes. Au total, ce sont 84 coquillages perforés qui constituent l'assemblage du matériel funéraire, en plus de 4 pendentifs. L'objet d'étude propose de décrire ces parures et d'étudier expérimentalement la manière dont elles ont été confectionnées et portées. Une phase de réplication en laboratoire de production des perles en utilisant des fragments de coquillages de la même espèce documentée à l'Arma Veirana est l'élément central de la recherche. Cela sera suivi par une analyse microscopique entre les répliques et les perles retrouvées à la sépulture. Cette présentation sera donc sur le cadre de recherche dans lequel les expériences seront entreprises afin de mieux comprendre l'implication de l'archéologie expérimentale dans la démarche scientifique. À travers ces expériences, nous tenterons d'explorer les preuves possibles de l'émergence de comportements novateurs, en particulier les premières expressions de hiérarchie sociale manifestées par le développement ou la transmission du statut social héréditaire.

Apples, oranges, and lunch boxes: Education in eras of infection – the case of tuberculosis versus COVID-19

Burke S (1)
1. Department of Anthropology, University of Manitoba, Winnipeg, Manitoba, Canada

While children's education has emerged as one of the key issues in the COVID-19 pandemic, schools have histories in relation to infectious disease-related concerns and attentions. This research explores disease understandings as they relate to children and the negotiation of education in the presence of pervasive infectious disease challenges. Adopting a comparative approach drawing together two points separated by about 100 years, the very different contexts of tuberculosis and coronavirus are considered, along with shifting perceptions of the nature and risks of disease progression, variable states of vulnerability and infectiousness, and the underlying characteristics of the microbes at hand. Through a comparative, biocultural lens, both scientific knowledge and public awareness are considered in the policies and attitudes framing education-related decisions. Despite myriad differences defining tuberculosis and coronavirus, comparisons prove useful in exploring disease contexts and histories that are framed and reframed through changing awareness, while also highlighting important differences connected with endemic and epidemic infectious disease contexts.

New investigations using spatial approaches in Holocene Later Stone Age southern African bioarchaeology

Cameron ME (1)
1. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada

This presentation will introduce a novel research project investigating Holocene Southern African Later Stone Age (LSA) human skeletal variation by integrating bioarchaeology, landscape approaches, and palaeoenvironmental research. Evolutionary anthropologists often investigate how environmental variation contributes to human diversity. For example, the relationship between long bone biomechanical properties as well as stable isotope investigations of bone collagen have both been connected to ecological conditions in some archaeological contexts. These traits are often compared among groups from different regions to determine if certain environmental conditions are associated with certain skeletal properties. For example, among Holocene Southern African LSA groups, some individuals have stable isotopic properties indicative of marine resource exploitation and most individuals have lower limb bone biomechanical properties indicative of highly mobile lifeways. These variables relating to diet and terrestrial mobility have been compared between different

Southern African regions, particularly along the southern and western Cape coasts. However, such regional analyses may mask the important influence of local factors, such as distances to key resources, like rich marine resources, or local vegetation patterns. This novel project seeks to understand if and how these local factors affected past lifeways with implications for skeletal properties. Geographic Information Systems (GIS) will be used to test how local environmental factors, such as vegetation and terrain, impacted skeletal indicators of physical activity patterns, diet, and stress. Spatial distributions of Southern African skeletal properties will be investigated by integrating burial site locations with contemporary environmental and landscape information. Temporal variation in palaeoenvironmental conditions will also be examined to clarify if long-term climate changes shaped skeletal properties. This research will combine innovative methods in skeletal and environmental analyses to elucidate how local contexts impacted past populations.

If not base camps then what? Perspectives on *Homo erectus* mobility/territoriality and social organization from Wonderwerk Cave and the Kathu Complex

Michael Chazan (1)
1. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada

Glynn Isaac's home base/food sharing model plays a central role in the archaeology of early hominins connecting the attributes of settlement structure visible in the archaeological record with aspects of social structure distinctive of human hunter gatherers. Yet decades of research have found little compelling evidence for such sites in Early Stone Age (ESA) contexts. This talk briefly presents a perspective on the structure of ESA archaeological localities and possible implications for the social structure of ESA hominin society based on research at Wonderwerk Cave and the Kathu Complex, located in the Northern Cape Province, South Africa.

An analysis of the Nutrition North Canada subsidy program in Northern Ontario from 2011 to 2019

*Checholik C (1), Galloway T (2)
1. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada
2. Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada

Populations living in remote northern communities in Canada experience higher rates of food insecurity compared to the rest of the country. An identified cause of this is that remote communities, defined as those without year-round road access, rely on air transportation to acquire nutritious, but perishable food throughout the year when road travel is not possible. High costs associated with transporting nutritious foods by air result in extremely high food costs, making healthy foods unaffordable and contributing to an elevated rate of food insecurity and diet-related chronic diseases. This study aims to understand the effectiveness of Nutrition North Canada (NNC), a Government of Canada subsidy program overseen by Indigenous Services Canada, aimed at reducing the costs of nutritious foods in remote Canadian communities. The success of the NNC program has been questioned by numerous academics as studies have repeatedly shown that rates of food insecurity have not decreased in remote communities since the establishment of NNC in 2011. In 2016, in response to complaints that NNC had not adequately reduced food costs, Indigenous Services Canada made changes to the program for the first time since its creation. Whether these changes implemented in 2016 are likely to have significantly lowered food costs and improved food security, is the question examined in this study. To study the effectiveness of the NNC subsidy program for the northern Ontario region specifically, a longitudinal dataset was compiled and analyzed from the publicly-available Reports section of the NNC website. The non-parametric Kruskal-Wallis test was used to test whether subsidy amounts increased significantly from the 2011/2012 fiscal year to the 2018/2019 fiscal year. The results indicate that in Ontario, although the total subsidy amounts increased in 2016, median subsidy amounts received by each community did not change significantly because in Ontario, 12 communities became newly eligible to receive the NNC subsidy in 2016. Therefore, despite federal claims which state otherwise, it is concluded that the NNC subsidy has not succeeded in making nutritious foods affordable in remote, northern communities.

Multiproxy reconstruction of dietary practices of the 'Archaic Age' populations of Playa del Mango site, Granma, Cuba

Chinique de Armas Y (1), Laffoon J (2), Buhay W (3), Reyes I (4), Skelton S (1), Rodríguez Suarez R (4), González Herrera UM (4), Roksandic M (1)
1. Department of Anthropology, University of Winnipeg, Winnipeg, Manitoba, Canada
2. Leiden University, Faculty of Archaeology, Leiden, The Netherlands
3. Department of Geography, University of Winnipeg, Winnipeg, Manitoba, Canada
4. Cuban Institute of Anthropology, Havana, Cuba

Paleoethnobotanical and stable isotope studies have demonstrated that Archaic Age populations from the Antilles, traditionally understood as groups who depended exclusively on wild resources, cultivated and consumed both C_3 and C_4 plants. However, questions remain about the relative importance of cultigens, in comparison to other resources, and the differential use of plants, especially maize, between populations and individuals. In this paper we combined the use of stable isotope analysis ($\delta^{15}N$, $\delta^{13}Cco$, $\delta^{13}Cen$, $\delta^{13}Cap$, $\delta^{37}S$) in 27 individuals from the archaeological site of Playa del Mango with the identification of starch grains in dental calculus. Although C_3 (e.g., *Calathea* sp., *Maranta* sp., *Ipomoea batatas*) and C_4 plants (*Zea mays*) were found in similar proportions in the dental calculus of the individuals sampled, the stable isotope results indicated that they had a diet 70:30 C_3/C_4 diet, where at least 65% was based on C_3 protein. This supports that the amount of starch grains, lack of or abundance, cannot directly indicate the frequency of starches consumed within a population. In addition, statistically significant differences were found between female and male individuals for the carbon composition of diet and its energy portion. The protein source of diet was found to be similar. This suggests a differential consumption of plants between females and males. Playa del Mango individuals' diet was statistically significant different that the diet reported for other Archaic Age sites from Cuba (Canímar Abajo, Cueva del Perico I, Cueva Calero and Guayabo Blanco), supporting that Archaic Age populations with different dietary practices inhabited Cuba in precolonial times. In addition to understanding the dietary variation among the Caribbean indigenous groups, this study demonstrated that the combined use of stable isotopes and starch analysis is a powerful tool to reconstruct dietary practices of past populations.

Ontogeny of social grooming in wild infant chimpanzees (Pan troglodytes schweinfurthii) at Ngogo, Uganda

Desruelle K (1), Curteanu C (1), Badescu I (1)
1. Département d'Anthropologie, Université de Montréal, Montréal, Québec, Canada

Social grooming is important for primates for its hygienic purpose and for the creation and maintenance of social relationships. Grooming skills are likely acquired during infancy and juvenility, but little is known about how this behaviour develops and which factors affect its expression. We examined the effects of infant and maternal characteristics on social grooming of infants with the mother and other group members in wild chimpanzees (*Pan troglodytes schweinfurthii*) at Ngogo, Uganda. January to April 2018 we collected behavioural data using one-hour focal animal sampling of 23 infants who ranged in age from birth to 7 y/o. We measured mean grooming rates (bouts/hour), probabilities (presence or absence), and durations (seconds per grooming bout), and used Generalized Estimating Equations (GEE) to determine the effects of infant age, sex and maternal parity on each grooming variable. Older infants gave (GEE, with mother: $p = 0.00$) and received (with mother: $p = 0.02$; with others: $p = 0.09$) longer grooming bouts. These results emphasize that social grooming for chimpanzees begins early in life during interactions mostly with mothers, but also with others, and that it becomes more prominent in infants' lives as they age. Whether the infant was male or female had no impact on grooming dimensions, which indicates that grooming fulfills important functions for both sexes in chimpanzees. In this male philopatric species, grooming for females is important when integrating into a new group during dispersal, which happens in adolescence, and for males grooming is used when integrating into the male social hierarchy in early adulthood. Primiparous mothers were groomed by their offspring longer than multiparous mothers ($p = 0.03$). Infants of multiparous mothers received more grooming by other group members than did infants of primiparous mothers (rate: $p = 0.10$; likelihood of grooming presence: $p = 0.00$). These results suggest that in contrast to primiparous females, infants of multiparous females benefit from grooming with a wider variety of

conspecifics, especially maternal siblings. Understanding how social grooming is acquired in early life sheds light on the functions of this behavior later in life, into adulthood.

Ostrich eggshell bead strontium isotopes reveal persistent macroscale social networking across late Quaternary southern Africa

Dewar G (1,2), Stewart BA (3,1), Zhao Y (3), Mitchell PJ (4,5), Gleason JD (6), Blum JD (6)
1. Rock Art Research Institute, University of the Witwatersrand, Witwatersrand, South Africa
2. Department of Anthropology, University of Toronto Scarborough, Toronto, Ontario, Canada
3. Department of Anthropology and Museum of Anthropological Archaeology, University of Michigan, Ann Arbor, Michigan, USA
4. School of Archaeology, University of Oxford, Oxford, United Kingdom
5. School of Geography, Archaeology, and Environmental Studies, University of the Witwatersrand, Witwatersrand, South Africa
6. Earth and Environmental Sciences, University of Michigan, Ann Arbor, Michigan, USA

Hunter-gatherer exchange networks that dampen subsistence and reproductive risks by building relationships of mutual support outside local groups that are underwritten by symbolic gift exchange. Hxaro, the system of delayed reciprocity between Ju/'hoãn individuals in southern Africa's Kalahari Desert, is the best known such example and the basis for most analogies and models of hunter-gatherer exchange in prehistory. However, its antiquity, drivers, and development remain unclear, as they do for long-distance exchanges among African foragers more broadly. Here we show through strontium isotope analyses of ostrich eggshell beads from highland Lesotho, and associated strontium isoscape development, that such practices stretch back into the late Middle Stone Age. We argue that these exchange items originated beyond the macroband from groups occupying the more water-stressed subcontinental interior. Tracking the emergence and persistence of macroscale, transbiome social networks helps illuminate the evolution of social strategies needed to thrive in stochastic environments, strategies that in our case study show persistence over more than 33,000 y

Geographically isolated Mseleni joint disease: Using a biocultural framework to assess onset and aetiology

Dinkele E (1,2), Ballo R (2), Fredlund V (3), Gibbon VE (1)
1. Division of Clinical Anatomy and Biological Anthropology, Department of Human Biology, Cape Town, South Africa
2. Division of Cell Biology/Nutrition/Physiological Sciences, Department of Human Biology, Cape Town, South Africa
3. Mseleni Hospital, Kwa-Zulu Natal, South Africa

Mseleni joint disease (MJD) is a crippling arthropathy that is endemic to a rural community of Bantu-language speakers in KwaZulu-Natal, South Africa. It is described as a bilateral, uniform, polyarticular condition that is most severely localised to the hip region. The geographic confinement of MJD is peculiar as the affected population is neither genetically nor culturally isolated from other Bantu-descendent South Africans. The early onset of MJD in children and adolescents and the greater prevalence in women are unique features of this condition. Several cultural, biological and epigenetic factors are suspected to be aetiological of MJD, however, these are yet to be identified. The aims of this study were to examine biocultural factors implicated in the onset and clinical presentation of MJD and to investigate the explanatory models of MJD in the affected community. Quantitative data from medical records (n=733) and both qualitative and quantitative data from surveys (n=50) from 2019 were analysed (HREC 079/2019). Findings from medical records confirm that MJD initiates in synovial joints and pathology in the lumbar spine (fibrocartilaginous joints) occurs due to a change in gait as a result of hip and knee pain. The onset of MJD occurs most commonly in the hip (68%) and knee joints (45%) with unilateral joint pathology identified more frequently (52%) at onset than bilateral pathology. No MJD patients younger than 35 years of age were identified, suggesting a later onset and diagnostic age than previously reported. Women were almost twice as likely to have MJD than men (OR= 1.88; p=0.03). Several women linked the onset of MJD to childbirth and performing domestic tasks requiring load bearing and walking long-distances. Survey participants perceived MJD to have one or several supernatural (witchcraft or evil spirits), natural (physiology, genetics, environmental conditions and sanitation) and/or social causes (gender-based practices

and lifestyle). Fieldwork experiences, data collection procedures and results will be presented to highlight the translational applications of this research for Mseleni patients, healthcare providers and the affected community. This work emphasises the utility of the biocultural approach in understanding aetiologies and health-seeking behaviours associated with diseases in contemporary populations.

Preliminary insights from the Grave 5 charnel house at Wadi Faynan 100, Jordan

Dolphin AE (1), Meijer J (2), Coffin J (1), Adams RB (1)
1. University of Waterloo, Waterloo, Ontario, Canada
2. Trent University, Peterborough, Ontario, Canada

Wadi Faynan 100 (WF100) is located in the Faynan Basin in Southern Jordan and was excavated June 2019 in order to begin the recovery of Bronze Age human remains. The graves excavated during the 2019 field season are unique in that they appear to be stone-built charnel houses containing multiple co-mingled internments. Within the double stone-walled enclosure of Grave 5, a minimum of five individuals were present and looting appears to have minimally impacted the skeletal material. Three relatively intact adult crania, one adult frontal bone, and two fragments of a juvenile cranium lined the northwest corner of the grave. Some postcranial remains were found beneath the crania with most material located in the southern portion of the grave. Grave 5, and the other charnel houses of Wadi Faynan 100 appear to be unique among other Early Bronze Age graves excavated thus far within the Faynan region, but maybe demonstrate similarities to burial practices documented at Bāb edh-Dhrā, 100Km to the north. Preliminary assessments of the remains from Wadi Faynan 100 will be discussed, including signs of cranial trauma from Grave 5. This work also presents new insights regarding regional relationships in the Early Bronze Age of Southern Jordan.

Don't you misdiagnose me: *Actinomyces spp*. and the issues surrounding misdiagnosis in archaeological and clinical populations

*Doucette RG (1), Merrett DC (1)
1. Department of Archaeology, Simon Fraser University, Burnaby, British Columbia, Canada

Bacterial disease is the most common cause of death in past and present human populations. Our role as palaeopathologists is to identify how bone is affected by the infectious disease process as well as develop an understanding of the subtleties of an immune system response. Major problems in the analysis of bone disease stem from a lack of sample specimens, poor preservation of the specimen, and misdiagnosis. In dry bone specimens, these problems intensify thus making a proper palaeopathological analysis exceptionally difficult or improbable. One of the most common infectious diseases misdiagnosed in dry bone, are those caused by *Actinomyces* spp., a gram-positive, non-acid fast bacterium, previously incorrectly classified as a fungus due to its filamentous appearance. The bony changes seen in archaeological and clinical specimens generally exhibit small, multiple lytic lesions with sclerotic margins, which are often very similar in appearance to those seen in cases of Tuberculosis and Leprosy. The pathogenic species of *Actinomyces* spp. do not present themselves in nature, however, are natural microflora of the oropharynx, gastrointestinal tract, and female genital tract. When presenting in a skeletal population, the bony changes are secondary to a tissue infection and are commonly located in the cervicofacial, abdominal, thoracic and central nervous system regions. The most significant archaeological instance of *Actinomyces* sp. identified in the archaeological record is that of the LeVesconte Burial Mounds in Southeastern Ontario by J.E. Molto (1990) which provides a differential diagnosis of rib lesions on middle woodland skeletons circa 230 AD. Through a combination of clinical information, differential diagnosis, and case study, this poster provides insight into issues surrounding misdiagnosis or lack thereof in archaeological populations and further compares Actinomycosis to similar presenting diseases such as Tuberculosis and Leprosy. Based on the information provided, researchers should consider Actinomycosis in their differential diagnoses when looking at palaeopathological findings as it may be the less common option but should not be dismissed.

Lab coats amongst the archives: Genomic resuscitation of Civil War vaccine strains from historical artefacts

Duggan AT (1), Poinar HN (1,2,3), Klunk J (4,5), Porter AF (6), Dhody AN (7,8), Hicks R (7,8), Smith GL (9), Humphreys M (10), McCollum AM (11), Davidson WB (11), Wilkins K (11), Li Y (11), Burke A (8), Polasky H (8), Flanders L (8), Poinar D (1), Raphenya AR (2), Lau TTY (2,12), Alcock B (2), McArthur AG (2), Golding GB (4), Holmes EC (6)

1. Department of Anthropology, McMaster University, Hamilton, , Ontario, Canada
2. M.G. DeGroote Institute for Infectious Disease Research, McMaster University, Hamilton, Ontario, Canada
3. Department of Biochemistry, McMaster University, Hamilton, Ontario, Canada
4. Department of Biology, McMaster University, Hamilton, Ontario, Canada
5. Present address: Arbor Biosciences, Ann Arbor, Michigan, USA
6. Marie Bashir Institute for Infectious Diseases and Biosecurity, University of Sydney, Sydney, New South Wales, Australia
7. Mütter Research Institute, Philadelphia, Pennsylvania, USA
8. Mütter Museum of The College of Physicians of Philadelphia, Philadelphia, Pennsylvania, USA
9. Department of Pathology, University of Cambridge, Cambridge, United Kingdom
10. Department of History, Duke University, Durham, North Carolina, USA
11. U.S. Centers for Disease Control and Prevention, Division of High-Consequence Pathogens and Pathology, Poxvirus and Rabies Branch, Atlanta, Georgia, USA
12. BC Cancer Research Centre, Vancouver, British Columbia, Canada

In 1980, following a 13-year eradication programme and almost 200 years after Edward Jenner's pioneering studies in vaccination, the World Health Organization declared the world free of smallpox. As we approach another era of mass global vaccination, we reflect on the wealth of behavioural and biological information preserved in the material record. Through non-destructive sampling of medical artefacts, stored in archives and museums around the world, we examine changes in medical cultural practices through time as well as interrogate the source materials for both host and pathogen DNA. Furthermore, the storage environment and careful curation of these items generally results in greatly reduced or negligible environmental contamination, generating DNA profiles that are more representative of the medical artefacts as opposed to ubiquitous exogenous contamination. These studies have begun to reveal fascinating aspects of 19th century vaccination practices. For example, sufficient DNA isolated from these materials have enabled the determination of biological sex and mitogenomic ancestry of individuals who aided in the perpetuation of these labile vaccines. In addition, the DNA enables genomic reconstruction of the viral strains associated with early vaccination campaigns. Through use of a novel methodology known as targeted enrichment for microbes of interest, we can place these historical pathogens into a phylogeny comparing them with modern strains. This allows us to begin to unravel the long evolutionary and shorter vaccination history of these immensely important viruses prior to their essential role in the eradication of one of humanity's most deadly pathogens.

Bifacial strategies before the Early Acheulean: new evidence from Kokiselei 6, West Turkana, Kenya 1.8 Ma.

Duke H (1), Feibel C (2), Harmand S (3)

(1) Department of Anthropology, University of Toronto, Toronto, Ontario, Canada
(2) Department of Anthropology, Rutgers University, New Brunswick, New Jersey, USA
(3) Department of Anthropology & Turkana Basin Institute, Stony Brook University, Stony Brook, New York, USA

We present new evidence for the emergence of biface shaping from the Kokiselei Site Complex (KS) in West Turkana, Kenya, at the Kokiselei 6 (KS6) site. This rich and well-preserved new site presents an opportunity to investigate processes of technological change during the earliest development of biface shaping within a single site complex. The development of biface shaping in lithic technology is often used as evidence for increased and/or novel cognitive abilities that contrast prior hominins' flaking capacities. Yet, recent research reveals a story of gradual change over time in a variety of different flaking and shaping strategies. Here, we examine the emergence of biface shaping technology at KS6 with a focus on direct comparisons between flaking and shaping strategies at the site. The Kokiselei Site Complex preserves the oldest known Acheulean lithic assemblage, KS4 (1.76 Ma), as well as several older sites. The chronostratigraphic research shows that KS6 stratigraphically

underlies KS4 and is the oldest site in the complex at 1.8 Ma. The KS6 excavation yielded thousands of piece-plotted lithic artefacts and faunal remains. Technological analysis of the lithics (n=3856) indicates a prevalence of bifacial flaking strategies alongside minimal evidence for biface shaping. Bifacial flaking and biface shaping at KS6 draw on similar operations and abilities. The evidence from KS6 suggest that biface shaping emerged gradually out of variability in bifacial core reduction, ultimately leading to the systematic production of bifaces characteristic of the Acheulean. These conclusions question long held assumptions about hominin cognitive evolution that suggest Acheulean technology required new, and more complex, cognitive abilities and gestures. Instead, our results suggest that biface shaping required a reconfiguration of existing cognitive abilities that had deep roots in older flaking strategies.

2D geometric morphometrics analysis of Liang Bua rat taxa

*Eber A (1), Veatch EG (2,3), Tocheri MW (1,4,5)
1. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada
2. Department of Anthropology, Emory University, Atlanta, Georgia, USA
3. Department of Anthropology, Yale University, New Haven, Connecticut, USA
4. Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington DC, USA
5. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia

Using 2D geometric morphometrics (2DGM) and high-resolution images of mandibular rat molars, this research aims to develop a robust, quantitative method to differentiate among the multiple species of rat present at the archaeological site of Liang Bua (Flores, Indonesia). Currently, there are eight endemic species of rats recorded in the Liang Bua stratigraphy (*Papagomys armandvillei, Papagomys theodorverhoeveni, Spelaeomys florensis, Hooijeromys nusatenggara, Komodomys rintjanus, Paulamys naso, Rattus hainaldi,* and *Rattus exulans*) and these taxa vary in terms of their body size, habitat preferences, and adaptations. Using a set of 18 landmarks distributed throughout the molar row, results from this work successfully distinguish between species, particularly those of similar body size, and do not appear to be significantly affected by tooth wear. For example, Principal Components Analysis (PCA) of the Procrustes shape coordinates clearly separates two species of medium-sized rats (*Komodomys rintjanus* from *Paulamys naso*), regardless of wear stage, based on differences from one another in terms of subtle molar characteristics and relative dimensions. The PCA of the larger-bodied rats also results in clearly defined shape clusters for *Papagomys armandvillei, Papagomys theodorverhoeveni, Spelaeomys florensis,* and *Hooijeromys nusatenggara*. Overall, 2DGM appears to be an appropriate method for quantitatively assessing the taxonomy of the large number of rat jaws recovered at Liang Bua. The resulting 2D "warp grids" also provide visualizations of the key shape differences between various rat taxa. Because these different rat species are known to vary in terms of habitat preference, this 2DGM approach offers an important quantitative tool for studying paleoecological changes through time at Liang Bua and other archaeological sites on Flores.

Physical activity practices amongst Arab newcomers in Western societies: A need for equitable and culturally sensitive physical activity opportunities

*Elshahat S (1), Newbold B (2), Moffat T (1)
1. Department of Anthropology, McMaster University, Hamilton, Ontario, Canada
2. School of Earth, Environment & Society, McMaster University, Hamilton, Ontario, Canada

Inadequate physical activity (PA) is the fourth leading risk factor for multiple non-communicable diseases and causes over 3 million deaths annually worldwide. The issue is much more prevalent among immigrants and refugees owing to socio-cultural and environmental factors such as discrimination and different social and physical environment attributes. This can be especially critical among Arab immigrants and refugees (AIR), who usually embody distinct cultural beliefs/values and previously lived in socio-physical environments that spontaneously fostered their PA levels. This review investigated PA patterns, knowledge, attitudes as well as barriers and facilitators to PA participation among AIR living in Western countries (the US, Canada, Australia,

New Zealand, and Europe). The aim of this review was to inform prospective PA research and policy development processes towards designing effective, culturally acceptable PA interventions for AIR. Despite demonstrating positive attitudes and reasonable knowledge of PA recommendations for health, AIR showed a low PA participation prevalence, highlighting the presence of a knowledge-compliance gap. The prevalence of adequate PA was lowest in the US, whereas Europe exhibited the highest adequate PA prevalence. Personal barriers to PA engagement included language issues and poor PA skills, whereas enhanced PA literacy was a primary facilitator. Family responsibility, perceived discrimination, and cultural restrictions were key psychosocial/cultural barriers, whereas social support, broader community cohesion, and culturally sensitive resources/spaces were powerful facilitators. Lack of availability of cyclist/pedestrian-friendly infrastructure was a leading environmental barrier among AIR living in North America, but not in Europe. Community-engaged and mixed-method PA studies of AIR are required to inform the development of evidence-based, culturally appropriate PA interventions. Intersectoral collaboration is needed to design PA-friendly environments/spaces and develop inclusive PA-enhancing policies, promoting AIR and other marginalized populations' PA engagement and hence, improving their overall health and well-being.

Comparative mitogenomics of prehistoric longtail macaques *(Macaca fascicularis)* from Liang Bua (Flores, Indonesia): Implications for understanding of past modern human dispersals

Evans BJ (1), Gansauge M-T (2), Tocheri MW (3,4,5), Schillaci MA (6), Sutikna T (5,7,8), Jatmiko (8), Wahyu Saptomo E (8), Klegarth A (9), Tosi AJ (10), Melnick DJ (11), Meyer M (2)
1. Department of Biology, McMaster University, Hamilton, Ontario, Canada
2. Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany
3. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada
4. Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington DC, USA
5. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia
6. Department of Anthropology, University of Toronto Scarborough, Toronto, Ontario, Canada
7. Centre for Archaeological Science, School of Earth and Environmental Sciences, University of Wollongong, Wollongong, Australia
8. Pusat Penelitian Arkeologi Nasional, Jakarta, Indonesia
9. Department of Anthropology, University of Washington, Seattle, Washington, USA
10. Department of Anthropology, Kent State University, Kent, Ohio, USA
11. Department of Ecology, Evolution, and Environmental Biology, Columbia University, New York, New York, USA

Wallace's Line demarcates a biogeographical boundary between the Indomalaya and Australasian ecoregions. Most placental mammalian genera, for example, occur to the west of this line, whereas most marsupial genera occur to the east. However, macaque monkeys are unusual because they naturally occur on both western and eastern sides. To further explore this anomalous distribution, we analyzed 222 mitochondrial genomes from ~20 macaque species, including new genomes from 60 specimens. These include population sampling of *Macaca fascicularis* (long-tailed macaque) specimens that were recovered during archaeological excavations at Liang Bua, a cave on the Indonesian island of Flores, and also museum specimens from other parts of the Lesser Sunda Islands, including specimens that were collected by Alfred R. Wallace. Direct calibrated radiocarbon ages for four macaque specimens from Liang Bua demonstrate that macaques were present on Flores by at least ~2,500 years ago, and analysis of ancient DNA from these specimens indicates that they were *M. fascicularis*. Mitochondrial genomes from these and other *M. fascicularis* specimens identifies three mitochondrial lineages that span the southernmost portion of Wallace's Line between Bali and Lombok, and divergences within these lineages are contemporaneous with, and possibly mediated by past dispersals of modern human populations. Taken together, these findings further characterize *M. fascicularis* evolution prior to and following modern human dispersal throughout Island Southeast Asia, and point to possible effects on biodiversity of ancient human cultural diasporas.

Terrestrial Forensic Taphonomy in Cape Town, South Africa

Finaughty DA (1), Gibbon VE (2)
1. School of Anthropology and Conservation, University of Kent, Canterbury, Kent, United Kingdom
2. Division of Clinical Anatomy and Biological Anthropology, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa

Cape Town, South Africa has a population of approximately 4 million people, and has the highest murder rate for any metropolitan region in the country. South Africa has a high rate of unnatural deaths and many of these are unidentified annually. Determination of the post-mortem interval (PMI) is a crucial element of forensic death investigations. An accurate estimate of PMI reduces the potential pool of individuals that the remains may belong to, thereby increasing the chances of correct identification. It also assists with understanding the context of a criminal case, narrowing the search window for police. In the case of a homicide, this can be used to exclude possible perpetrators or corroborate testimony. The estimation of PMI relies heavily on interpreting the state of decomposition, a continuous process influenced by multiple environmental factors, along with invertebrate and vertebrate activity. Since these factors can vary by geographic area, local data is crucial for forensic validity. The aim of this presentation is to introduce the multidisciplinary terrestrial taphonomic research enterprise based in Cape Town's forensically significant habitats and show the relevance of locally specific surface decomposition date for improving PMI estimates for the region. Using porcine carcasses as proxies for human decomposition, decay rates for clothed and unclothed carrion through both summer and winter seasons will be provided; the forensically significant role of the Cape grey mongoose (*Galerella pulverulenta*) as a wild scavenger will be explained; and we will introduce the locally developed fully automated data collection system comprising weather stations, carcass weighing apparatuses, and camera trapping which provides for truly quantitative measurement of variables comprising the decomposition ecosystem. A discussion of the findings to date will illuminate the importance of local data, the necessity for incorporation of ecological principles and forensic realism into taphonomic experimental design, and the value of automating data collection. In addition, an outline of the future and continued research at this site will be demonstrated.

The relative effectiveness of different protected area types at reducing forest fire frequency in Madagascar

Frappier-Brinton T (1)
1. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada

Climate change continues to increase the frequency of forest fires worldwide, and Madagascar already has some of the most prevalent fire use of any country, with an estimated 25-50% of land burning every year. Forest fires, as both slash-and-burn clearing and escaped grassland fires, are one of the major causes of rampant deforestation in Madagascar, and Madagascar has established over 50 terrestrial protected areas to preserve its forests and endemic species. However, researchers have raised concerns that some protected areas, particularly those that were rapidly established following the 2003 "Durban Vision" conservation initiative, may not be as effective as others at preserving their forest ecosystems. The majority of the recently established protected areas are "Special Reserves", meaning that they are not managed by Madagascar National Parks, and generally do not have park rangers enforcing forest protection regulations. Most Special Reserves were established with integrated community management in tandem with non-governmental conservation organizations. Research on the ability of community-protected areas to prevent forest fires compared to government-operated protected areas worldwide has found results that vary by region. This study will be the first to assess forest fire prevalence across all protected areas in Madagascar. Analysis will be conducted using FIRMS satellite data for fire location over the past 10 years. Data will be analyzed using ArcGIS to compare fire locations to protected areas, comparing their designation (Special Reserve vs National Park), IUCN category, habitat type, size, and year of establishment. The relative success of each protected area at reducing forest fire frequency will be assessed by comparing the number of forest fires per km^2 within the park to that in a surrounding buffer area. These results will help inform conservation theory and implementation by highlighting which types of protected areas are most effective at decreasing fire frequency, as well as calling attention to particular protected areas in Madagascar that may need additional help to prevent future forest fires.

Eating the evidence: first documentation of forensically significant consumption of carrion entomofauna by the Cape grey mongoose *(Gaerella pulverulenta)*

French G (1), Spies MJ (2), Gibbon VE (2), Finaughty DA (1)
1. School of Anthropology and Conservation, University of Kent, Canterbury, United Kingdom
2. Division of Clinical Anatomy and Biological Anthropology, Department of Human Biology, Cape Town, South Africa

Blow fly larvae (maggots) play a vital role in decomposition and are often a primary signifier of the 'active' stage of decay. Being among the first inhabitants of carrion, determining the age of the oldest maggots is one of the most accurate and widely used methods for estimating the post-mortem interval (PMI). However, little research has considered the predator-prey dynamic that insects infesting a carcass face, leaving a gap in taphonomic research where PMI estimation is at risk. In South Africa, the Cape grey mongoose (CGM; *Galerella pulverulenta*) has been identified as a scavenger of forensic significance. Questions surrounding their potential impact on carrion insect assemblages are not conclusively answered. This research aimed to establish detailed insight into CGM carrion feeding patterns and behaviours. Four camera traps, capturing videographic footage, were situated around a single clothed porcine carcass, sensitive enough to be triggered by maggot mass movement. The footage revealed the first conclusive evidence of CGM consumption of carrion entomofauna. Totals were compared against times where the mongooses fed on the carcass itself or the maggots. Though carcass feeding grossed a higher quantity (86.24%), maggot feeding was observed frequently (12.84%) and is thought to have occurred more often than videographically documented. In addition to direct predation reducing carcass-based maggot population size, the mongooses exhibited a digging behaviour (335 instances) under the carcass, creating a tunnel wherein maggots may fall away from the carcass. Taken together, and considered in light of the paucity of international literature quantifying scavenging behaviour in forensic contexts, these previously undocumented CGM behaviours, and the extent thereof, pose serious implications for modelling decomposition and deriving PMI estimates in both local and international investigations. Towards addressing this, a standardised research methodology for quantifying such scavenging behaviours is proposed, and recommendations for future research are discussed.

Three-dimensional geometric morphometric analysis of talar and medial cuneiform shape variation in chimpanzees and bonobos

*Friesen SE (1), Knigge RP (2), Tocheri MW (1,3,4)
1. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada
2. Department of Integrative Biology & Physiology, University of Minnesota Medical School, Minneapolis, Minnesota, USA
3. Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington DC, USA
4. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, New South Wales, Australia

Interpretations of early hominin locomotor behaviour typically rely upon comparisons of fossil hominin anatomy with that of extant humans and great apes. Establishing form-function relationships between extant great ape anatomy and their locomotor behaviours, as well as understanding the breadth of variation that exists within these taxa, helps inform interpretations of early hominin behaviour. Previous studies have shown that the shapes of the talus and medial cuneiform among gorillas are strongly linked to how frequently particular populations or taxa climb. In this study, we explore the extent of shape variation in these foot bones among chimpanzees and bonobos. Early studies reported that bonobos practiced more arboreal locomotion than chimpanzees; however, more recent fieldwork indicates that bonobo and chimpanzee locomotor behaviours are more similar to one another than previously thought. This suggests that the tali and medial cuneiforms of bonobos and chimpanzees should show minimal shape differences. A large sample of chimpanzee and bonobo tali and medial cuneiforms (N > 100 for each) was quantitatively analyzed using 3D geometric morphometric methods. We found that talar and medial cuneiform shape for all chimpanzee subspecies differed significantly from that of bonobos, and that both western chimpanzee and bonobo tali exhibit characteristics previously linked to a higher frequency of climbing in gorillas and generally among catarrhines. The first metatarsal facet of bonobo and some eastern and central chimpanzee medial cuneiforms displayed morphology associated with greater abduction of the hallux. Significant differences in talar and medial cuneiform shape were also found

between western, central, and eastern chimpanzees. Contrary to predictions, substantial variation in talar and medial cuneiform shape was observed among chimpanzees and bonobos, including features that may represent some degree of functional adaptations for climbing in some taxa.

The influence of infant age, sex, and maternal parity on infant carrying in wild chimpanzees

*Gaudreault M (1), Landry F (2), Curteanu C (2), Desruelle K (2), Badescu I (2)
1. Département de sciences biologiques, Université de Montréal, Montréal, Québec, Canada
2. Département d'Anthropologie, Université de Montréal, Montréal, Québec, Canada

Primate mothers must hold and carry their infants in different positions to facilitate nursing, thermoregulation, transport, and safety. The positions of infants on the mother's body can therefore influence infant development and survival, which affects population growths. We studied 38 chimpanzee (*Pan troglodytes*) mother-infant pairs at Ngogo, Uganda to investigate the potential effects of infant age and sex, and maternal parity, on positions that infants adopt while in body contact with the mothers. We used 1-hour focal animal sampling of infants to record changes in positions, including ventral (PV), dorsal (PD), on the side (PS), lap (PL), low lap (PW), and in contact beside the mother (PB). We conducted Generalized Estimating Equations (GEE) to evaluate the effects of age, sex, and mother's parity on each infant's total number of positions, percentages (frequency of position/total positions*100) and rates (frequency of position/focal hours). Results showed that younger infants, who are likely lighter, were held and carried more than older infants in PV, PL, PW (GEE % and rate: $p < 0.01$) and PS ($p < 0.05$). Older, and heavier, infants were held more than younger infants in PD (%: $p < 0.05$) and PB (%: $p < 0.01$). The total number of positions and rates, or the overall physical contact with the mother, decreased with infant age ($p < 0.01$). Female and male infants adopted positions at similar rates and percentages. Primiparous females tended to hold infants in PV (%: $p = 0.06$) more, possibly to facilitate easier handling, and showed PW more (% and rate: $p < 0.05$, $p < 0.01$), which may indicate maternal inexperience. Multiparous females, who may be more permissive, held their infants more in PD (rate: $p < 0.01$), PS (% and rate: $p < 0.01$, $p < 0.05$) and PB (rate: $p < 0.05$). This study contributes to better understanding the infant carrying strategies used by primate mothers to ensure their infants' safety and development, and sheds light on how these strategies may change with increasing maternal experience and as infants become more independent.

Re-examining human variation in Equatorial Africa from the Late Stone Age to modern times: a 3D analysis of the temporal bone

*Ghalem Y (1), Ribot I (1)
1. Department of Anthropology, Université de Montréal, Montréal, Québec

The human morphology of the cranium is a useful tool in exploring population history and adaptation. When establishing biological distances between groups, skull morphology, depending on the chosen anatomical region, reflects not only genetics but also environmental factors. For instance, studies have demonstrated that the face is associated with climatic adaptation, while part of the vault and the cranial base, especially the temporal bone, reflect human phylogeny. Thereby, the present study uses the temporal bone, a key anatomical region to investigate past and recent human diversity at several archaeological sites from Equatorial Africa. The best-preserved temporal bones from the Late Stone Age (Shum Laka 7,000 – 3,000 BP), the Iron Age (Upemba Depression, 600 – 1,900 AD), and the late modern period (19th – 20th centuries) were selected and were morphometrically analyzed using 3D geometric morphometrics to investigate human diversity through time. Results show that: i) the 3D morphology of the temporal bone reflects phylogenetics; ii) there is morphological continuity from the Late Stone Age until the late modern period, and iii) there is morphological variation within the archaeological sample as well as within the recent sample. This study complements paleogenetics in highlighting the beneficial re-examination of archaeological human remains as they can provide novel information on humankind's diversity and adaptation in Equatorial Africa.

Sexual orientation-based disparities in bone health among American adults

Gibb JK (1), Shattuck EC (2)
1. Department of Health & Society, University of Toronto Scarborough, Toronto, Ontario, Canada
2. Institute for Health Disparities Research, University of Texas at San Antonio, San Antonio, USA

Sexual minority (SM) people experience significant stress associated with stigma, contributing to a higher rate of adverse health outcomes. Several known factors (e.g. smoking) elevate risk of poor bone health, but to date little research has examined disparities in bone health among SM people. To address this, we analyzed sexual orientation differences in an available bone mineral density (BMD) cross-sectional dataset assessed via dual x-ray absorptiometry. We combined the 2007-2008, 2009-2010, and 2013-2014 cycles of US National Health and Nutrition Examination Survey to examine sexual orientation-based differences in z-scored BMD in the proximal femur (greater trochanter and intertrochanter locations), bone mineral content (BMC) in the femur and spine, and osteoporosis risk among Lesbian/Gay (n= 53), Bisexual (n= 97), Same-Sex Experienced (n= 103), and Heterosexual (n= 2,990) adults. Sexual orientation-based disparities in bone mass were observed across all anatomical sites. This effect was due to differences between heterosexual and gay men, and persisted in linear regressions after adjusting for risk factors. We found differences in femoral and femoral neck BMC in heterosexual and gay men ($p = 0.02$) and in femoral, femoral neck and spinal BMC between heterosexual and bisexual women ($p = 0.05$). Sexual orientation remained significant in BMC regressions. Our findings suggest that SM men but not women are at greater risk for poor bone health relative to heterosexuals and this disparity is independent of the lifestyle and psychosocial risks included in our models.

Separating the illness from the individual: using bioarchaeology of disability to understand how Tuberculosis impacted life

Gooderham E (1), Cardoso HFV (1)
1. Department of Archaeology and Centre for Forensic Research, Simon Fraser University, Burnaby, British Columbia, Canada

This paper will operationalize bioarchaeology of disability, which applies theoretical frameworks from biology, disability studies, history, and biological anthropology to understand the impacts of marginalization due to disability in the past. Engaging with the social model of disability, it is understood that the disability community is marginalized due to physical and social barriers. Bioarchaeology of disability uses principles from paleopathology and osteobiography but emphasizes the analysis of disability as a social identity. As such, it is also distinguished from bioarchaeology of care because bioarchaeology of disability prioritizes the narratives of people with disabilities over the care they would have received from the able-bodied perspective. Using multidisciplinary theoretical perspectives, this paper seeks to understand how Tuberculosis and the consequential disability impacted the life of a nine-year-old child. Osteological and paleopathological data published by Gooderham et al. (2020) is used in this paper to show how paleopathological conditions can be contextualized within the larger social framework. Unpublished archival data associated with the child will inform on demographics to further support this analysis. The evaluation of the child's illness within the social framework of 1940s Lisbon will show how disability impacted this child's life and death. Engaging with both skeletal and archival data, this paper shows how bioarchaeology of disability can be a valuable theoretical perspective to understand how marginalization due to disability can impact health.

How to know you've 'caught' a pathogen: exploring *Brucella melitensis* presence in a medieval monk

*Hider J (1,2), Duggan A (1,2), Klunk J (1,3), Eaton K (1,2), Long G (3), Fornaciari G (4), Golding B (4), Prowse T (2), Poinar H (1,2,5)
1. McMaster Ancient DNA Centre, McMaster University, Hamilton, Ontario, Canada
2. Department of Anthropology, McMaster University, Hamilton, Ontario, Canada
3. Department of Biology, McMaster University, Hamilton, Ontario, Canada
4. Department of Translational Research on New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy
5. Department of Biochemistry, Hamilton, Ontario, Canada

Our ability to recover ancient DNA (aDNA) has significantly increased with next-generation sequencing and targeted enrichment. While our ability to recover pathogen DNA has improved, it is still challenging to recover from archaeological remains because of factors such as degradation of the target DNA, the addition of contaminant DNA and inhibitors of DNA amplification, and inefficient laboratory methods. If pathogen DNA can be recovered, the challenge then becomes determining whether the researcher has 'caught' the pathogen. This requires validating the classification of DNA as a match to a pathogen and determining whether it is authentic (i.e. ancient) DNA. This is particularly challenging when the potential pathogen aDNA is low abundance (e.g. less than 1000 molecules). We examine this issue by analyzing samples with a low abundance of *Brucella melitensis* from a 14th century CE Italian monk, Sante Brancorsini. We have identified a high-coverage *Brucella melitensis* genome from a calcified nodule from the monk. The 12 other samples we have from Sante Brancorsini include preserved tissue, bone, and calcified nodules. These samples show no evidence or very low abundance of *B. melitensis* DNA. It is challenging to validate classifications and authenticate them as ancient using standard methods (e.g breath of genomic coverage, DNA deamination) when working with low copy reads. We utilize an ensemble approach to validate classifications, which requires agreement between three taxonomic classification programs in their assignment of a read to *Brucella melitensis*. This decreases the likelihood of a false positive assignment. Preliminary results show that for one low copy sample (a calcified nodule) we are able to validate the *B. melitensis* assignment.

Broken record: Informing contemporary trauma registries by asking questions of the past

*Hogan JL (1), Mant M (2)
1. University of Alberta, Edmonton, Alberta, Canada
2. University of Toronto Mississauga, Mississauga, Ontario, Canada

Trauma is among the leading global causes of death and disability, killing over 5,000,000 people annually and indirectly affecting millions more. Rapid industrialization, sprawling urbanization, and increasing resource disparity demanded rapid adaptation from medical response systems. In the 1970s, trauma registries were implemented in American hospitals to empower surveillance systems with data-driven preventative strategies and treatment options. Trauma registries soon began forming in both high- and low-income countries, the latter of which experience 90% of all global traumas. Worldwide, there are 285 active registries in 35 different countries, including cost-effective and sustainable registries that have been introduced in low-resource settings such as Kenya. This country has faced traumas in the form of high traffic collision rates, unintentional burns, terrorist attacks, and post-election violence. In response to an expressed need for more complete hospital injury data that reflects this burden, Kenya's second-largest referral hospital implemented a trauma registry that revealed nearly six times more patient capture compared to retrospective chart reviews. 1,918 patients were included over six months, revealing important trends in injury types, severity, gender, geolocation, and care-seeking practices. Examining current trauma incidents is vital, though there is potential for further enriching our knowledge through reviewing injuries of the more distant past. Bone records evidence of past trauma, allowing bioarchaeologists to assess antemortem and perimortem incidents for insights into lived experiences of trauma. Only rarely are health records associated with individual skeletons, limiting the possible conclusions to be drawn. Bioarchaeological research reinforces the importance of demographic data, assessing potential injury recidivism, and incorporating biocultural lines of information to assess individual risk. Looking to the lacunae evident in bioarchaeological datasets can help frame the questions we should be asking of contemporary injured people. Linking these data over time within a patient's health history is an important step in understanding trauma recidivism and creating a robust injury response system. This presentation discusses how lessons learned from injury data most difficult to obtain in bioarchaeological studies of trauma recidivism can be incorporated into current-day trauma registries to produce high-impact results.

Unprecedented? Young adult conceptions of COVID-19

Holland AH (1), Prine A (2), Mant M (3)
1. Department of Family Medicine, McMaster University, Hamilton, Ontario, Canada
2. Groves Memorial Community Hospital, Fergus, Ontario, Canada,
3. Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada

COVID-19, the disease caused by the novel coronavirus SARS-CoV-2, has quickly become one of the most significant global health threats of the past century. Universities and colleges are special subpopulations, with complex local, national, and international networks, including domestic and international students, exchange students, and commuters versus students in residence. This research distributed an online survey to University of Toronto students (REB approval #39169), capturing a convenience sample of 592 students. This survey captured the earliest survey data in Canada following the university's cancellation of in-person classes and start of government-mandated lockdown (March 20-April 17, 2020), providing an important baseline dataset concerning student engagement with COVID-19-related information. Students were surveyed to assess their demographic factors, media use, self-reported anxiety, perceived severity of COVID-19, personal susceptibility, and adoption of health behaviours. Further, students were asked to compare COVID-19 to previous infectious disease outbreaks (i.e., SARS, H1N1, 1918 influenza) to understand their perceptions of the current outbreak in historical context. Social media was the most common media type accessed (97.0%) but was most likely to be perceived as poor in communicating unbiased information (39.0% of users) and most likely to cause anxiety (46.2%). Females were most likely to report high anxiety related to contracting COVID-19 after hearing or reading a media report. The majority of participants (60.1%) judged COVID-19 to be Very Severe; there was a significant relationship between being female and the adoption of new health behaviours. 57.4% indicated they felt susceptible to COVID-19, while 40.9% did not. Feeling susceptible was associated with studying a healthcare field or being personally affected by COVID-19. Individuals who stated they were not susceptible to COVID-19 declared mitigating factors such as new health behaviours to be a major driver in their perception. 52% of students considered COVID-19 to be worse than SARS and 56% deemed it worse than H1N1; only 10% said it was worse than 1918 influenza. Students cited advances in modern medical technology, increased globalization, and mass communication as factors influencing their comparisons of the present with the past outbreaks.

A warrior, a pregnancy and a Highlander on the North Coast: Interpreting life events using multi-tissue stable isotope analysis, Virú Valley Peru

*Hyland C (1,2), Millaire J-F (3), Szpak P (1)
1. Department of Anthropology, Trent University, Peterborough, Ontario, Canada
2. School of Archaeology, University of Oxford, Oxford, United Kingdom
3. Université du Québec à Trois-Rivières, Trois-Rivières, Québec, Canada

Stable isotope analysis can provide incredible insight into the life histories of individuals especially when multiple tissues are available and a wide range of analyses are employed. Multi-tissue (bone collagen, hair, nail, skin, and tendon) stable isotope analysis (carbon, nitrogen, sulfur, and strontium) on thirteen individuals from the lower Virú Valley identified non-seasonal changes in a predominantly C_4-based terrestrial diet. Closer intra-individual examination revealed a potential past pregnancy for Burial 7 and further support for the identification of Burial 8 as a warrior. Burial 5, however, had a stable isotope signature unlike any previously found on the north coast of Peru, indicating both a large contribution of C_3-terrestrial resources to their diet and an $^{87}Sr/^{86}Sr$ ratio suggestive of highland residence during childhood. This research provides the first strong stable isotope evidence of a highland individual within a coastal burial in northern Peru, provides new insight into the life histories of these individuals, and stands as an example of the wealth of information that can be gained from the combination of multiple stable isotope techniques.

Spatial movement foraging strategies among free-ranging Japanese macaques *(Macaca fuscata)* at the Awajishima Monkey Center, Japan

Joyce MM (1), Teichroeb JA (2), Turner SE (1)
1. Department of Geography, Planning & Environment, Concordia University, Montréal, Québec, Canada
2. Department of Anthropology, University of Toronto Scarborough, Toronto, Ontario, Canada

Research has shown that nonhuman primates are capable of making intentional, directional movement choices in order to solve spatial navigation problems in foraging. Here, we investigated the influence of age, sex, rank, physical impairment and competition on route choice decision-making in solitary foraging trials. We conducted a multi-destination foraging experiment with 6 feeding platforms in a (4m x 8m) Z-array, recording 180 successful solitary trials by 30 identifiable individuals from a group of ~400 free-ranging Japanese macaques inhabiting forests around the Awajishima Monkey Center. Results from movement trials suggested that the macaques were able to: (1) select optimal routes (23.9% of the trials), and (2) use heuristics similar to primates in other studies (Nearest Neighbour rule 19.4%, Convex Hull 4.5%) (e.g. their movements were non-random). Our results also suggest that contextual factors led to variation in Japanese macaque route decision-making. For example, the animals used what we termed a sweep strategy (27.1% of trials), which allowed the individual to maintain vigilance on conspecifics (reducing the risk of competitors acquiring isolated food pieces), while also minimizing travel distance. We argue that this strategy was a response to the island's topography and high intragroup competition. Our research on individual variation in route choice contributes to a better overall understanding of group-level movements and the processes underlying foraging decisions.

The temporal distribution of pottery and aquatic shellfish in the Holocene deposits at Liang Bua indicates major shifts in modern human behaviour through time

Julianto IMA (1), Sutikna T (2,3,4), Jatmiko (4), Faith JT (5), Tocheri MW (1,2,6)
1. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada
2. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia
3. Centre for Archaeological Science, School of Earth and Environmental Sciences, University of Wollongong, Wollongong, Australia
4. Pusat Penelitian Arkeologi Nasional, Jakarta, Indonesia
5. Natural History Museum of Utah & Department of Anthropology, University of Utah, Salt Lake City, Utah, USA
6. Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington DC, USA

Liang Bua (Flores, Indonesia), is best known as the type site of *Homo floresiensis*. However, this extinct hominin species vanished from the cave's archaeological record ~60 to 50 thousand years (ka) ago. Although there is some evidence of modern humans at Liang Bua between ~47 and 12 ka, it is during the Holocene epoch that a reasonably continuous material record of modern human behaviour is recorded. To date, 80 radiocarbon ages have been acquired from charcoal samples excavated from this Holocene sequence. These ages span the entire duration of the Holocene and indicate that there are no major temporal gaps within this ~12-ka-long depositional sequence. Using the R Bacon package for age-depth modelling and the calibrated radiocarbon ages, age-depth models for multiple excavated 2 x 2 m sectors were constructed, enabling a reasonably detailed examination of modern human cultural change at Liang Bua through the Holocene. Based on the age-depth models, we examine the temporal distribution of pottery and aquatic shellfish at the site in four adjacent sectors that together form a larger 4 x 4 m area. The age-depth models for this area derive from 35 calibrated radiocarbon ages that are relatively evenly dispersed between ~0.5 and 12.1 ka and span ~4 m depth of sediment. Our results suggest that locally sourced freshwater gastropods (Thiaridae and Neritidae) are absent or scarce through the first half of the Holocene but these shells become abundant after ~4 ka, with peak abundances occurring ~3.5 ka and a decline to moderate levels after ~3 ka. Pottery first appears at ~3 ka immediately above the shellfish midden and is consistently present in the sequence thereafter. Although the observed changes in pattern of freshwater shellfish exploitation clearly occurred over a longer period of time and were likely determined by factors other than the onset of an agricultural lifestyle, the appearance of pottery

at ~3 ka signals a likely shift to increased sedentism and/or farming. Moreover, the specific timing of this shift to pottery suggests that it may represent an influx of Austronesian culture and/or people to Flores.

Addressing the legacy of residential school cemeteries: Exploring the important role of a Community Liaison

*Kennedy D (1,2), *Nichols K (3,4,5), Holland E (2), Albanese J (5,6), Reder D (3), Yang D (4,5), Cardoso H (4,5), Yellowhorn E (3)
1. Community Liaison for the Sioux Valley Dakota Nation, Manitoba, Canada
2. Department of Anthropology, Brandon University, Brandon, Manitoba, Canada
3. Department of Indigenous Studies, Simon Fraser University, Burnaby, British Columbia, Canada
4. Department of Archaeology, Simon Fraser University, Burnaby, British Columbia, Canada
5. Centre for Forensic Research, Simon Fraser University, Burnaby, British Columbia, Canada
6. Department of Sociology, Anthropology, and Criminology, University of Windsor, Windsor, Ontario, Canada

Calls to Action 74 & 75 of the Truth and Reconciliation Commission reaffirms the importance of locating and identifying graves and cemeteries of Indian residential schools. However, it is silent on the legal responsibilities and formal accountability held by federal and provincial agencies. Nor do academic researchers and community partners have clear guidelines for developing community engagement and partnerships required to undertake this sensitive work. Sioux Valley Dakota Nation is spearheading a project designed to locate and identify graves associated with the Brandon Residential School. Supported by faculty and students from Simon Fraser University, University of Windsor, and Brandon University, the project is founded on Indigenous aspirations to find, protect and return (if desired) individuals who died to their home communities. Our team is working to address the Commission's Calls to Action, while ensuring that all affected Indigenous Nations are involved. In the process, we have confronted many practical problems as we translate the recommendations into an applied investigation. This presentation will discuss the important role of the Sioux Valley Dakota Nation community liaison in establishing community relationships and navigating ethical, legal, political, and cultural complexities. By weaving western and Indigenous worldviews together, we work to find a resolution and honour the missing children, unmarked graves, and their communities at the Brandon Residential School.

X-citing Bones: An investigation of the use of portable X-ray fluorescence (pXRF) in the identification of scurvy, rickets, and cribra orbitalia in archaeological bone

Kilburn NN (1), Gowland RL (1), Halldórsdóttir HH (2,3), Williams R (2,3), Thompson TJU (2)
1. Department of Archaeology, Durham University, Durham, United Kingdom
2. School of Health and Life Sciences, Teesside University, Tees Valley, Middlesbrough, United Kingdom
3. National Horizons Centre, Darlington, United Kingdom

This research investigates the applicability of portable X-ray fluorescence spectrometry (pXRF) in identifying potential chemical element changes resulting from scurvy, rickets, and cribra orbitalia in archaeological human skeletal remains. pXRF is a promising method for archaeological analyses as it is non-destructive and, compared to other chemical analysis methods, relatively fast and inexpensive. The use of pXRF could provide palaeopathologists with an additional diagnostic tool for accurately distinguishing pathological conditions, as well as furthering understanding about alterations to bone element composition occurring as a result of disease. The femora of 99 individuals (34 adult; 63 non-adult) from the Coach Lane skeletal collection (c. 1711-1829), curated at Durham University, were analyzed using pXRF. The resulting data was plotted on scatterplots and visually examined for variation in elemental content in relation to known disease categories, with possible patterns explored further statistically. No significant differences in the elemental ratios of individuals with scurvy, rickets, and cribra orbitalia were observed. In this instance, it is likely that the industrial location of the burial site, and its resultant post-depositional diagenetic changes, caused pathological bone element alterations to be obscured. While no differences were found in the analysis of metabolic diseases, further examination of chemical element composition in relation to other disease categories may still be worthwhile investigating in the future

Morphological integration in the hominoid midfoot

Komza K (1), Viola TB (1,2), Netten T (1), Schroeder L (3,4,5)
1. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada
2. Institute for Archaeology and Ethnography, Siberian Branch, Russian Academy of Sciences, Novosibirsk, Russia
3. Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada
4. Human Evolution Research Institute, University of Cape Town, Cape Town, South Africa
5. Buffalo Human Evolutionary Morphology Lab, Department of Anthropology, University at Buffalo, Buffalo, New York, USA

Patterns of morphological integration in living apes and humans can be used to make inferences about the evolvability of skeletal regions throughout hominin evolution, and can explain observed morphological patterns in the fossil record. Here, we consider the observation that medially-located elements of the foot appear more variable throughout the hominin lineage than laterally-located elements. Plio-Pleistocene hominins show adaptations for arboreal and terrestrial locomotion within the medial cuneiform, navicular, and metatarsals (Mts) 1 – 2. Laterally, there appears to be less variation, with most hominins showing adaptations for a stiff foot. Based on these observations, we test the hypothesis that the medial elements of the great ape and human foot are less morphologically integrated compared to the lateral elements. This would imply that the medial elements are more evolvable, and would explain their high morphological variation throughout hominin evolution. The study sample is composed of midfoot elements (the cuneiforms, navicular, cuboid, and Mts 1 – 5) of *Homo sapiens* (n=83), *Pan troglodytes* (n=63), *Gorilla gorilla* (n=41), and *Pongo* sp. (n=42). Integration was quantified using interlandmark distances from these elements, organized into sets of *a priori* defined functional modules. Patterns of integration across these functional modules were then compared against sets of random traits from the whole midfoot. Results show that all non-human apes have less integrated medial elements, whereas modern humans have highly integrated medial elements. This may explain the morphological diversity we see in the medial elements of habitually and facultatively bipedal hominins. It also suggests that an abducted hallux is less integrated than an adducted one, and that the former may be more evolvable. For a large portion of the hominoid lineage, the medial midfoot may have been more evolvable, up until the evolution of obligate bipedalism. Afterwards, the medial midfoot became more integrated, and less likely to produce new morphological variation. Results also show that chimpanzees have relatively consistent magnitudes of integration throughout the midfoot, corresponding with their variable locomotor repertoire. In contrast, specialized taxa (i.e., orangutans and humans) have more distinct patterns of integration that correspond with plantar pressure distribution during locomotion.

The effects of growth rates on rachitic porotic lesion expression and the consideration of the medial clavicle in active rickets

*Lamer M (1), Veselka B (2), Hoogland MLP (3), Brickley MB (1)
1. Department of Anthropology, McMaster University, Hamilton, Ontario, Canada
2. Department of Art Sciences and Archaeology, Brussels, Belgium
3. Faculteit Archeologie, Universiteit Leiden, Leiden, Netherlands

Rickets is the inadequate endochondral mineralization of newly deposited osteoid resulting from vitamin D deficiency. The body's failure to mineralize osteoid at the growing ends of the bones results in the formation of porotic lesions at the metaphyseal growth plates. Porotic lesions form more readily and are most severe where the bone is rapidly growing during deficiency. As such, faster growing long bones would be first to form porotic lesions, and the resulting porotic lesions would be more severe than those in slower growing bones. This poster examines the effects of the growth rates of long bones on the timing and expression of porotic lesions using the distal femur and ulna, and the medial clavicle metaphyseal growth plates. The slower growing medial clavicle has to date not been investigated in cases of rickets, and was examined in this research to determine if active cases of rickets can be recorded in older individuals, as the medial clavicle is the latest fusing bone in the human body. The absolute annual growth rates of the femur, ulna, and clavicle were calculated using data from a combination of longitudinal and cross-sectional growth studies by subtracting the bone length from one year by the total bone length of the preceding year. Porotic lesions at the distal femur and ulna metaphyseal growth plates and the medial clavicle metaphyseal growth plates were recorded in 17/69 (24.6%) of individuals from the Dutch

skeletal collections of Middenbeemster and Hattem (17th to 19th centuries). A variation of growth plate porosity scores was found within the same individuals. The growth rates of the long bones at the time of death were used to determine the progression and stage of the vitamin D deficiency being experienced. Porotic lesions at the medial clavicle were found to form more slowly and were recorded in seven individuals between the ages of 18-25 years. Recording porotic lesions at the medial clavicle is valuable, as it continues to grow throughout adolescence and into early adulthood, allowing active rickets to be identified in older individuals.

Stone artefact assemblage composition as a proxy for changing Holocene land use practices at Liang Bua

Lin SC (1,2), Jatmiko (3,2), Julianto IMA (4), Ferdianto A (1,2), Sutikna T (2,1,3)
1. Centre for Archaeological Science, School of Earth and Environmental Sciences, University of Wollongong, Wollongong, Australia
2. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia
3. Pusat Penelitian Arkeologi Nasional, Jakarta, Indonesia
4. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada

The Liang Bua stone artefact sequence is marked by the persistence of a casual approach to stone tool production from the Pleistocene to the Holocene. This pattern gave rise to an impression of simplicity and stasis in the hominin technological behaviour represented at the site. However, beyond stone tool manufacture, hominin technological complexity is also expressed in the selection, use and transport of stone tools. Through this lens, 'simple' artefacts may be used and managed in dynamic ways by past mobile groups as they organised and carried out activities across the landscape. In this study, we examine a sample of stone artefacts from the Holocene layers of Sector XVI at Liang Bua that span between ~6,000 years ago to the recent past. Despite the simple nature of the core reduction techniques and the dominance of locally abundant raw material types, the lithic assemblages exhibit clear temporal variation in the selection and transport of artefacts that are symptomatic of broader changes in human movement and land use practices. In particular, between ~4,000–3,000 years ago, increased lithic discard frequencies and core size suggest that Liang Bua cave was utilised more regularly at this time. Analyses of flake size distribution show that smaller flakes were underrepresented in the lithic assemblage during this period, possibly reflecting the repeated production and transport of small cutting-edge pieces for localised activities outside the cave. Coinciding with the peak in shellfish consumption and a noticeable increase in abundance of pig remains at Liang Bua, these data indicate a reorganisation of human land use practices in the Liang Bua region ~4,000-3,000 years ago, where human settlement potentially shifted towards a more localised system focused along the river valley immediately prior to the onset of farming in the region. Following the appearance of pottery at the site ~3,000 years ago, the lithic discard pattern shows a decline in the use of the cave with respect to stone tool production and use. This change reflects a sustained shift in the focus of human activities elsewhere on the landscape after the uptake of food production.

The legacy of Canadian soldiers killed in action during the First and Second World Wars

Lockyer S (1)
1. Directorate of History and Heritage, Department of National Defence, Ottawa, Ontario, Canada

Anthropological methods, along with methods from other disciplines, allow the Canadian Armed Forces's Casualty Identification Program to attempt to identify recently discovered human skeletal remains of Canadian service members who died during the First and Second World Wars and the conflict in Korea, approximately 27,000 of whom have no known grave. Families are at the core of the Program. The passage of time, in some cases more than 100 years, and the fact that they have never met in person in no way diminishes the legacy of these service members and the impact on their families, both their military family and their family in the more traditional sense. When the remains are identified, every effort is made to notify the service member's family that their ancestor has been found and will be buried by their unit. If the remains cannot be identified, the military family will bury the service member regardless of regimental association. Over the years, the effect the identification process and subsequent burial has with the families continues to resonate. From the small militia regiment whose members volunteered at a rate of 65% to participate in the burial of one of their soldiers, to the

great-nephew (a high school history teacher) who shouted “They found Harold!” when he entered his class the morning after being told his great-uncle had been found, these deaths that occurred over 100 years ago profoundly affect people alive today. This paper will discuss a number of cases and experiences the author shared with the families demonstrating the enduring connection between the past, the work of the Canadian Armed Forces’s Casualty Identification Program, and the present.

Discrete vs. descriptive: Examining sexual dimorphism in the juvenile pelvis

Mackay-Brown A (1), Holland E (2)
1. School of Science & Engineering, University of Dundee, Dundee, Scotland, United Kingdom
2. Department of Anthropology, Brandon University, Brandon, Manitoba, Canada

Due to the inextricable relationship between early sexual dimorphism and the process of growth and maturation, identifying secondary sex characteristics in the juvenile pelvis for sex assessment is often avoided. Regardless of difficulty and limited accuracy, differentiating between male and female individuals remains important for understanding potential sex differences in archaeological populations, as well as being a key demographic indicator in forensic identification that requires demonstrable accuracy and error. This study examines the applicability of the Phenice traits to juvenile remains through both the original Phenice method, and the modified method by Klales, which utilizes an ordinal scale. This research contributes to the understanding of how these three sexually dimorphic traits vary with age and which method is best able to measure their expression in juvenile remains. Sex was determined for 44 individuals between the ages of 6 and 18 in the Hamann-Todd Osteological collection utilizing the left *os coxa*. Neither method was able to effectively predict sex between the ages of 10 and 14 (the amount of error peaks between these ages), while the accuracy of prediction wavers before 10 and increases after 14. However, through noting that these inconsistencies are associated with age groups that are primarily female, as well as observations during the application of the methods, the reasons for the failure of both methods was explored. As the Klales method required increased attention to the form of the ventral arc, noted patterns suggested that the ventral arc in juveniles may not be well articulated. Modifying the description of the ventral arc to encompass the ‘precursor arc’ and ‘symphyseal wrap-around’, the Klales method can predict an individual to be female 62% of the time. It was concluded that the onset of puberty confounds the ability for both methods to accurately predict sex during this age range and that altering our understanding of the ventral arc to encompass preliminary stages of sexual dimorphism contributes to an increase in assessment accuracy. The results point to necessary further research of the preliminary ventral arc and the necessity of a unified descriptive system for juvenile osteological traits.

3D geometric morphometric analysis of the trapezoid in extant great apes and humans as well as fossil hominins

Mackereth EM (1,2), Tocheri MW (2,3,4)
1. Department of Pathology & Anatomical Sciences, University of Missouri, Columbia, Columbia, Missourri, USA
2. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada
3. Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington DC, USA
4. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia

Past studies have shown that quantitative assessments of carpal morphology capture important details about the functional morphology and evolutionary history of hominins and hominids. Here we use three-dimensional geometric morphometrics (3DGM) to explore trapezoid morphology in a relatively large comparative sample of extant hominids (N = 267) and fossil hominins (N = 6). Using the commercial software Stratovan Checkpoint, patches of landmarks with a density of 9 x 9 each were placed on the scaphoid, trapezium facet, second metacarpal, and capitate facets. A Generalized Procrustes Analysis was conducted on the landmarked data followed by a Principal Component Analysis (PCA) to visualize the resulting shape variation. A second analysis that did not include the patched landmarks for the capitate facet was also conducted because this facet is absent in most of our gorilla sample. All statistical analyses were conducted in R. The PCAs of both 3DGM analyses result in similar shape distributions along the first and second PC axes. Modern humans and

Neandertals cluster positively along PC1 due to their more boot-shaped trapezoids whereas extant great apes and Homo floresiensis cluster negatively due to their more pyramidal wedge-shaped trapezoids. These findings are consistent with previous studies that examined trapezoid shape using a combination of articular surface angles and relative areas. However, previous work did not include bonobos and our results show that bonobos and orangutans cluster together positively along PC2 while chimpanzees and gorillas cluster together negatively. This suggests that the primitive trapezoid shape condition for hominids may have been more similar to that of orangutans and bonobos rather than chimpanzees and gorillas.

Dynevor Indian Hospital (1908-1934): Historical trauma, tuberculosis, and persistent colonial legacy

Mant M (1), Abonyi S (2), Hackett P (3)
1. Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada
2. Department of Community Health & Epidemiology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada
3. Department of Geography & Planning, University of Saskatchewan, askatoon, Saskatchewan, Canada

This research concerns the early (1908-1934) history of the Dynevor Indian Hospital outside of Selkirk, Manitoba. In 1939 the hospital was purchased by the Canadian government for use as the first tuberculosis hospital in Canada exclusively for Indigenous people, operated on Ottawa's behalf by the Sanatorium Board of Manitoba. Our work is the first investigation of the primary hospital admission records from Dynevor Hospital during its tenure as part of the Indian Hospital System. Dynevor's service area covered much of southern Manitoba and parts of northwestern Ontario. Many young patients were sent directly from residential schools to Dynevor; an overwhelming number were suffering from tuberculosis. Tuberculosis, even in the years before Dynevor became a dedicated tuberculosis hospital, was the most frequent reason for admission; of the admitted cases from 1908-1934, 62.9% were children and youths under the age of 20. Indigenous individuals in Canada today have much higher rates of tuberculosis than non-Indigenous Canadian-born individuals. Analysis of records from settler institutions such as hospitals helps us uncover and address this legacy of colonialism, a step critical for reconciliation. Indeed, during the current COVID-19 pandemic we have already witnessed the stigmatizing of minority populations in Canada as potential vectors of disease – this research speaks to the historical context of framing groups as sites of contagion.

The influence of developing technological infrastructure on sleep and circadian rhythm in a community of Guatemalan Kaqchikel Maya

*McKinnon L (1), Samson DR (1), Nunn CL (2,3), Rowlands A (4), Salvante KG (4), Nepomnaschy PA (4)
1. Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada
2. Department of Evolutionary Anthropology, Duke University, Durham, North Carolina, USA
3. Duke Global Health Institute, Duke University, Durham, North Carolina, USA
4. Maternal and Child Health Laboratory, Faculty of Health Sciences, Simon Fraser University, Burnaby, British Columbia, Canada

Humans rely on sleep for a host of functions related to survival and reproduction, including immune response, memory consolidation, cellular maintenance, and emotional regulation. Thus, identifying the factors that affect sleep behaviour is important for understanding human health and fitness. A number of factors appear to influence sleep duration and circadian rhythm, including characteristics of industrialization such as access to electricity and reduced exposure to circadian regulators (e.g., sunlight, temperature fluctuation). We investigated the association between industrialization and sleep using data collected in a population of Guatemalan Kaqchikel Maya who are in a transitional stage of industrial development. We tested the circadian entrainment hypothesis, predicting that Maya sleep will be longer and more efficient than sleep in populations with lower industrialization levels and shorter and less efficient than sleep in populations with higher industrialization levels. Additionally, we predicted that Maya circadian rhythms will be weaker than those in contexts with greater environmental exposure and stronger than those in more environmentally-buffered settings. Data were obtained using CamNtech MotionWatch 8 actigraphs, which are non-invasive wearable devices that provide objective sleep and circadian rhythm measures. The data were compared with those from

populations with varying degrees of industrialization. As expected, we found that individuals from this population tend to sleep longer (mean = 6.52 hours, SD = 1.14) and more efficiently (mean = 78.39%, SD = 8.75) than individuals from small-scale populations with lower industrialization levels, but shorter and less efficiently than individuals from more industrialized settings. Counter to predictions, circadian rhythm amplitude (mean = 0.92, SD = 0.07) and stability (mean = 0.58, SD = 0.28) are higher than in both small-scale and industrial contexts. Despite the purported role of industrialization in driving a sleep loss epidemic, our results reveal that higher industrialization levels do not reduce sleep duration and quality; instead, the safety and comfort of sleeping sites afforded by technological development appear to improve sleep in this population. Importantly, the Maya exhibit strong, stable circadian rhythms, suggesting that an intermediate degree of environmental exposure and technological buffering supports optimal circadian rhythm strength and stability.

Have fowl, will travel: Chickens and the transition to farming at Liang Bua, Flores

Meijer HJM (1,2), Walker SJ (1), Jatmiko (3,4), Wahyu Saptomo E (3,4)
1. University Museum, Department of Natural History, University of Bergen, Bergen, Norway
2. Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington DC, USA
3. Pusat Penelitian Arkeologi Nasional, Jakarta, Indonesia
4. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia

Chickens *(Gallus gallus var. domesticus)* are the most widespread domestic animals in the world and have become a dominant part of our diets. They became first domesticated in the Neolithic in Southeast Asia, and then spread both eastwards and westwards. Their eastward spread into Island Southeast Asia and the Pacific is believed to have been part of the Neolithic package and linked to the arrival of dogs, pigs and pottery. In the Pacific, Neolithic chicken remains appear closely linked to human migration. However, chickens are extremely rare in the archaeological record of Island Southeast Asia. The routes and timing of the dispersal of chickens from their native range in Mainland Southeast Asia into Island Southeast Asia, and from Island Southeast Asia into the Pacific, remain therefore unclear. Here we present the first archaeological evidence for chickens on Flores, Indonesia from the site of Liang Bua. Liang Bua has yielded an extensive faunal sequence that spans the Late Pleistocene and Holocene. Despite junglefowl being native to Flores, they are absent from Liang Bua's Pleistocene sequence and appear for the first time in the Holocene deposits. Twelve chicken remains have been unearthed so far and the oldest remains, a premaxilla and a tibiotarsus fragment, are dated to ~2.2 and ~2.3 thousand years (ka) ago, respectively. The youngest chicken remains are dated to ~0.3 ka and include an immature radius. The absence of any junglefowl remains in older deposits, the cutmarks on some of the bones, and the presence of juveniles suggests that these remains likely represent domesticated chickens. If correct, this is the first evidence for domesticated chickens on Flores, and in Wallacea more broadly. Their first recorded appearance in the Liang Bua sequence occurs a few centuries after pottery first appeared ~3 ka ago and the oldest directly-dated modern human burials at the site that have pottery as grave goods (~2.7–2.6 ka). Thus, chickens are found at Liang Bua within an archaeological context of farming but whether they were introduced nearer to the onset of agriculture on the island remains unclear.

Hominin Ecology of the Early Oldowan 2 Ma

Mercader J (1,2), Akuku P (3), Boivin N (1,2,4,5), Bugumba R (6), Bushozi P (7), Camacho A (8), Carter T (9), Clarke S (1), Cueva-Temprana A (2), Durkin P (8), Favreau J (9), Fella K (7), Haberle S (10), Hubbard S (1), Inwood J (1), Itambu M (7), Koromo S (11), Lee P (12), Mohammed A (7), Mwambwiga A (1), Olesilau L (11), Patalano R (2), Roberts P (2,4), Rule S (10), Saladie P (3), Siljedal G (1), Soto M (13,14), Umbsaar J (1), Petraglia M (2,4,5)
1. University of Calgary, Calgary, Alberta, Canada
2. Max Planck Institute for the Science of Human History, Jena, Germany
3. Institut Català de Paleoecologia Humana i Evolució Social (IPHES), Tarragona, Spain
4. School of Social Science, University of Queensland, Brisbane, Queensland, Australia
5. National Museum of Natural History, Smithsonian Institution, Washington DC, USA
6. Ministry of Natural Resources and Tourism, Dar es Salaam, Tanzania

7. University of Dar es Salaam, Dar es Salaam, Tanzania
8. University of Manitoba, Winnipeg, Manitoba, Canada
9. McMaster University, Hamilton, Ontario, Canada
10. Australian National University, Canberra ACT, Australia
11. University of Iringa, Tanzania
12. University of Toronto, Toronto, Ontario, Canada
13. Universidad Autónoma de Madrid, Spain
14. Madrid Institute for Advanced Study, Madrid, Spain

Environmental change is key for human evolution, especially at times of anatomical and behavioral change in life histories, such as the origin of meat consumption, economic diversification, and dispersal. However, for the earliest phase of human evolution featuring the technology-dependent hominins that shaped our lineage since 2.6 Ma, the Oldowan, there is a dearth of archaeological evidence directly associated with rich chronostratigraphic and environmental datasets amenable to tracking ecological change and adaptation to new physiographic conditions. One place where this type of information has been recently retrieved is the Western Plio-Pleistocene rift basin of Olduvai Gorge (now Oldupai), Tanzania. We explore habitat range by Oldowan-bearing hominins amidst extremely diverse ecosystems throughout a stratified sequence 235 ka-long, thus predating by >180 ka the earliest landmark fossil hominins and classic Oldowan from the Eastern side of the basin. Our study provides multi-proxy evidence of environmental adaptability, demonstrating colonisation of fresh volcanic landscapes and occupation of fast-changing biomes by 2 Ma.

2D taphonomy: Reconstructing the taphonomic histories of Andean funerary bundles with conventional radiography

*Motley J (1), Nelson AJ (1), Watson L (2), Poeta L (1), Hopkins Barriga A (3)
1. Department of Anthropology, Western University, London, Ontario, Canada
2. Universidad Nacional Mayor de San Marcos, Ciudad Universitaria, Lima, Perú
3. Directora del Museo de Sitio Huallamarca, Ministerio de Cultura, San Isidro, Lima, Perú

This presentation reports on the taphonomic analysis of Andean funerary bundles from the archaeological site Huaca Huallamarca (Lima, Peru) through the examination of plane x-rays. On the Central Coast of what is now Peru, funerary bundles consist of human remains wrapped in large amounts of textiles. A taphonomic study of these bundles would contribute both to understanding their state of preservation and to the reconstruction of past funerary rituals. The traditional method of studying these bundles is to unwrap them. However, unwrapping is destructive. X-rays remain the most cost effective and portable non-destructive option for paleoradiographers in the field. A methodology to systematically assess bundle contents from these x-rays would assist museums in their curatorial efforts as well as provide data for answering cultural, biological, and taphonomic questions. However, taphonomic analysis from 2D superimposed x-ray images has limitations. This presentation will describe those limitations and how methodical approaches using illustration, ground truthing through damaged bundles and comparative computed tomography scans, and novel taphonomic methods can produce information on burial positioning, decomposition processes, secondary burial, and the overall condition of mummies. This presentation will demonstrate that conventional radiography can contribute to the reconstruction of taphonomic histories. When integrated with other bioarchaeological data, these histories can facilitate the creation of hypotheses for further study and produce baseline data for comparison with future 3D analyses.

Childhood lead exposure in 18th-19th century North Atlantic fisheries

*Munkittrick TJA (1), Scott A (2), Grimes V (1,3)
1. Department of Archaeology, Memorial University of Newfoundland, St. John's, Newfoundland, Canada
2. Department of Anthropology, University of New Brunswick, Fredericton, New Brunswick, Canada
3. Department of Earth Sciences, Memorial University of Newfoundland, St. John's, Newfoundland, Canada

Lead is a toxic substance with no biological function, but the metal's properties were so useful that its mining and subsequent use in cultural materials were ubiquitous for centuries. In modern contexts, lead toxicity is

attributed to air pollution from mining/industrial activities or accidental ingestion. However, it is not clear that this holds true in the Atlantic World. Previous bioarchaeological studies established that throughout England, humans were exposed to significant amounts of lead from a common source during the medieval and industrial periods; yet, studies in North America are mainly from the industrial period and suggest that their source was local lead ore. In contrast, there was no mining of lead-bearing resources that could have caused exposure to European migrants and settlers during the 18th to mid-19th centuries in Atlantic Canada. Since teeth form during childhood and lead exposure reflects individuals' interactions with their physical and cultural environments, this tissue presents an ideal means of examining movement and lead sourcing. To test whether 18th-19th century populations in Atlantic Canada were exposed to 'foreign' versus 'local' lead, tooth enamel from 27 individuals from four fishing settlements in Newfoundland and 19 individuals from the earliest cemetery at the Fortress of Louisbourg, Nova Scotia were sampled. A further 19 individuals from a Royal Naval cemetery in Newfoundland were sampled as a comparative. Samples were preferentially taken from the enamel of second molars, which represent 2-8 years of age. Lead concentrations were determined using solution-ICPMS and lead isotope ratios using MC-ICP-MS. These data suggest that lead exposure to individuals in the fishing settlements were greater than expected from the natural environment alone. Additionally, the lead is consistent with English and Western European lead ore, likely originating from imported lead-containing cultural materials such as ceramics. However, there are outliers consistent with values seen at other 19th century sites in America and New Zealand. Through lead concentration and isotope analyses, our study significantly contributes to our understanding of the role that physical versus material environments play in lead exposure and the utility of lead isotopes for identifying distinct cultural groups during the 18th and 19th centuries.

Do the regions of the spinal column record stress differently? An analysis of growth stunting in the vertebral neural canal

*Nelson J (1), Holland E (2), Harrington L (1), Cardoso HFV (3)
1. University of Alberta, Edmonton, Alberta, Canada
2. Brandon University, Brandon, Manitoba, Canada
3. Simon Fraser University, Burnaby, British Columbia, Canada

The diameters of the vertebral neural canal (VNC) are used as an indicator of non-specific stress during early childhood because VNC growth occurs during the first years of life and cannot experience catch-up growth once fusion has occurred. Most studies that assess the VNC prioritize measurements of the lumbar region, as these vertebrae undergo post-natal growth over the longest period, and therefore have the greatest potential for growth disruption. This study explores the validity of such a focus by comparing the levels of growth stunting (defined by z-score ≤-2) in the cervical, thoracic, and lumbar VNC diameters of 58 subadult individuals from a documented skeletal collection. Data from 50 adult individuals provided a standard for VNC diameters by which to generate z-scores for the subadults. ANOVA was used to assess for differences in the mean z-scores for each vertebral region of those individuals who were identified as stunted. No significant difference between means in the level of growth stunting was identified in the anterior-posterior diameter ($p = 0.813$). Growth stunting in the transverse diameter of the cervical region differed significantly from the lumbar ($p \leq 0.000$) and thoracic regions ($p \leq 0.000$). Contrary to expectations, the cervical region was found to be more stunted in TRD than both the thoracic and lumbar regions. These findings indicate that a focus on the lumbar region alone could overlook growth stunting recorded by the earlier developing cervical vertebrae. *(Funding for this project was provided by SSHRC - Social Sciences and Humanities Research Council of Canada. An earlier version of this abstract was published in the AJPA but not presented at the 2020 meeting of the AAPA.)*

Syphilis in antiquity: Examination of paleopathological presentation and its history

*Nguyen Y (1)
1. Department of Anthropology, McMaster University, Hamilton, Ontario, Canada

Syphilis, a bacterial infection that is caused by a bacterium otherwise known as *Treponema pallidum*. In modernity syphilis's most common mode of transmission is associated with sexual transmission and its active form can often appear in the form of rashes, fevers, and weight loss in patients. However, sexual transmission is not the only mode, many researchers have found that syphilis can be passed onto a baby from a mother who suffers from the disease (congenital), from close quarters, poorly maintained living conditions and unhygienic practices. In the archaeological record, syphilis is diagnosed by extensive changes to the ectocranial table with lesions appearing as smooth nodules that are raised and rounded. In addition, syphilis may present as peg-like and crescent-like shapes in the teeth. However, the appearance of Hutchinson's teeth is often associated with mammary teeth rather than permanent dentition. Within this poster, we will examine a case of Hutchinson's teeth and its unusual appearance in permanent dentition and the possible causes of this unusual case. Although syphilis is still prevalent in modernity, by examining how syphilis may have arisen, evolved, and spread in antiquity allows researchers to get a better grasp of the pathological presentation. Researchers have suggested approximately three main hypotheses. The Columbian hypothesis, the pre-Columbian hypothesis, and the unitarian hypothesis. This poster further will explore the origins of syphilis and its spread. In addition, it will examine the presentation of syphilis in the archaeological records and how researchers may definitively diagnose syphilis in antiquity.

Adolescence and innovation in the European Upper Paleolithic

Nowell A (1), French JC (2)
1. Department of Anthropology, University of Victoria, Victoria, British Columbia, Canada
2. Department of Archaeology, Classics and Egyptology, University of Liverpool, Liverpool, United Kingdom

Childhood and adolescence are two stages of development that are unique to the human life course. While childhood in the Pleistocene has received considerable attention in recent years, adolescence during the same period remains an understudied area of research. Yet it is during adolescence that key social, physical and cognitive milestones are reached. Thus, through studying adolescents, there is enormous potential for improving our understanding of Upper Palaeolithic lifeways more broadly. The reason for the dearth of these types of studies may be the perceived methodological difficulty of identifying adolescents in the archaeological record. In many ways, it is easier to distinguish children (*sensu lato*) from adults based on size, developmental age and associated artefacts. Adolescents, however, are often seen as more ambiguous, more liminal. Working within an evolutionary framework and using a definition of adolescence rooted in biology, we draw on psychology, ethnography and palaeodemography to develop a model of what it might have meant to be a 'teenager' in the European Upper Palaeolithic. Citing the biological, social and cognitive changes that occur during this life stage, we propose an important role of teenagers in the origins and spread of new ideas and innovations throughout the Late Pleistocene.

Paramedics, power, politics and precaution: Lessons from SARS and COVID-19

Oliphant A (1), Nouvet E (1), Faulds C (1), Bengall S (1)
1. Faculty of Health Sciences, Western University, London, Ontario, Canada

In 2020, Ontario faced a second, substantial pandemic in the form of COVID-19, comparable only to the SARS pandemic of 2002. Paramedics are often the first point of contact for acute health concerns in communities. Their responsibilities range from acute interventional care to supportive care, often providing this care in unconventional, unpredictable environments. As a result of these environments, their experience as healthcare providers diverges from those who work in clinical settings. It is unclear how experiences of paramedics during SARS informed practice, risk, and safety for paramedics during COVID-19. We conducted 22 interviews with paramedics ranging in skill from PCP to ACP across Ontario. We then compared our emerging thematic data against the literature that relates to paramedics in Ontario generated during SARS. We found that 1) Inequities that emerged in Ontario's paramedics services during SARS have not necessarily been rectified or considered during COVID, and these inequalities persist, 2) Protocols that emerged during SARS such as the Precautionary Principle were not implemented adequately for paramedics and 3) Despite a recognition of their role as frontline healthcare providers, they are not adequately represented in the literature or media, as evident both in events

that occurred during SARS, and COVID-19. We conclude that lessons from SARS did not necessarily translate to practice and protocol implementation during COVID-19, and paramedics remain an under-represented group in the discussion of front-line healthcare providers in Ontario during points of crisis.

Human genetic variation across the Holocene at Liang Bua

Oliveira S (1), Pugach I (1), Hubner A (1,2), Essel E (1), Hajdinjak M (3,1), Jatmiko (4,5), Sutikna T (5,6,4), Wahyu Saptomo E (4,5), Tocheri MW (7,8,5), Meyer M (1), Stoneking M (1)
1. Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany
2. Max Planck Institute for the Science of Human History, Jena, Germany
3. The Francis Crick Institute, London, United Kingdom
4. Pusat Penelitian Arkeologi Nasional, Jakarta, Indonesia
5. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia
6. Centre for Archaeological Science, School of Earth and Environmental Sciences, University of Wollongong, Wollongong, Australia
7. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada
8. Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington DC, USA

The appearance of pottery (as a proxy signal for farming) in Island Southeast Asia has long been linked to ideas about the spread of Austronesian languages and culture through the region. Present-day Eastern Indonesians carry a mosaic of DNA segments that are related to Papuan and Austronesian groups. This dual genetic ancestry has been interpreted as a signature of admixture between indigenous foragers and Austronesian-speaking farmers who expanded out of Taiwan beginning ~5 thousand years (ka) ago. However, it is not clear whether the Papuan-related ancestry identified in contemporary groups represents the ancestry of indigenous groups, or whether it was introduced more recently. Moreover, there is uncertainty as to when the contact between Austronesians and indigenous foragers took place in Eastern Indonesia, reflecting limitations in both the methods used to date admixture from genetic data, as well as the information contained in present-day genomes. To overcome some of these limitations, we generated genome-wide ancient DNA data from skeletal remains of eight modern human individuals recovered from Holocene sediments at Liang Bua. Bones from two of these individuals yielded direct calibrated radiocarbon ages before present (ka cal. BP) of 3.7 and 2.7 ka cal. BP, while another has a modelled U-series age of ~7.5 ka. The exact ages of the other four are less certain as they have not yet been directly dated, although one is from a similar burial context as the 2.7 ka-old individual. Our preliminary analysis shows that two of the individuals (~2.7 ka old) share ancestry with both Papuan and Austronesian groups, while the others exhibit no Austronesian-related ancestry and are most closely related to present-day Australians and Papuans (Australopapuans) albeit highly differentiated from them. These data suggest that the cultural changes observed at Liang Bua after ~3 ka ago are associated with a component of Austronesian ancestry. Our analyses further indicate that the split between the pre-Austronesian Liang Bua individuals and Australopapuans occurred before the split of Australopapuans and Negrito groups from the Philippines, suggesting that the pre-Austronesians from Liang Bua harbor ancient ancestry related to an earlier modern human settlement of this region.

The influenza pandemic of 1918-1919 in Cape Breton Island, Nova Scotia

Parish J (1)
1. Department of L'nu, Political, and Social Studies, Cape Breton University, Sydney, Nova Scotia, Canada

The influenza pandemic of 1918-1919 remains one of the most devastating pandemics caused by an acute infection in recorded history. While much has been written about the pandemic around the world and within the research of CAPA members, we are still uncovering details about the impacts that the influenza pandemic had over a hundred years later. The connectedness of populations is invariably one of the driving forces of perpetuating infectious diseases in humans. Interpersonal contact is paramount to allowing infectious agents to spread and be introduced to an increasing environment of resources found in previously uninfected individuals.

Islands have the potential to thwart this spread if that contact is recognised as problematic and measures are taken to restrict it sufficiently. They have the unique ability to cut off traffic flow to and from the island by way of a limited number of entry points. This can also backfire if quarantines are enacted too late. As we are finding out in 2020, population bubbles can effectively lessen the cases during pandemics. This research poster explores some of the initial findings of a multi-year, ongoing project to transcribe and investigate the death records of the four counties of Cape Breton Island, Nova Scotia. The scope of the project will eventually include the 12 years before, during and after the pandemic proper (1913-1924). This poster explores the initial findings of two years of transcription revealing the death records of 2,065 individuals from 1918-1924 in the smaller two counties, and the death records of 3,416 individuals from 1918-1919 in the larger two counties of Cape Breton. Each record contains up to 49 pieces of data, including primary and immediate causes of death. Early indications suggest that Cape Breton Island may have partially mitigated the effects of the 1918-1919 influenza virus but that its deaths from related pulmonary infections were unaffected or heightened in the period following the pandemic. A careful analysis of the records reveals the traffic of military personnel, due to Sydney's status as a port city, may have negatively contributed to the arrival of the pandemic.

Multi-resolution scanning of a shrunken head

*Poeta LS (1), Nelson AJ (1), Fournier E (2)
1. Department of Anthropology, Western University, London, Ontario, Canada
2. Object Research Systems, Montréal, Québec, Canada

This presentation examines the application of clinical and micro-computed tomography (CT) to examine traits used to differentiate ceremonial tsantsas from commercial tsantsas. Tsantsas are shrunken heads traditionally created from the remains of enemies after a battle by indigenous tribes from southern Ecuador and northern Peru. Victorian-era European collectors drove a commercial market for tsantsas, resulting in a large number of fakes being made from animal skins or unclaimed human bodies in collections amongst the real ceremonial tsantsas. Work by our group and others has demonstrated 16 features such as the conservation of tissue, evidence for production techniques, and specific features of the head that can be used for authenticity assessments. These traits have, until now, been assessed using visual examination or clinical computed tomography. However, six of these traits are difficult to assess at the resolution permitted by clinical CT, and we propose that they would be better assessed using micro-CT. The poster will examine these six traits in detail in order to evaluate a tsantsa from the collection of the Chatham-Kent Museum. This project will prove the analysis of tsantsas at several levels of resolution using clinical and micro-CT will significantly advance the ability of researchers to authenticate tsantsas, but this technology will also aid in repatriation efforts of the ceremonial tsantsas, situating them in their proper ethnographic context, and contribute to conservation efforts via their digital preservation. It will also generate valuable visualizations and information for museum exhibitions to aid in the mobilization of knowledge about these unique cultural specimens.

Occurrence of the critically endangered Coquerel's Sifaka *(Propithecus coquereli)* across a fragmented landscape in Northwestern Madagascar

Ramilison ML (1), Andriatsitohaina B (1,2), Chell C (3), Rakotondravony R (1), Radespiel U (2), Ramsay MS (2,4)
1. Faculté des Sciences, de Technologies et de l'Environnement, Université de Mahajanga, Mahajanga, Madagascar
2. Institute of Zoology, University of Veterinary Medicine Hannover, Hannover, Germany
3. University Centre, Bishop Burton College, Beverley, United Kingdom
4. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada

Habitat loss and fragmentation affect species occurrence and distribution in rapidly changing ecosystems. These issues are especially relevant on the island of Madagascar where modern deforestation has been widespread and is ongoing. We investigated the occurrence of the critically endangered Coquerel's sifaka *(Propithecus coquereli)* in an anthropogenically modified landscape: the Mariarano region of Northwestern Madagascar. We surveyed four large forest sites from 500 to 5,000 ha and 16 forest fragments ranging from 1.5 to 19.2 ha in size.

We recorded various attributes of the visited sites such as area, distance to nearest large forest, and anthropogenic disturbance. We encountered sifakas in 10 of 16 fragments and in all large forest sites, with the majority of encounters occurring in habitat edge zones. Furthermore, we encountered 19 sifakas in the matrix such as in villages and fields. We found that neither human disturbance, area, nor distance to a large forest predict the presence of sifakas in the Mariarano region. Our results suggest that Coquerel's sifakas are able to persist in highly degraded and small forest fragments under certain conditions, but further research is needed on their long-term viability in anthropogenically modified landscapes.

Origin myths of critically endangered Coquerel's Sifaka

Ramsay MS (1,2), Ramilison ML (3), Andrinambinina G (4)
1. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada
2. Institute of Zoology, University of Veterinary Medicine Hannover, Hannover, Germany
3. Faculté des Sciences, de Technologies et de l'Environnement, Université de Mahajanga, Mahajanga, Madagascar
4. Département des Eaux et Forêts de l'Ecole Supérieure des Sciences Agronomiques, Université de Antananarivo, Antananarivo, Madagascar

How humans relate to the "natural" environment around them is influenced by their cultural upbringing and values. These perceptions, whether positive or negative, can directly impact conservation initiatives. When attempting to conserve a particular species it is vital to understand how local people perceive their environment and where these perceptions come from. In order to understand the local perceptions of the critically endangered Coquerel's sifaka *(Propithecus coquereli)* we conducted a series of interviews in the Mariarano region of northwestern Madagascar. We asked participants about their knowledge of the origins of sifaka and how they perceived sifaka in a spiritual, economic, or other sense. We conducted 105 interviews in three villages in the Mariarano region. Five separate origin myths were recorded in the Sakalava dialect of Malagasy and then translated to English, to our knowledge the first recordings of these myths. Based on these interviews, women were more likely than men to know and pass on a myth regarding the origins of sifaka. Additionally, knowledge of an origin myth led to an increased positive perception of sifaka in these villages. The generally positive perceptions of sifaka in Mariarano match the relative biological abundance of sifaka in this region. While there are many factors that go into the conservation of the critically endangered Coquerel's sifaka, we suggest that myths passed on by Sakalava women may be playing a pivotal and underappreciated role.

Ancient Maya catchment use: Stable sulphur isotopic evidence from Caledonia, Cayo District, Belize

*Rand A (1), Freiwald C (2), Grimes V (1,3)
1. Department of Archaeology, Memorial University of Newfoundland, St. John's, Newfoundland, Canada
2. Department of Sociology and Anthropology, The University of Mississippi, University, Mississippi, USA
3. Department of Earth Sciences, Memorial University of Newfoundland, John's, Newfoundland, Canada

Stable sulphur isotope analysis of archaeological human and animal bone collagen is an increasingly popular means of investigating diet and mobility in past societies. The recent application of this technique in the Maya Region suggests there is sufficient heterogeneity in environmental sulphur isotopes to contribute to understandings of subsistence and mobility in this culture area. While anomalous sulphur values within a dataset are typically interpreted as nonlocal individuals, the consumption of protein from catchments with distinct environmental sulphur values can also contribute to variability in human bone collagen. This study presents the sulphur, carbon, and nitrogen isotope results of 18 individuals from the Maya site of Caledonia, Cayo District, Belize, who primarily date to the Late Classic period. The strategic location of Caledonia on the Vaca Plateau across the Macal River from the nearby Mountain Pine Ridge allowed the Maya who lived there to utilize resources from multiple catchment areas. Because these catchments have different environmental sulphur isotope values, the isotopic results demonstrate that some local individuals obtained dietary protein from animals hunted from the Mountain Pine Ridge, while others were more reliant on maize grown on the limestone based Vaca Plateau. One individual with an unusually elevated sulphur value was also identified as a migrant to the site, perhaps from the Central Petén. This indicates that the variability in human sulphur isotope values at

Maya sites may not only indicate the presence of nonlocal individuals, but also the consumption of protein from isotopically distinct catchments. This research contributes to understandings of Maya catchment use through the direct analysis of human remains rather than animal proxies and demonstrates the necessity of a multi-isotopic approach when reconstructing subsistence and mobility practices in the past.

Application of 3D scanning techniques for the digitalization of pre-Columbian crania collections

Rangel-de Lázaro G (1,2,3), Martínez-Fernádez A (4), Rangel-Rivero A (5), Benito-Calvo A (6)
1. Department of Earth Sciences, Natural History Museum, London, United Kingdom
2. Institut Català de Paleoecologia Humana i Evolució Social, Tarragona, Spain
3. Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Tarragona, Spain
4. Department of Geography, University of Valladolid, Valladolid, Spain
5. Museo Antropológico Montané, Universidad de La Habana, La Habana, Cuba
6. Centro Nacional de Investigación sobre la Evolución Humana, Burgos, Spain

During the 19th and 20th centuries, numerous museums, scientific societies, and royal academies were founded in Europe and America. In this scenario, the Anthropological Museum Montané was founded in Havana, Cuba. Its collection has grown over the years, thanks to researchers, antiquarians, and amateurs. Since its foundation, the Museum Montané has become an essential institution for anthropological and archaeological research in the region. Nowadays, the Museum Montané, like other museums in developing countries, faces a challenge in the introduction of state-of-the-art technologies to digitizing exhibits and the creation of innovative projects to attract visitors. The current possibilities of virtualization of cultural heritage using digital technologies have a favorable impact on the preservation, access, and management of museum collections. The use of three-dimensional (3D) models fosters engagement with visitors, stimulates new forms of learning, and revalorizes the exhibits. In the current study, we use a hand-held structured light scanner to create 3D reality-based models of pre-Columbian crania from the Caribbean and South American collection of the Anthropological Museum Montané. The resulting 3D models were used for producing 3D printing replicas and animated videos. The 3D resources derived will encourage new knowledge through research and provide broader access to these pre-Columbian crania collections through learning and outreach activities. The significance of digitizing these specimens goes beyond the creation of 3D models. It means protecting these fragile and valuable collections for future generations. The methodology and results reported here can be used in other museums with similar collections to digitally document, study, protect, and disseminate the archaeological heritage. In the future, we seek to continue exploring the application of novel methods and digital techniques to the study of the pre-Columbian crania collections in Latin American and the Caribbean area.

Lunar and meteorological variables influence sleep in diurnal gibbon *(Hylobates moloch* and *Hylobates pileatus)*

*Reyes KR (1), Samson DR (2), Nunn CL (3), Patel UA (4)
1. Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada
2. Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada
3. Department of Anthropology, Duke University, Durham, North Carolina, USA
4. Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada

Sleep in the primate order remains understudied, with only 7% of species having reported total sleep duration. Even less have had their sleep quantified synchronously with meteorological data, drivers that have been reported to influence sleep-wake regulatory behaviours across the animal kingdom. In the current preliminary study, we investigate how wind, humidity, temperature, lunar phase, and illumination from moonlight influence sleep-wake regulation, including sleep quota variables such as sleep duration, sleep fragmentation, and sleep efficiency in two captive gibbon subspecies, the Javan Gibbon *(Hylobates moloch)* and the Pileated Gibbon *(Hylobates pileatus)* (N = 52 nights). Gibbons performed strict diurnal behaviour showing little nighttime activity and a remarkable sleep efficiency mean of 98.3. We found illumination from moonlight in relation to the lunar phase, and amount of wind to be the strongest drivers of high-quality sleep (longer duration, less fragmentation,

and higher sleep efficiency). From these results, it appears illumination and wind sensitively while sleeping may be evolutionarily advantageous and conserved in arboreal diurnal primates.

New data on Early Holocene funerary practices at Ganj Dareh (Iran)

Riel-Salvatore J (1), Lythe A (1)
1. Université de Montréal, Département d'Anthropologie, Montréal, Québec, Canada

The Early Neolithic site of Ganj Dareh (Kermanshah, Iran) is arguably one of the most significant sites for enhancing our understanding of goat domestication and the onset of sedentism. Despite its central importance, it has proven difficult to obtain contextually reliable data from it and integrate the site in regional syntheses because it was never published in full after excavations ceased in 1974. Here, we present the Ganj Dareh archive at Université de Montréal (housed in the Laboratoire d'archéologie de l'Anthropocène) and show how the documentation and artifacts it comprises still offer a great deal of useful information about the site. In this presentation, we focus on three aspects. First, we present the complete first stratigraphic profile for the site, which reveals a more complex depositional history than Smith's five-level sequence. Second, we explore the spatial organization of different levels which highlights the presence of a single burial in Level B-02 and of a triple burial in an elaborate structure in Level C-01. Finally, we describe and analyze these mortuary data and situate them into the broader context of PPN mortuary practices in the Zagros, showing both similarities and differences from funerary practices at other coeval sites. These data help refine our understanding of Ganj Dareh's depositional and occupational history and recenter it as a key site to improve our understanding of the social dimensions of the Neolithization process in the Middle East.

New hominin finds from Velika Balanica and Kozja Cave, Serbia

Roksandic M (1), Lindal J (2), Radović P (3), Mihailović D (4)
1. Department of Anthropology, University of Winnipeg, Winnipeg, Manitoba, Canada
2. Department of Anthropology, University of Manitoba, Winnipeg, Manitoba, Canada
3. National Museum Kraljevo, Kraljevo, Serbia
4. Department of Archaeology, Faculty of Philosophy, University of Belgrade, Belgrade, Serbia

The Central Balkans – the area south of the Danube River and north of Greece – is increasingly being recognized as an important area for the potential admixture of Neanderthal and modern human populations, as testified by new genetic evidence of the early presence of modern humans at the site of Bacho Kiro (Bulgaria). On the other side of the continent, new evidence from Portugal has pushed back the earliest appearance of the Aurignacian in the furthest corners of Western Europe to 38-40 kBP, some 5 millennia older than the oldest previously established date. Further in the past, Apidima 1 and 2 testify that Neanderthals and modern humans either overlapped or succeeded one another as inhabitants of the Balkan Peninsula between 210-160 kBP. We present preliminary results on new specimens from Serbia uncovered this field season: two teeth from Velika Balanica in Southern Serbia, and a mandibular fragment from Kozja Cave in the Iron Gates hinterland. The Velika Balanica teeth come from two different layers: the older is dated radiometrically to 300 kBP, while the younger has not been dated directly, but is no younger than 120 kBp. The specimen from Kozja Cave has not been dated yet, but it was found in association with Mousterian artifacts. Another cave in the vicinity, Mala Cave, has a small Aurignacian tool assemblage dated to the period before the Campanian Ignimbrite (CI) eruption. The mandible shows a mixture of Neanderthal and modern human traits which makes it remarkably interesting.

Investigating origins of individuals from a British Royal Navy Hospital Cemetery, English Harbour, Antigua: A multi-isotopic analysis

*Ross JB (1), Varney T (1)
1. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada

Excavations and research concerning a British Royal Naval Hospital Cemetery (c. 1763-1834) in English Harbour, Antigua have shed light on the intricacies of the lives of those interred. Questions regarding diet and toxic trace

element exposure have allowed for a unique glimpse into the diverse lived experiences of enslaved and free Black individuals, and Europeans that served the British Royal Navy stationed in the West Indies. However, still unexplored is the natal origin of the deceased, a significant element in the reconstruction of life histories, especially for Black individuals who experienced the African diaspora. This study details strontium (Sr), oxygen (O), and carbon (C) isotope analyses of tooth enamel and bone apatite to ascertain the possible birthplace for 19 adult male individuals. Dental and bone tissues are examined in tandem for $\delta^{18}O$ and $\delta^{13}C$ to provide childhood versus adulthood values, respectively. Strontium isotope analysis is at the forefront of mobility studies since it relies on distinct chemical signatures in underlying bedrock, however, disparate regions do sometimes possess overlapping $^{87}Sr/^{86}Sr$ ratios. To elucidate these intersections, archaeologists have used Sr in combination with $\delta^{18}O$ and $\delta^{13}C$ isotope analysis, which depends on drinking water and the carbohydrate portion of diet respectively to successfully estimate archaeological populations' natal origins. It was hypothesized due to the transient nature of colonial-era military sites that interred individuals would originate from diverse locations, including Africa, Europe, or other Caribbean islands. Seven individuals exhibit isotopic signals that suggest natal origins outside of Antigua or a significant change in locality throughout their life. Previous osteological analysis of craniofacial features assessed five of these individuals to be of Black ancestry, and two of European ancestry. One of the latter is the only known individual excavated, an assistant surgeon from the HMS Pyramus, whose isotopic ratios indicate likely natal origins in Britain. Three Black individuals show strong evidence for natal origins in Africa based on high (>0.71) dental $^{87}Sr/^{86}Sr$ ratios as well as their $\delta^{18}O$ and $\delta^{13}C$ isotopic values. These results support previous assessments of ancestry as well as the diverse nature of British naval personnel in the West Indies.

The hypothalamic-pituitary-adrenal axis and sleep as modulators of metabolic energy across the adolescent transition in a group of Mayan girls

Rowlands A (1), Salvante KG (1), McKinnon L (2), Samson D (2), Prescivalli AP (1), Nepomnaschy PA (1)
1. Maternal and Child Health Laboratory, Faculty of Health Sciences, Simon Fraser University, Burnaby, British Columbia, Canada
2. Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada

We hypothesize that changes in two critical metabolic energy modulators may mediate the adolescent transition: sleep and the hypothalamic-pituitary-adrenal axis (HPAA). We argue that sleep and stress may interact, influencing the onset and pace of the adolescent transition. We investigate these interactions in 21 Mayan girls aged 12 to 15 years (avg = 13.5 y). We monitored growth (BMI and waist/hip ratios); sleep (actigraphy data - CamNtech MotionWatch 8); HPAA activity (first morning urinary [FMU] cortisol); metabolic energy (FMU adiponectin and c-peptide); and reproductive maturity (FMU estrogen, progesterone, and follicle-stimulating hormone). Preliminary results suggest that BMI, waist/hip ratio and the proportion of girls reaching menarche was lower in 12 than 15 year olds (BMI: 24.0 to 31.06; waist/hip ratio: 0.84 to 0.80; menarche status: 40% to 100%, respectively). Sleep quality was higher in older girls (sleep fragmentation 24.24% in 12 year olds vs 19.99% in 15 year olds). Cortisol levels initially increased from 12 to 13 year olds (36 ng/ml to 46 ng/ml), then gradually declined with age. Adiponectin levels were highest in 12 year olds (1.8 ng/ml) and lowest in 15 year olds (1.35 ng/ml). C-Peptide decreased from 12 to 13 year olds (29.32 ng/ml to 21.02 ng/ml) then increased in 14 year olds (28.46 ng/ml). Lower energy reserve levels (adiponectin) at age 12 coincided with an HPAA activity peak, which suggests a shift in energy allocation at the time when most girls are entering their reproductive maturation transition. Increased sleep quality with age suggests an increased need for energy restoration, as girls began investing more energy into the maturation of reproductive tissues and function. This study will contribute novel information about how sleep and HPAA may modulate metabolic trade-offs and the variation in the onset, pace, and timing of reproductive maturation in girls.

Confronting new mysteries and old problems: Ancient DNA and legacy skeletal collections

Sawchuk EA (1,2), Prendergast ME (3,4)
1. Department of Anthropology, University of Alberta, Edmonton, Alberta, Canada

2. Department of Anthropology, Stony Brook University, Stony Brook, New York, USA
3. Division of Humanities, Saint Louis University-Madrid, Madrid, Spain
4. Department of Anthropology, Rice University, Houston, Texas, USA

Since the first fully-sequenced ancient human genome was published in 2010, ancient DNA (aDNA) methods have been applied to a growing list of archaeological questions worldwide. Paleogenomic research has generated an enormous amount of data on the past, but it has also given rise to a host of brand new mysteries. Many surprising discoveries have come from aDNA recovered from 'legacy' skeletal collections accessioned in the late 19th/early 20th century with absent, spotty or missing records on archaeological context. It is not clear-cut whether such poorly-documented collections should even be included in aDNA research. Given the destructive nature of aDNA sampling, research proposals should target sites and individuals with the best chances of testing specific hypotheses based on established radiocarbon dates and associated material culture. Yet when contextual information is unavailable or lost, aDNA – in tandem with direct dating – may be one of the only means left of obtaining information on ancient individuals. For this reason, some curators are keen to support paleogenomic research on legacy collections. To illustrate this dilemma, we present three cases from our research on the Pastoral Neolithic era in eastern Africa (~4000-1200 BP): Prettejohn's Gully, Gishimangeda Cave, and Molo Cave. Individuals sequenced from these sites could radically alter what we know about this time period, but interpretations remain frustratingly limited without contextual data and the next steps for research are unclear. Recovering aDNA under these circumstances compels us to confront long-standing issues surrounding legacy skeletal collections and ask ourselves how we do right by the individuals we have undertaken to curate in perpetuity.

White faced capuchins across environments: Captive, wild and urban

*Schmidt Z (1), Mirville M (1), Bolt L (1)
1. University of Wisconsin-Oshkosh, Oshkosh, Wisconsin, USA

Non-human primates face unique risks from anthropogenic threat due to their close genetic relationship with humans and proximity to human settlements. Due to their susceptibility to human disease, modification and loss of habitat, many non-human primates are considered threatened or endangered. One species of non-human primate that interacts frequently with humans is the white faced capuchin *(Cebus capucinus)*. These Neotropical primates are dietary generalists with specialized behaviours allowing them to inhabit areas on the periphery of human-dominated landscapes. Living in these areas can result in conflict between humans and non-human primates, which can result in injury and death of affected primates. Rehabilitation centers exist to mitigate the effects of humans on non-human primates; however, the rehabilitation process can be very complicated for capuchin monkeys, given their characteristics as a social and high-energy species. Given this complexity, capuchins may change their behaviour when in human-influenced environments. In an attempt to understand the effect of anthropogenic involvement on capuchin behaviour, I compared the activity budgets and state behaviours of capuchin monkeys studied in captive, urban, and wild environments in Montezuma, Costa Rica. I collected data in October and November 2019 using continuous-time focal animal sampling for 30 mins on individual focal animals with occasional scans samples, and collected 100 hours of data in total. I expected that foraging, vigilance, and locomotion behaviors would be drastically different in the urban populations with intermittent differences with the captive capuchins due to human-wildlife contact. The urban group exhibited a higher rate of vigilance and frugivory than the wild population, and also travelled using substrates that were atypical of the wild group. Captive capuchins exhibited behaviours that were similar to both wild and urban populations. Capuchins are behaviourally very flexible and can adapt to urban environments, these adaptations have a possibility of yielding negative health effects.

The evolution of the human chin: A quantitative genetics perspective

Schroeder L (1,2,3), Scott JE (4), Robinson CA (5,6,7), von Cramon-Taubadel N (3)
1. Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada

2. Human Evolution Research Institute, University of Cape Town, Cape Town, South Africa
3. Buffalo Human Evolutionary Morphology Lab, Department of Anthropology, University at Buffalo, Buffalo, New York, USA
4. Department of Sociology and Anthropology, Metropolitan State University of Denver, Denver, Colorado, USA
5. Department of Biological Sciences, Bronx Community College (CUNY), New York, USA
6. Doctoral Program in Anthropology, City University of New York Graduate Center, New York, USA
7. The New York Consortium in Evolutionary Primatology (NYCEP)

The evolution of the chin in humans is a longstanding area of inquiry in evolutionary studies. Previous research, ranging from biomechanical and ontogenetic approaches to studies of mandibular symphyseal form and rate of evolution, have provided a number of potential theories to explain the processes underlying chin prominence. Some have invoked the role of direct selection or interpreted the chin as a product of biomechanical, developmental, and architectural constraints on the skull, while others hold the view that the chin is a spandrel – a by-product of evolution. Here, we use a quantitative genetic approach to assess the latter. First, we estimated evolutionary rates, via Lande's generalized genetic distance, along each branch of a fully-resolved hominoid phylogeny to detect rate-shifts in masticatory and basicranial morphology. Second, where directional selection was identified, we reconstructed the pattern of selection acting on specific traits. Overall, results indicate that much of the diversity in extant hominoid mandibular form can be explained by strong stabilizing selection; however, a rapid evolutionary rate (suggestive of directional selection) was detected along the branch to humans. Reconstructed selection gradients indicate strong selection acting to decrease palatal, basicranial, and alveolar length (for both the mandible and maxilla), as well as anterior corpus width and height, and to increase posterior mandibular width, consistent with selection for a parabolic dental arcade. However, for the majority of the traits related to the chin, selection gradients and trait responses occurred either in opposite directions, indicating correlated responses to selection, or selection gradients were not significantly different from zero. The correlated responses were all negative, indicating that they were under the influence of strong negative selection coefficients acting elsewhere, likely related to facial retraction. Thus, our results provide evidence that the distinct human chin could be an evolutionary by-product of direct selection on other aspects of skull form.

Intra-observer reproducibility test of age-related features on the auricular surface

*Sierra E (1), Albanese J (2)
1. Simon Fraser University, Burnaby, British Columbia, Canada
2. University of Windsor, Windsor, Ontario, Canada

Perhaps the greatest challenge to those investigating human skeletal material is accurate age estimation. Factors that contribute to shape an individual's morphology are numerous, and variability increases with chronological age. Maybe because of the challenge of characterizing natural human variation, traditional research has focused on testing for accuracy over precision on age estimation. However, for this study the aim was set on examining reproducibility. Therefore, we defined a new data collection protocol that integrates sources of age-related skeletal variability in the pelvic region: a series of features and landmarks on the auricular surface. Reproducibility was assessed in a blind intra-observer analysis on 30 individuals. These were chosen using a sampling strategy to include a wide range of variation, which resulted in a series of test cases equally distributed by sex over a broad range of ages. Specimens were selected from the Terry Collection (Smithsonian Institution). Our protocol divided the range of age-related variation in several stages, represented by a numerical score. Results show that >90% of the times the score is the same or falls within the neighbouring stage. These intra-observer reproducibility results, together with our previous results on the pubic symphysis, show potential for further studies about how to include more variability in age estimation methods based on the pelvis.

Mapping biogenic and diagenetic lead exposure in experimentally altered bone

*Simpson R (1), Cooper DML (2), Coulthard I (3), Swanston T (4,5), Grimes V (6,7), Munkittrick TJA (6), Jankauskas R (8), Varney TL (9)
1. Department of Anthropology, University of Alberta, Edmonton, Alberta, Canada
2. Department of Anatomy, Physiology, and Pharmacology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

3. Canadian Light Source, Saskatoon, Saskatchewan, Canada
4. Department of Anthropology, Economics, Political Science, MacEwan University, Edmonton, Alberta, Canada
5. Department of Biological Sciences, MacEwan University, Edmonton, Alberta, Canada
6. Department of Archaeology, Memorial University, St. John's, Newfoundland, Canada
7. Department of Earth Sciences, Memorial University, St. John's, Newfoundland, Canada
8. Department of Anatomy, Histology and Anthropology, Vilnius University, Vilnius, Lithuania
9. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada

Trace element analysis of lead (Pb) in bioarchaeological skeletal remains can provide valuable insights into past human lifeways, but this area is severely limited by diagenesis, the chemical, physical, and biological alteration of remains occurring in the depositional environment. Bone can be particularly susceptible to diagenetic contamination. Elemental mapping techniques (e.g. synchrotron radiation X-ray fluorescence imaging [SR-XFI]) may provide one means of distinguishing between biogenic (lifetime) and diagenetic Pb uptake. To test the hypothesis that biogenic and diagenetic Pb exposure result in different spatial distributions within bone microstructural features, we experimentally induced Pb diagenesis in modern human bone samples from Saskatoon, Saskatchewan. We used inductively coupled plasma-mass spectrometry (ICP-MS) to determine bulk Pb concentrations of bone samples and SR-XFI to map the spatial distribution of Pb on the microscale in the untreated and experimentally treated modern bone samples and in archaeological bone samples from Antigua and Lithuania that represent probable cases of primarily biogenic versus diagenetic lead exposure, respectively. Results from both modern unaltered and altered modern bone samples support the hypothesis that there is a clear difference in the distribution of Pb for biogenic and diagenetic uptake that aligns with patterns previously observed in the archaeological bone samples from Antigua and Lithuania. Biogenic Pb distributes heterogeneously across bone microarchitecture according to bone remodeling dynamics, while diagenetic Pb is mainly confined to the periosteal surfaces of bone with some enrichment of post-mortem cracks and sub-periosteal canals. These data will help distinguish biogenic and diagenetic Pb uptake and inform sampling strategies in archaeological bone in future studies.

Kin-like bonds: Allocare between co-religionists increases when kin are less available

Spake L (1), Shaver J (1)
1. Religion Programme and Centre for Research on Evolution, Belief, and Behaviour, University of Otago, Dunedin, New Zealand

Alloparenting is a key feature of human societies that has contributed to their demographic success. In small-scale societies, kin are the most likely to provide alloparental support to mothers. Modernization, however, has led to the fragmentation of the kin networks which traditionally provided alloparental support. Modernization has also led to a rise in fertility differentials between religious and non-religious individuals. We propose that co-operation between co-religious in the form of alloparenting is one of the mechanisms through which religious individuals achieve higher fertility than their secular peers without reduced offspring outcomes. In this presentation, we evaluate whether religious women receive more alloparental support than non-religious women. An online questionnaire was distributed to women with at least one child under the age of 5 years and residing either in the US (N = 615) or the UK (N = 921). Each woman answered questions about her religious practices, her fertility history, her kin and social networks, and the people who help her care for her focal child. We explore the associations between the number of people who provide alloparental care and (1) the mother's religious behaviors (2) the number of kin residing within an hour's travel. In the US, regular prayer is associated with a larger number of alloparents, but regular attendance at a house of worship is not. The association between regular prayer and the number of alloparents is also present in the UK, albeit more weakly. In both cases, having a greater number of kin residing locally increases the number of alloparents. Women in the US receive help from fewer kin members than women in the UK, potentially because they also tend to have fewer kin residing nearby. For religious women, a greater number of co-religionist allocarers is associated with fewer kin residing nearby. This suggests that co-operation between co-religionists helps religious parents to care for children when they are not able to recruit help from kin.

Climate change impacts on potential future ranges of non-human primate species based on cumulative CO_2 emissions and the resulting surface temperature increase

*Stewart BM (1), Turner SE (1), Matthews HD (1)
1. Department of Geography, Planning & Environment, Concordia University, Montréal, Québec, Canada

Climate change is likely to negatively affect the habitats of non-human primate species. Recent research has identified a near-linear relationship between cumulative CO_2 emissions, and the resulting regional and seasonal temperature increase. We use this relationship to assess the potential impact that cumulative CO_2 emissions could have on the range areas available to primate species. Climate change is expected to exacerbate habitat loss, as temperatures move further from primate historical temperature ranges. We used data from the IUCN on range areas for 426 species and subspecies of non-human primates, combined with spatial climate data from the Coupled Model Intercomparison Project Phase 5 (CMIP5) that represents temperature changes per unit CO_2 emissions. Using these data, we estimated the portions of each species' range area where annual-average temperatures exceed the pre-industrial seasonal maximum temperatures (PSMT), for cumulative CO_2 emissions from 0.6 – 2.0 teratonnes of carbon. For the level of emissions corresponding to a 2°C global temperature increase scenario, 26.1% of all habitat ranges had temperatures in excess of their PSMTs, and for 8% of species, the entire current habitat was above their PSMT. As cumulative CO_2 emissions increase (0.6TtC to 2.0TtC), the percentage of primate habitat with temperatures above the PSMT, increases from 10% to 64%. This suggests potential for considerable loss of or compromised habitat for non-human primates on a global scale, as a result of the emergence of climate conditions that are outside the range of historical experience. Our results point to priority areas for conservation efforts, and the need for future research on strategies to increase the resilience of vulnerable local non-human primate populations.

Skeletal phenotypes and life history theory: Ancient clues to interpret modern health and disease

Stock JT (1)
1. Department of Anthropology, University of Western Ontario, London, Ontario, Canada

Human physiology is subject to limitations imposed by the physics of energetic systems. The alimentary limits of human digestion provide an upper limit to human energetic intake and thus expenditure and constrains the energy that can be deployed within the body towards physiological processes. Life history theory (LHT) predicts that energetic allocation within the body will represent trade-offs between competing demands and provides a theoretical framework for integrating studies of human variation. In this context, phenotypic variation in the human body represents trade-offs between competing energetic demands of maintenance, growth, reproduction, and immune function. These are often seen as discrete areas of research, despite the fundamental links in how the body is constrained in its 'investment' in these systems. The application of life history theory to the study of phenotypic variation from prehistoric human remains provides us with the potential to better understand the ecology and etiology of health and disease today. In this presentation I review recent contexts where the investigation of non-pathological phenotypic skeletal variation has informed us about the etiology of contemporary disease: a) the identification of regions of plasticity within the skeleton that reflect adaptive trade-offs in human growth, b) the early Holocene emergence of low lean mass in South Asia as a precursor to contemporary patterns of metabolic disease, and c) the reduction in bone quality associated with subsistence transitions as a precursor to modern frequencies of osteopenia. The results demonstrate the utility of a life history approach to our understanding of the ecology of contemporary health and disease.

Faunal change through the Holocene at Liang Bua: Endemic versus introduced mammals

Sutikna T (1,2,3), Faith JT (4), Jatmiko (3,1), Wahyu Saptomo E (3,1), Tocheri MW (5,6,1)
1. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia

2. Centre for Archaeological Science, School of Earth and Environmental Sciences, University of Wollongong, Wollongong, Australia
3. Pusat Penelitian Arkeologi Nasional, Jakarta, Indonesia
4. Natural History Museum of Utah & Department of Anthropology, University of Utah, Salt Lake City, Utah, USA
5. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada
6. Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington DC, USA

Flores is an oceanic island that has never been connected by land to either the Asian or Australian continents (during the Pleistocene these are referred to as Sundaland and Sahul, respectively). Because of this lack of past land connections, there is a paucity of terrestrial mammalian taxa that have successfully dispersed to Flores. At the archaeological site of Liang Bua, which preserves a relatively complete stratigraphic sequence that spans the past ~190 thousand years (ka), the first recorded appearance on Flores of a number of terrestrial mammals occurs during the Holocene. Here we examine the first appearance ages and subsequent distribution of several non-endemic taxa at Liang Bua in relation to the initial occurrence of pottery at ~3 ka ago and the oldest directly-dated modern human burials at the site that also include pottery as a grave good (2.7 ka and 2.6 ka). Pig is the only non-endemic mammal observed at Liang Bua prior to ~3 ka ago but it is relatively scarce through the earlier parts of the Holocene. Beginning ~3.6 ka ago pig becomes noticeably abundant relative to the total vertebrate assemblage. Macaques, porcupines, and civet cats appear together ~3 ka ago and are all consistently present in the sequence thereafter, albeit at lower relative abundances than pigs. In contrast, deer and dog are only observed within the past 1,000 years although a few putative fragments of deer are observed as far back as ~3 ka ago. In total, these results suggest major changes to the Flores mammalian fauna occurred between ~3.6 and 3 ka ago and these immediately preceded the onset of C_4-plant agriculture on the island. The observed pattern suggests that each of these non-endemic taxa was likely transported intentionally to Flores by modern humans (presumably Austronesians) although further evidence is needed to test this hypothesis.

Are a third of archaeological bone collagen stable isotope measurements unreliable?

Szpak P (1), Guiry EJ (1,2)
1. Department of Anthropology, Trent University, Peterborough, Ontario, Canada
2. School of Archaeology and Ancient History, University of Leicester, Leicester, United Kingdom

The carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) isotopic compositions of human bone and tooth collagen can provide a powerful tool for studying past cultural and biological phenomena, including diet and mobility. Collagen has a well-understood chemical composition that has enabled the development of invaluable quality control (QC) criteria for isotopic data – something that is extremely rare among archaeological biogeochemical research as a whole. The most important of these collagen QC criteria is C:N Atomic (% ratio of carbon to nitrogen), which provides an indicator for the extent to which the amount of carbon and nitrogen present in a sample matches the known composition of pure collagen, thereby indicating whether contamination or diagenesis may be influencing a sample's isotopic compositions. Using acceptable C:N Atomic range (2.9-3.6) criteria identified in the 1980s, tens of thousands of archaeological and modern bone and tooth collagen isotopic measurements have been parsed to remove data with unreliable isotopic compositions. Our aims in this presentation are twofold. First we show that, while in some cases the traditional C:N Atomic collagen QC parameters are applicable, in many others they can result in use of unreliable (skewed) isotopic data. We therefore argue that the traditional 'one size fits all' approach to the C:N Atomic QC criterion should be used with caution. Second, we outline new taxon- and region-specific collagen QC criteria, based on revised acceptable C:N Atomic ranges, that can help to improve archaeological interpretations of past human diets by more accurately identifying problematic isotopic data. Based on a survey of 25,000+ isotope compositions published in the last 30 months, more than a third of recent analyses fall outside our revised C:N Atomic. It is therefore critical that future research pays closer attention to collagen QC criteria.

Assessment of optimal methods for the demineralization of bone for stable isotope analyses

*Tait V (1), Grogan T (1), Szpak P (1)

1. Department of Anthropology, Trent University, Peterborough, Ontario, Canada

The purpose of our research is to better understand how bone collagen extraction methods can potentially affect collagen yields and stable isotope ratios. Many isotope labs follow a modified Longin (1971) collagen extraction method, however this method has not been rigorously tested and modifications to the protocol are frequently based on assumed optimal conditions. For this project, we assessed the demineralization step, specifically how much time it takes to demineralize bones of different grain sizes. Demineralization is the process by which the mineral component of bone is removed leaving the organic material behind. What is of primary focus in regard to demineralization is that collagen isolation procedures have the potential to damage and reduce yields available for analysis. Determining the best combination of demineralization time and bone size will help to offset unnecessary loss of usable collagen. Five bones of ranging quality and preservation were used including modern cow (n=3) and well-preserved archaeological terrestrial mammal bone (n=2), each bone producing 55 samples for a total of 275 samples. Bone pieces were demineralized in 0.5 M HCl for 11 different time periods, starting at 10 minutes and increasing to 7 days. In addition, 5 bone particle sizes ranging from larger chunks to powdered bone fractions were analyzed to see if any combination of factors produced optimal collagen yields. Preliminary results indicate that demineralization time and bone size have a large impact on collagen yields. Further research will include additional modern and well-preserved archaeological bones as well as poorly-preserved archaeological mammal bone to determine whether bones of different preservation status require different demineralization procedures. Samples with promising collagen yields will be subject to stable carbon and nitrogen isotope analysis to ensure the variable demineralization procedures do not produce spurious data.

Standardization of NaOH treatment for the removal of humics from archaeological bone collagen

Teeter MA (1), Szpak P (1)
1.Trent Environmental Archaeology Laboratory, Department of Anthropology, Trent University, Peterborough, Ontario, Canada

The removal of contaminants from archaeological material before stable isotope analysis is essential for producing valid and reliable data. The use of a sodium hydroxide (NaOH) has long been the standard procedure for removing a class of contaminants known as humics. Humic substances occur naturally in the burial environment and are generally dark in colour, acidic, aromatic, and hydrophilic compounds that are derived from decaying organic matter. These compounds have been found to infiltrate and bond with bone collagen, one of the primary analytical substrates used for stable isotope analysis. When compared to bone collagen, humic compounds are carbon-rich, nitrogen-poor, and have low $\delta^{13}C$ values, and therefore must be removed to isolate the collagen for stable isotope analysis. A major caveat concerning NaOH treatment is that the compound by nature is a highly caustic base that decomposes proteins via hydrolysis of peptide bonds. Therefore, an optimal number of treatments, concentration, and time duration must be used to remove humics from collagen without degrading the collagen itself. To date very little has been done to standardize the NaOH treatment protocol. In fact, inter-laboratory procedures can vary in the concentration, duration, and number of treatments of NaOH used to remove humics. This research looks to standardize this procedure with recommendations pertaining to the variables mentioned above for archaeological samples in various states of preservation. Seventeen skeletal samples in various states of preservation, ranging from modern cow bone to ancient human and animal remains, were used. Bulk material from each bone sample was subdivided and exposed to 20 different treatments of varying time, number of washes, and concentrations of NaOH. Additionally, one subdivided sample from each bone was given no treatment. Collagen yield, $\delta^{13}C$ and $\delta^{15}N$ values, and C:N atomic were used to assess the efficacy of each treatment for removing humic contaminants while maintaining collagen integrity across all levels of preservation.

The impact of handling time and food quality on vervet monkey foraging decisions

Teichroeb JA (1), Vasey EN (1), Arseneau-Robar TJM (1,2)

1. Department of Anthropology, University of Toronto Scarborough, Toronto, Ontario, Canada
2. Department of Biology, Concordia University, Montréal, Québec, Canada

Resources vary along multiple dimensions, including quantity, quality, ease of access, dispersion, distance, predation risk, and the level of competition. Animals have to quickly assess all these factors before making foraging decisions. The cognitive mechanisms and trade-offs involved, as well as how animals rank these factors are all largely unknown. We ran an experiment examining the impact of handling time and food quality on wild vervet monkey *(Chlorocebus pygerythrus)* foraging decisions at Lake Nabugabo, Uganda. We set up a multi-destination pentagon array (5 platforms) where each target was located 5 m from others. On each trial (N=935), 4 platforms were baited with 3 kernels of less-preferred maize, and 1 platform contained a preferred high-quality resource (half banana) that required handling time (located in a box with a hole cut at the top). We found that when monkeys foraged in the array alone (N=441) and they knew they could get every resource, they usually took the most efficient path, choosing platforms in order of distance (82.6% of trials), regardless of where the high-quality/handling time resource lay. Whereas when monkeys were in competition (N=494), they often bypassed corn platforms (37% of trials) and raced for the high-quality/handling time target ($p<0.0002$). Dominant vervets were far more tolerant of subordinates snatching corn in competitive trials than the banana ($p<0.0001$). For individuals, handling time decreased significantly with experience with the box ($p<0.0001$) and there was a tendency to be faster at removing the banana when more competitors were present ($p=0.062$). This experiment builds upon previous foraging experiments in our study system that are beginning to elucidate multi-factor foraging decisions in vervet monkeys. Here, we demonstrate that vervets make profitable choices that simultaneously consider resource quality, ease of access (handling time and distance), and degree of competition.

The onset of farming on Flores by at least ~2,700 years ago and the implications for Austronesian cultural history and dispersal

Tocheri MW (1,2,3), Sutikna T (3,4,5), Faith JT (6), Jatmiko (5), France C (7), Dupras TL (8)
1. Department of Anthropology, Lakehead University, Thunder Bay, Ontario, Canada
2. Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington DC, USA
3. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia
4. Centre for Archaeological Science, School of Earth and Environmental Sciences, University of Wollongong, Wollongong, Australia
5. Pusat Penelitian Arkeologi Nasional, Jakarta, Indonesia
6. Natural History Museum of Utah & Department of Anthropology,University of Utah, Salt Lake City, Utah, USA
7. Smithsonian Museum Conservation Institute, Suitland, Maryland, USA
8. Department of Anthropology, University of Central Florida, Orlando, Florida, USA

Agriculture is a key underlying factor of numerous modern human dispersals during the Holocene. The spread of Austronesian populations across the Pacific over the past five thousand years (ka) represents one of the last major prehistoric human dispersal events, but the role of farming in this biological, cultural and linguistic expansion from Taiwan into Island Southeast Asia and beyond remains poorly understood. Here we show that modern humans, rats (murine rodents), and pigs from Liang Bua, an archaeological cave site on the eastern Indonesian island of Flores, abruptly shifted to eating C_4 plants ~2.7 thousand calibrated radiocarbon years before present (ka cal. BP), following a ~15-ka-period of C_3-dominated diets. This observed dietary shift, which occurs almost simultaneously with the first appearance of pottery (~3 ka) in the Liang Bua stratigraphic sequence, suggests significant anthropogenic landscape transformation for cultivation and a substantial change in the subsistence economy of prehistoric human populations living around Liang Bua. To date, multiple modern human burials with grave goods, including pottery and polished adzes, have been recovered from the Holocene sequence at Liang Bua. Although most of these were excavated between 1965 and 1989, we recovered three additional burials in 2019, one of which had associated pottery and one included a polished adze. Two of these burials yielded direct ages of ~2.7 and ~2.6 ka cal. BP and their carbon stable isotope values indicate a substantial C_4 component. In total, our results provide the first unequivocal demonstration that farming of an

introduced C_4 plant(s), most likely millet, was adopted in eastern Indonesia by ~2.7 ka ago, corroborating linguistic, archaeological, and genetic evidence of Austronesian dispersal in Island Southeast Asia.

Tattoo or post-mortem markings? An experimental approach to analyzing skull markings from Muge Valley (Portugal)

*Tratch ML (1), Roksandic M (2)
1. Department of Anthropology, University of Manitoba, Winnipeg, Manitoba, Canada
2. Department of Anthropology, University of Winnipeg, Winnipeg, Manitoba, Canada

This research focuses on attempting to replicate a red marking discovered on the left temporal squama of an individual skull exhumed from the Cabeço da Arruda site (dating from 8,500 to 6,900 cal BP) in Muge Valley, Portugal. The marking is measured at roughly 3.75 cm in diameter and appears to represent a sun or sun-like imagery. There are two possible explanations for this marking: it was either a post-decompositional ochre drawing on an already defleshed skull, or the result of ochre-based ink staining the skull during deep-tissue tattooing. We conducted an experimental study in order to replicate the marking and test the latter tattoo hypothesis. Two skulls, a pig (*Sus scrofa domestica*) and a sheep (*Ovis aries*), were tattooed using traditional tattooing techniques. In order to approximate the Mesolithic tattooing techniques, pigment was made from a charcoal-water mix and smeared into wounds made from a needle modified from a Cervid metapodial. The frontal and parietal regions of the skulls – with the thinnest soft tissue layers – were targeted. The skulls were buried and left to decompose over the summer months. Upon exhumation of the remains, we observed the following: there was no ink staining on the frontal bone of the pig skull, whereas, the sheep presented staining on the parietal bones. While the ink was able to reach and stain the bones of the sheep, the marking was not as clear as the one present on the individual from the Muge Valley. This study revealed that, while it is possible for traditional tattoo ink to stain the underlying bone in regions where the soft tissue layer is thin, the possibility of a tattoo producing the clear marking on the Cabeço da Arruda skull is less likely.

The 1918/19 pandemic influenza: Hidden heterogeneity in an island population

Tripp L (1), Sawchuk LA (2)
1. Department of Anthropology, Prince George, British Columbia, Canada
2. Department of Anthropology, University of Toronto, Scarborough, Toronto, Ontario, Canada

The current pandemic caused by SARS-CoV-2, has led many to observe that there is a great variation in the morbidity and severity of the disease. The questions we asked about why some locations are so hard hit, yet others are barely touched by the disease, are familiar to scholars studying the last 'Great pandemic.' Numerous studies on the 1918 influenza pandemic have explored explanations such as: urban/rural differences; variation in socio-economic (SES), population density, age and sex composition, as well as previous exposure (or lack of) to influenza pandemics and other respiratory diseases as modifiers in immune response to the novel 1918 virus. Yet, there is little consensus as to the importance of any of the above explanatory factors in playing a role in influenza susceptibility in populations. Further, the link of previous respiratory diseases and heightened susceptibility to, or conversely sensitisation/immunity to the 1918/19 influenza virus, has not been empirically examined.

In our paper, we examine the relationship of two childhood respiratory diseases (measles and whooping cough) with influenza mortality in the Maltese city with the highest death rate during the second wave of 1918 influenza (Sept. to Nov.). There was a significant difference between the higher death rate of suburban communities with the lower rural and urban influenza deaths rates ($x2=32.32$, $p<0.01$). In particular, in the central suburban community of Birchicara, the influenza death rate was 5.3 per 1000, which was double the overall rate of the island (2.59 per 1000), and nearly 20% of deaths were in children under 10 years. Preliminary results indicate that whooping cough in 1917/18, which preceded the influenza pandemic, by a few months, rather than measles, could have explained the elevated influenza death rates in the children in the community.

Whooping cough was highest in Birchicara at an alarming rate of 535.7 per 1000 versus 127.35 per 1000 on the rest of the island. Factors, such as SES, and population density did not play a role. Therefore, we speculate the whooping cough may have had a syndemic potential in increasing influenza severity in children previously infected with whooping cough.

Female dominance rank and having a disabled infant predict fecal cortisol levels in free-ranging female Japanese macaques

Turner SE (1), Fedigan LM (2), Moriarity RJ (1), Matthews HD (1), Shimizu K (3)
1. Department of Geography, Planning and Environment, Concordia University, Montréal, Québec, Canada
2. Department of Anthropology, University of Calgary, Calgary, Alberta, Canada
3. Okayama University of Science, Okayama, Japan

Cortisol, a hormone released in response to stressors, can provide a useful window into an organism's physiological well-being. Experiencing chronic challenges to homeostasis has been found to be associated with significant deviations from mean baseline cortisol in many species. In the group of free-ranging Japanese macaques (*Macaca fuscata*) at the Awajishima Monkey Center (AMC) in Japan, more than 15% of individuals have congenital limb malformations (CLMs), which presents a unique opportunity to investigate the relationships among physical impairment, behaviour, and physiological stress levels in adult primates. We collected 569 fecal samples from 27 female Japanese macaques over three consecutive birth seasons, which were analyzed using enzyme immunoassay to extract cortisol levels. Using these data, we explored the relationship between fecal cortisol levels and individual (physical impairment and reproductive status), social (dominance rank and availability of close kin for social support) and ecological variables (exposure to potential predators, rainfall, and wild fruit availability). Physical impairment in adult females was not significantly related to cortisol levels; however, having a disabled infant was associated significantly with higher cortisol in the mother. Dominance rank showed a significant positive correlation with cortisol, such that higher-ranking females tended to have lower baseline cortisol levels than lower-ranking females. However, exposure to potential predators, rainfall, fruit availability, and social support availability had no significant effect on cortisol levels. In summary, these results point to the effectiveness with which disabled monkeys can behaviourally compensate for their physical impairments and the potential physiological cost to mothers associated with providing extra care for disabled infants who are unable to cling. Additionally, social variables, such as dominance rank, may influence cortisol levels in free-ranging female Japanese macaques.

L'organisation spatiale: Analyse quantitative et comparative des Homo sapiens et des Néandertaliens au site de Riparo Bombrini (Ligurie, Italie)

Vallerand A (1)
1. Département d'Anthropologie, Université de Montréal, Montréal, Québec, Canada

La disparition des Néandertaliens est l'un des plus grands débats en préhistoire. La période où l'on assiste à leur déclin correspond à l'arrivée des Homo sapiens en Europe, il y a environ 40 000 ans. On suppose ainsi que des différences fondamentales distinguent les deux espèces, ce qui aurait permis aux Homo sapiens de mieux s'adapter à l'Europe du Pléistocène supérieur. Un élément souvent mentionné afin de distinguer notre espèce des autres représentants du genre Homo est la capacité de structurer son espace au sein des sites qu'ils occupaient. Toutefois, des fouilles récentes de sites clairement attribués aux Néandertaliens ont livré des preuves de l'utilisation de l'espace de manière structurée notamment aux sites de Tor Faraj en Jordanie, La Folie en France, à l'Abric Romani en Espagne et tout récemment à Amalda I en Espagne. Afin d'établir si ces prétendues différences fondamentales entre les Néandertaliens et les Homo sapiens existent bel et bien, il est nécessaire de procéder à des analyses comportementales afin de comparer directement les deux espèces. Dans le cadre de ma thèse de maîtrise, je procède à une analyse spatiale comparative au site de Riparo Bombrini (Ligurie, Italie), un abri sous-roche effondré du Paléolithique supérieur et moyen contenant des artéfacts aurignaciens et moustériens. Ce projet représente une opportunité unique et sans précédent de caractériser un

comportement clé chez les Néandertaliens et les Homo sapiens dans un même site. Cette étude est intimement liée à l'utilisation et l'application des outils SIG en archéologie préhistoriques et à l'analyse quantitative des données. À travers cette présentation, je présenterai les résultats préliminaires des analyses spatiales au site de Riparo Bombrini de deux couches protoaurignaciennes (A1, A2) et d'une couche moustérienne (MS) ainsi que les résultats des analyses précédentes sur les assemblages. Le but de cette analyse est donc d'utiliser des méthodes statistiques afin de mettre à jour les différences qualitatives des schémas d'utilisation de l'espace des deux espèces, d'observer la variabilité comportementale et de donner du sens à cette variabilité.

Vitamin D deficiency and soft diet alters mandible morphology and size: implications for archaeological human populations from a mouse model system

*Van Ankum EM (1), Majcher KB (2), Dolovich AT (2), Johnston JD (2), Boughner JC (1)
1. Department of Anatomy, Physiology & Pharmacology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada
2. Department of Mechanical Engineering, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

Sociocultural factors influence variation in human mandibular form. Throughout archaeological time, mandibles have become smaller and less prognathic, while also changing in population-specific ways. For instance, the Industrial Revolution (IR) was a large-scale sociocultural shift in Britain ca. 1760-1850, followed by significant changes to human craniofacial structure. These changes arose alongside a dietary shift from harder to softer foods. Biomechanical forces influence bone remodeling by increasing bone cell signalling, differentiation, and matrix secretion, subsequently influencing jaw shape. Remodeling is also influenced by vitamin D, which regulates bone cell differentiation and signalling. Vitamin D deficiency became more frequent post-IR, as evidenced by paleopathological signs of rickets. It is unclear how diet texture and vitamin D translate into variation in adult mandible morphology. Via a mouse model and specialized diets, we tested the effects of dietary texture and vitamin D on mandibular form. We hypothesized that vitamin D is: 1) imperative for normal mandibular growth, and; 2) a greater influence on mandibular form than diet texture. C57BL/6J mice weaned at 7 weeks were raised on a soft or hard diet with vitamin D (n=40; n=48), or a soft diet lacking vitamin D (n=39). Post-sacrifice, adult mice were scanned with a Skyscan1172 micro-CT system and landmarked in Amira. Landmark datasets underwent Principal Component Analysis (PCA) in Morphologika. Mice fed soft diets had shorter mandibles with diminutive alveolar bone, gentler masseteric crests, wider angle between dentary bones, and larger bicondylar breadth. Diet groups occupied distinct but overlapping regions of shape space, with diet texture accounting for 30.8% (PC1) of total shape variance. Presence/absence of vitamin D accounted for 13.8% (PC2) of total shape variance between soft diet groups. Mice fed vitamin D had mandibles with more flaring angular processes, more robust masseteric crests, and elevated alveolar bone. In sum, vitamin D influenced mandible shape less than diet. These results indicate mandibular regions that are sensitive to vitamin D and more prone to variability during growth. Parsing out how these regions are influenced by diet helps explain archaeological variation in jaw phenotype, particularly among agricultural and industrialized populations.

Zooarchaeology at Liang Bua: Anthropogenic traces of human subsistence on small mammals

*Veatch EG (1,2), Jatmiko (3,4), Wahyu Saptomo E (3,4)
1. Department of Anthropology, Emory University, Atlanta, Georgia, USA
2. Department of Anthropology, Yale University, New Haven, Connecticut, USA
3. Pusat Penelitian Arkeologi Nasional, Jakarta, Indonesia
4. Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage, University of Wollongong, Wollongong, Australia

From the time modern humans first appear in the stratigraphic record (~46 ka) until the appearance of pottery (~3 ka) and the onset of C_4-plant farming (~2.7 ka) at Liang Bua, the primary mammalian prey available to these foraging populations would have included almost exclusively endemic murine rodents (i.e., rats). At ~3 ka and after on Flores, agriculture and several non-endemic mammals are introduced to the island that undoubtedly altered their diets and subsistence pathways from foraging endemics to consuming domesticates. The extent to which local populations hunted local murines prior to, during, and after the transition to sedentism at Liang Bua

is unknown. Here, a taphonomic and zooarchaeological study was performed on a sample of 2,747 cranial and postcranial murine elements to identify human activity during this time. Skeletal elements derive from a single Sector (XI) retaining stratigraphic units of foraging activity (~18–5 ka), increased sedentism (~5–3 ka), and farming practices (~3 ka – present). Where possible, skeletal elements were identified to a body size category and analyzed for traces of human activity. Results from skeletal element abundances, bone surface modification analysis, and burning patterns indicate gradual yet fluctuating periods of human activity in the cave with a noticeable peak corresponding to the introduction of pottery (~3 ka) followed by a substantial decrease in fire-use. Cutmarks identified on large-bodied murines—indicating direct human consumption—before ~5 ka are scarce, but the greater relative abundance of large to giant-body sized murines (>600 g) coupled with an increasing amount of burnt bone may indicate a slow but increasing amount of human activity from ~18–5 ka. Between ~5 and 3 ka, small murines became incorporated into the human diet for the first time. This expansion of diet breadth—coupled with intensified shellfish harvesting—may indicate the presence of other biodegradable technologies (i.e., nets, snares, traps) used to collect these additional resources. Finally, the presence of cutmarks on large to giant-bodied size murines soon after ~3 ka suggest that humans continued to forage for endemic small mammals after the transition to farming.

Skeletons in wells: Post-mortem treatments in Roman Eretria, Greece

Weerasinghe P (1)
1. Department of Anthropology, University of Waterloo, Waterloo, Ontario, Canada

This paper reports on adult and juvenile human skeletal remains that were excavated by the Swiss School of Archaeology in Greece (ESAG) from a 3rd century CE Gymnasium well excavated in 2016-17 at Eretria on the island of Euboea, Greece. A major question in the excavation concerned the nature of this unusual deposition of human remains. The bones were commingled and incomplete; attempts to identify individuals yielded little additional information. Age, sex, pathology, as well as taphonomic and other changes on bone were recorded. The data were used to determine whether these individuals were deposited in the well as skeletonized individuals or as whole bodies. The level of breakage, the post-mortem sharp force trauma, and the missing elements of bone suggest that the adults and juveniles entered the well as skeletonized individuals. It is likely that these individuals were buried elsewhere first and that the deposit in the Gymnasium well is a secondary internment. The paper further argues that the individuals that were deposited in the Eretrian Gymnasium well received a variation of a “normative” manner of burial in ancient Greece as opposed to a form of “deviant” burial that human skeletal remains in wells have come to be associated with in archaeological literature.

The Stone Age archaeology of Iringa Region, southern Tanzania

Willoughby PR (1)
1. Department of Anthropology, University of Alberta, Edmonton, Alberta, Canada

The Iringa Region, in the Southern Highlands of Tanzania, contains an archaeological and fossil hominin record ranging from the Acheulean through historic and modern times. Acheulean sites are located in open-air gullies, where Pleistocene sediments are exposed. A survey in 2018 located numerous new sites besides the famous Isimila Korongo. The region is also well known for its extensive rock outcrops with shelters. In them, a record from the Middle Stone Age (MSA) to present has been identified. Fossil modern human teeth have been recovered from one shelter (Magubike) and a partial Pleistocene human skeleton in another (Mlambalasi). The paper reviews recent work in Iringa and the role of this region in the emergence of modern *Homo sapiens*.

Examining the impact of demineralization methods on the stable isotope composition of bone collagen

Wilson T (1), Szpak P (1)
1. Department of Anthropology, Trent University, Peterborough, Ontario, Canada

The purpose of this research was to further our understanding of the impact that demineralization methods may or may not have on bone collagen stable isotope composition. To test the null hypothesis that no significant differences will exist in the stable isotope composition of bone collagen regardless of demineralization method, we compared the ^{13}C and ^{15}N values of modern terrestrial mammal bones that have been exposed to three different treatment protocols that are commonly referenced in the literature. The isotopic data for samples left untreated (whole bone powder), treated with EDTA and treated with HCl were compared to evaluate the impact of demineralization. We predicted that the samples pretreated using HCl and those pretreated with EDTA would produce statistically similar ^{13}C and ^{15}N values, but significantly different ^{13}C and ^{15}N values from the equivalent samples left untreated. This study represents a significant contribution to the literature, given that all dietary and trophic ecology interpretations using stable isotope composition of bone collagen rely on the production of robust data that are not influenced by pre-treatment methodologies. Currently, there is some concern that demineralization alters ^{13}C and ^{15}N values, and therefore the recommendation to use whole bone powder rather than pure collagen has become more common. The results of this study will examine this concern and further elucidate the efficacy of various demineralization methods as compared to the analysis of untreated whole bone powder.

Variation in the cross-sectional geometry of the first metatarsal and the relationship with the femur and tibia

Wollmann J (1), Cameron M (1)
1. Department of Anthropology, University of Toronto, Toronto, Ontario, Canada

The examination of cross-sectional geometric properties (CSGP) of long bones can be informative about differential activity patterns and levels of terrestrial mobility. Typically, these analyses focus on the femur and tibia, but it is currently questioned if the metatarsals in an individual reflect the same mobility signature as the corresponding femur and tibia. This study examines femora, tibiae, and first metatarsals to evaluate variation in the CSGP between groups with different mobility patterns and the relationship between CSGP of bones within the lower limb. The sample consists of protohistoric Andaman Islanders (n=28) and Later Stone Age (LSA) Southern Africans (n=36) from the forest and fynbos biomes from 10,000 – 2,000 BP. Data were acquired from past studies of these groups. Mann Whitney U-tests and multivariate statistics evaluated variation between groups. Ordinary least squares regression evaluated the relationships between CSGP of the femur, tibia, and first metatarsal. Mann Whitney U-tests show that LSA Southern Africans had significantly more robust femora and tibiae, but not first metatarsals, than Andaman Islanders. Multivariate statistics show that LSA Southern Africans had a much broader range of variation in CSGP than Andaman Islanders but that groups could not be separated from each other. Regressions revealed that the strength of relationships between the CSGP in the leg is dependent upon group distinction, in that Andaman Islander females had the strongest relationships and LSA Southern African males had the weakest relationships. Additionally, while the femur and tibia are always closely related, the relationships to the first metatarsal are variable. LSA Southern Africans are more terrestrially mobile than Andaman Islanders and have a wider range of variation in the intensity of their mobility, but these differences are not reflected in the first metatarsals. The femur and tibia experience similar patterns of loading, specifically in compression and tension, but this loading pattern is different in the first metatarsal. Overall, first metatarsals alone do not accurately reflect differential levels of mobility between groups.

Syphilis, blame, and stigma across the centuries

Woodley C (1)
1. Department of Anthropology, McMaster University, Hamilton, ON

This project examines how a blame framework surrounding syphilis evolved and interacted with societal and political factors since the 15th century in the Western World. A review of published articles which reference historical records and osteological investigations to create a timeline of blame patterning. Political enemies and those who were "immoral" were blamed for syphilis throughout the 15th-16th century. During the 17th-18th

centuries, blame shifted to low socioeconomic status (SES) members of society. In the 19th century, the assignment of blame no longer had political associations; however, disadvantaged (low SES) members of society continued to be blamed. This is a pattern that would continue throughout the 20th century and into the 21st. Blame and stigma shifts in relation to political and societal views. Over time, societal factors outweighed political viewpoints. Both osteological and historical records denote a correlation between syphilis incidence rates and the SES of certain regions. This may indicate that low SES individuals were more prone to syphilitic infection which may have further disadvantaged them in society. These disadvantaged and vulnerable populations were often assigned blame. Researching blame patterning may provide insight into the trajectories of contemporary diseases. By understanding factors that contribute to blame assignment and patterning in both historical and contemporary populations, we can better understand how stigma and society interact. Syphilis presents an osteological paradox. Only when the disease reaches advanced tertiary stages does it physically impact the skeleton. However, individuals who had the disease in its earlier stages may still have died from the illness with no osteological evidence. Moreover, the osteological data came primarily from cemeteries in historically low SES regions; little research has been conducted to investigate cemeteries used by individuals of higher SES and social status. Limited evidence may skew representation towards disadvantaged populations. Further investigation should be conducted in cemeteries of higher SES areas to provide a more well-rounded representation of all social classes. With more inclusive evidence, we may garner a better understanding of historical syphilis blame patterning, which may provide deeper insight into contemporary diseases.