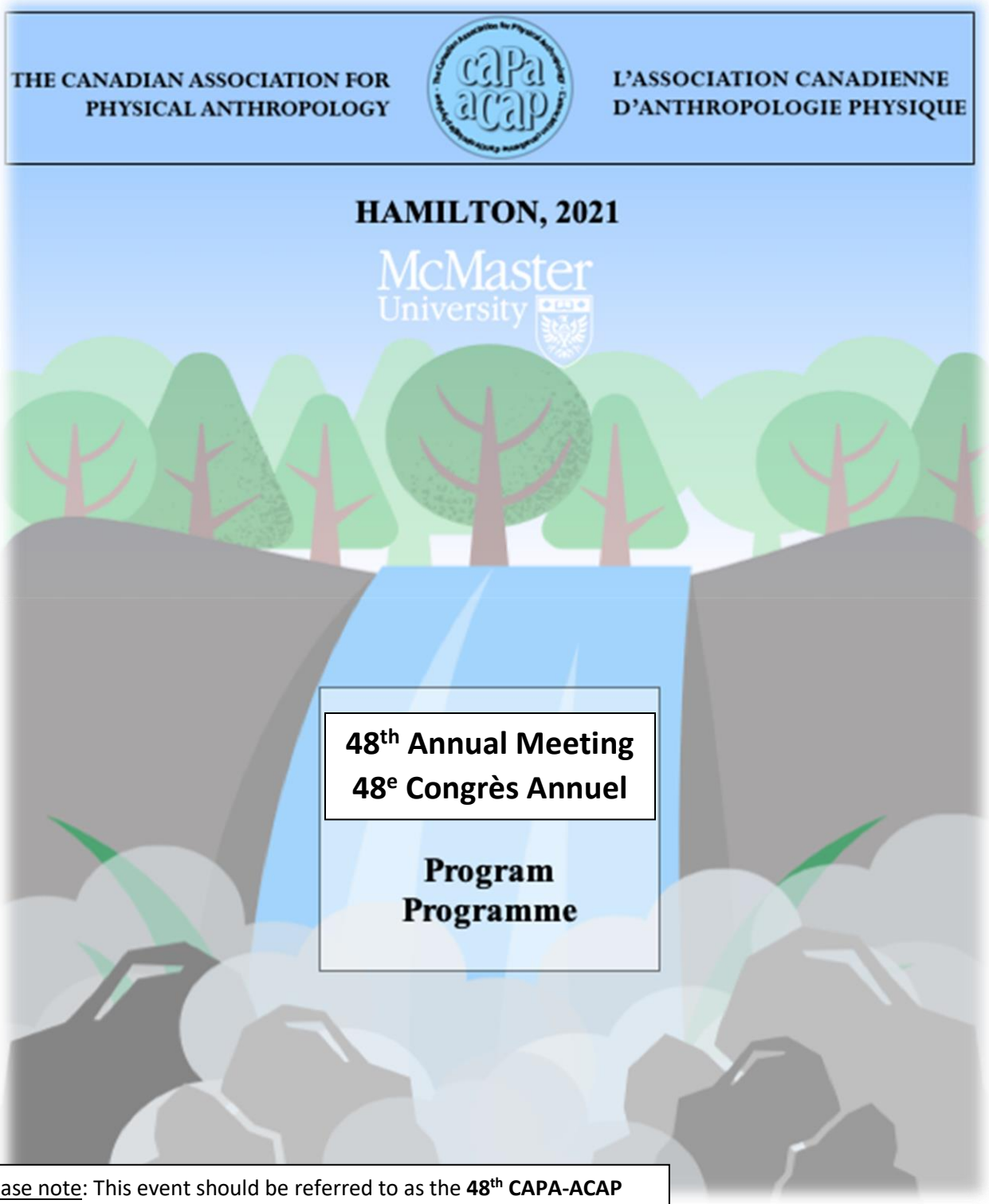


Please note: This event should be referred to as the **48th CAPA-ACAP annual meeting**. This change has been made since the initial publication of the program. Older versions of the program may refer to this event, the 2021 annual meeting, as the 49th.

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.

Cover design by K. Borisov

Welcome to Hamilton, Ontario

The CAPA-ACAP organizers and planning committee, the McMaster Department of Anthropology, the Faculty of Social Sciences, and the City of Hamilton wish you a very warm welcome to the 48th annual Canadian Association for Physical Anthropology/ l'Association Canadienne D'Anthropologie Physique meetings. Hamilton, a.k.a. Steeltown, is known as the waterfall capital of the world with over 130 waterfalls located in and around the city. Hamilton is also home to a piece of Canadian coffee history; it is the location of the first Tim Horton's, built in 1964. The downtown core of Hamilton is going through a renewal, so we invite you to take a stroll along James Street North to check out coffee houses, restaurants, independent shops, and one of our local breweries, Merit Brewing. The City of Hamilton has provided this Digital Welcome Package to help you explore the city.

We are excited that you are participating in our first-ever hybrid (in-person and virtual) meetings. Fingers crossed that it all goes smoothly! We have scheduled the in-person and virtual sessions to ensure that participants can attend nearly all sessions. Due to the high number of virtual and in-person presentations, we are holding concurrent sessions in the afternoon on Friday, October 29th.

This year's Student Luncheon will deal with an important and timely topic: "Precarious positions: A discussion on diversity and marginalization in Biological Anthropology." We are grateful to the Faculty of Social Sciences, McMaster University, for their support of the student luncheon.

We wish you a safe and very enjoyable stay in Hamilton!

CAPA-ACAP 2021 Organizing Committee

Land Acknowledgement

We acknowledge the traditional territories upon which we gather; McMaster University is located on the traditional territories of the Mississauga and Haudenosaunee nations, and within the lands protected by the "Dish with One Spoon" wampum agreement". For many thousands of years, the first people sought to walk gently on this land, offering their assistance to the first European travelers and sharing their knowledge for survival in what was at times a harsh climate. We seek a new relationship with the original peoples of this land, one based in honour and deep respect. May we be guided by love and right action as we transform of our personal and institutional relationships with our indigenous friends and neighbours.

Organizing Committee for CAPA-ACAP 2021

Organizing Committee

In Person Events: Megan Brickley, L. Elizabeth (Bess) Doyle, Tina Moffat, Tracy Prowse

Virtual Events: Matthew Tocheri

Planning Committee

Marcia Furtado, Delia Hutchinson, Bonnie Kahlon, John Silva, Katherine Woodley

Volunteers (In Person)

Creighton Avery, Robb Beggs, Marie-Helene B.Hardy, Katarina Borisov, Jess Hider, Lily Godawa, Julie Nguyen, Cassidy O'Kopniak, Sarah Oresnik, Sam Price, Becca Tough, Hannah Whitelaw

Volunteers (Virtual)

Anneliese Eber, Elizabeth (Becky) Carpenter, Michael Duncan, Rebecca Christenson, Sarah Friesen, Claire Woodley, Stephanie Skelton

Student Luncheon Coordinator

Lauren Poeta

Ontario COVID-19 Protocols and the CAPA-ACAP Conference

As of September 22, 2021, the government of Ontario requires that people are fully vaccinated (i.e., two doses plus 14 days) and provide their proof of vaccination along with photo ID to access certain indoor public settings and facilities. This includes meeting and event spaces, such as banquet halls and conference/convention centres, as well as restaurants, gyms, and bars. If you are attending the CAPA-ACAP conference in person, **please ensure that you have a copy of your 2nd vaccination receipt and matching photo ID** (e.g., driver's license or health card). You will be asked for your vaccination confirmation by the hotel staff OR when you pick up your materials at the CAPA-ACAP registration desk, and **your lanyard with your name will serve as evidence that you have provided proof of full vaccination.** You should always wear your lanyard in the conference venue.

Individuals visiting from outside the province or the country will be required to show their full vaccination status and identification to enter the settings mentioned above. Click on this news.ontario.ca link for more information.

CAPA – ACAP Statement on Diversity and Inclusion

Our organization embraces diversity among its membership and values the inclusion of people with diverse perspectives and backgrounds. We commit to providing a welcoming and safe space for scientists and scholars regardless of sex, ethnicity, age, physical appearance, sexual orientation, gender identity, disability, financial situation, religion, national origin, cultural background, pregnancy, parental or marital status, immigration status, academic affiliation, or any other aspect of identity. We seek at all times to mitigate the harms caused by inequities within our academy. We acknowledge the lands on which we gather and our continuing commitment to decolonizing our professional interactions through community-engaged approaches. Bullying, harassment, or discriminatory forms of behaviour have no place within our society. All members are to be treated with dignity and respect and are expected to adhere to the CAPA-ACAP Code of Ethics as well as any such codes by which they are bound through institutional or other affiliation.

Déclaration de l'ACAP - CAPA sur la Diversité et l'Inclusion

Notre organisation encourage la reconnaissance et le support de la diversité parmi ses membres et valorise l'inclusion de personnes ayant des perspectives et des expériences diverses. Nous nous engageons à fournir un espace accueillant et sûr aux scientifiques et aux membres de la communauté universitaire, quels que soient leur sexe, leur origine ethnique, leur âge, leur apparence physique, leur orientation sexuelle, leur identité de genre, leur handicap, leur situation financière, leur religion, leur origine nationale, leur identité culturelle, leur grossesse, leur statut parental ou matrimonial, leur statut d'immigrant, leur affiliation universitaire ou tout autre aspect ayant trait à leur identité. Nous cherchons à tout moment à atténuer les dommages causés par les iniquités au sein de notre organisation. Nous reconnaissons l’histoire des terres sur lesquelles nous nous rassemblons et perpétuons notre engagement à décoloniser nos interactions professionnelles par le biais d'approches communautaires inclusives. L'intimidation, le harcèlement ou les formes de comportement discriminatoires n'ont pas leur place dans notre société. Tous les membres doivent être traités avec dignité et respect et doivent adhérer au code d'éthique de l’ACAP-CAPA, ainsi qu'aux codes auxquels ils sont engagés par le biais d’affiliations institutionnelles ou autre.

Sponsors and Acknowledgements

We gratefully acknowledge the following for their support of CAPA-ACAP 2021:

Faculty of Social Sciences and Department of Anthropology, McMaster University

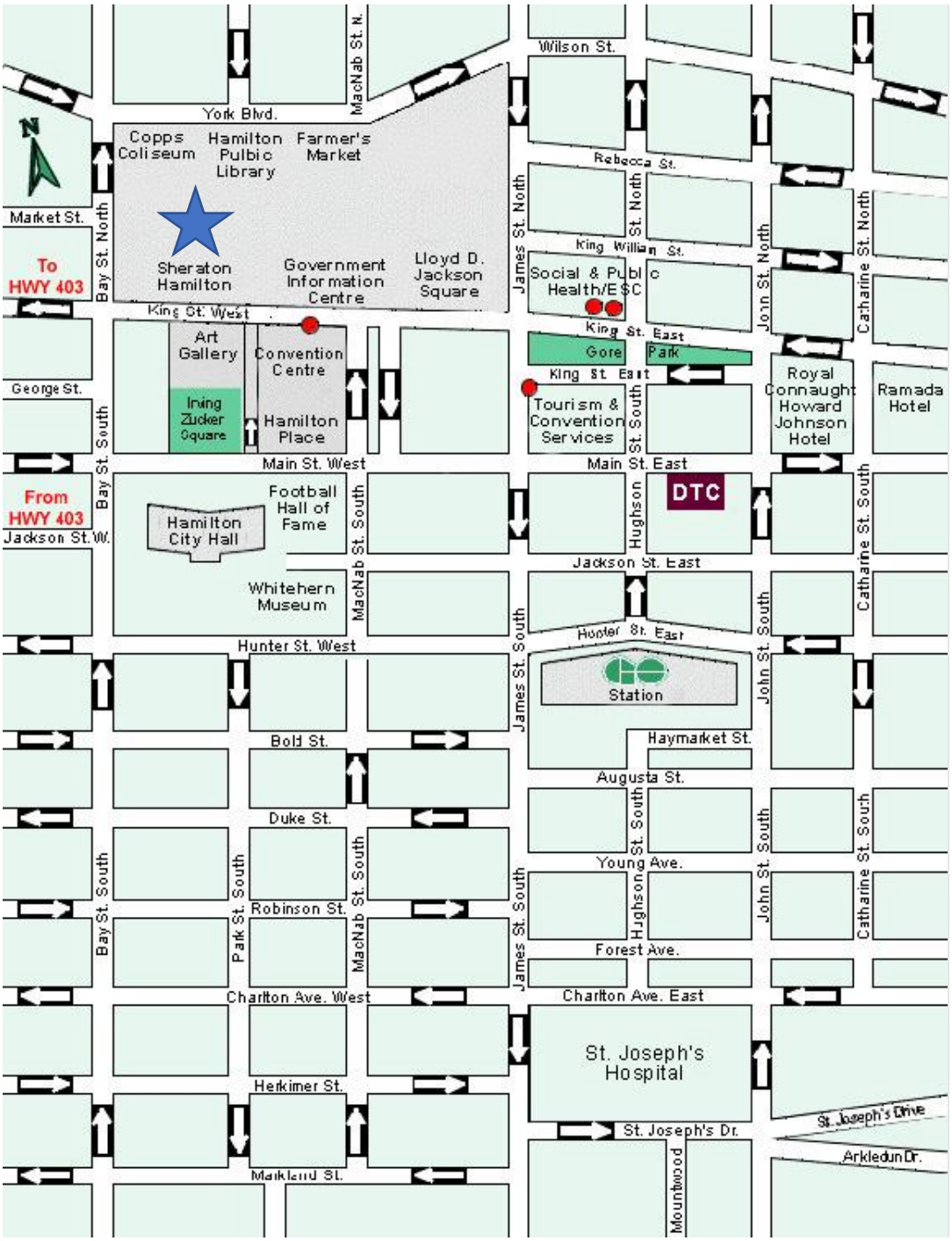
Department of Sociology and Anthropology, University of Guelph

And the Following Contributors

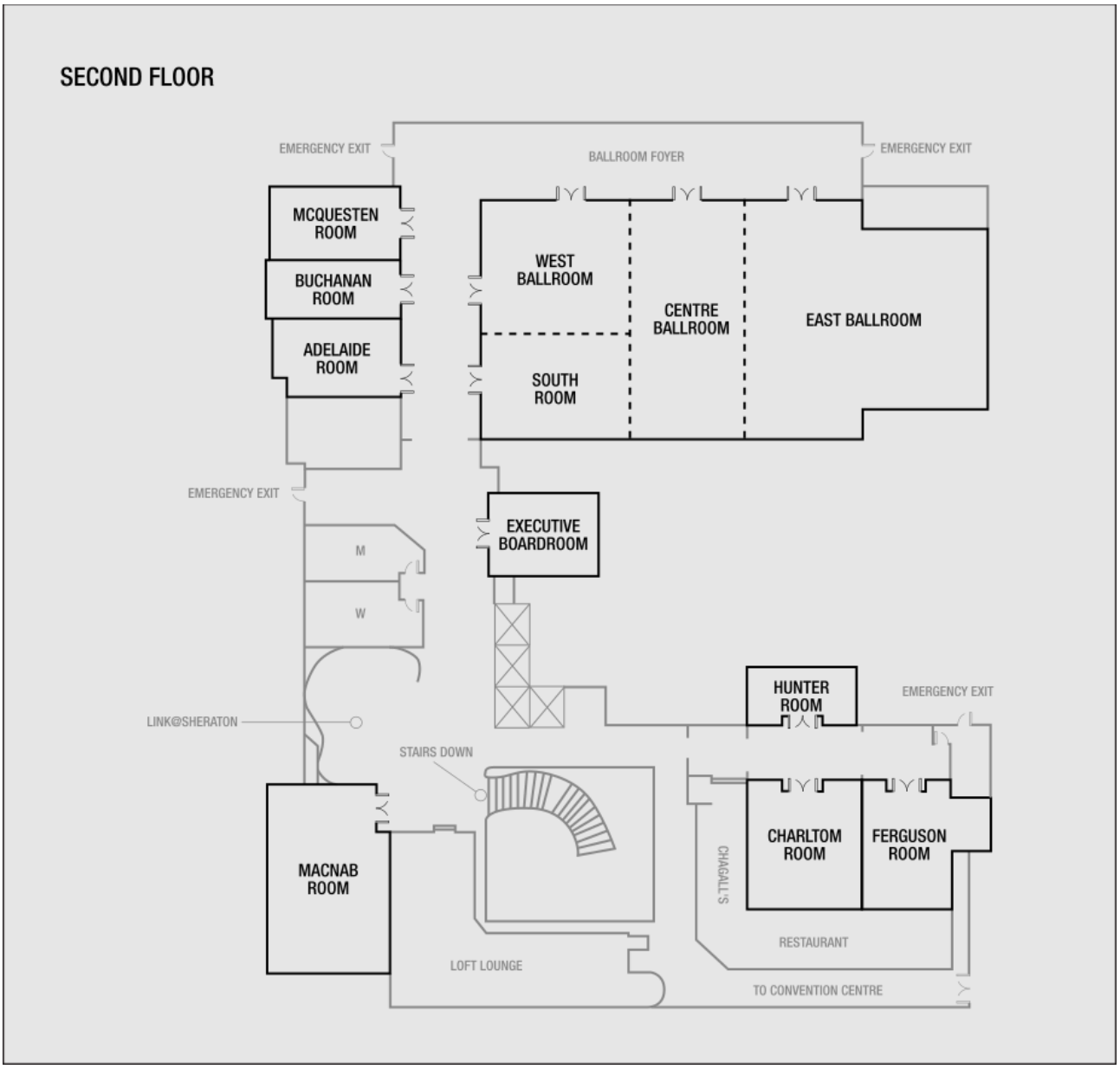
Area Contributors

Hamilton

Downtown Hamilton Map



Sheraton Hamilton Second Level Floor Plan



Mental Health, Safety, and Sexual Assault Resources in Hamilton

Link to resources with maps

SACHA Sexual Assault Centre
75 MacNab St South, Hamilton
24-hour support line: 905-525-4162
Website: https://sacha.ca/
SACHA is a non-profit, community-based organization that provides support to people who have experienced sexualized violence at any point in their lives. They work to end violence and oppression through education, advocacy, outreach, coalition building, community partnerships, and activism
This service provides counselling and a 24-hour support line for sexual violence survivors as well as people who may be supporting survivors. They have virtual distance counselling and telephone intake to support individuals during COVID-19. They also have various resources and public education material on their website.

24-hour Crisis Outreach and Support Team (COAST) Hamilton
Phone number: 905-972-8338, or online at coasthamilton.ca
This is a crisis service where the caller is connected to a support worker who completes an intake assessment and helps the caller come up with a plan of intervention. If needed, a mobile outreach team will be dispatched to the caller's location.

St. Joseph's Healthcare Hamilton Emergency Psychiatry Services
Located at St. Joseph's Healthcare Hamilton Hospital emergency department: 50 Charlton Avenue East, Hamilton. St. Joseph's Healthcare is the regional centre for mental health and addiction and the only adult emergency department in Hamilton
Phone number: (905) 522-1155

Assaulted Women's Helpline
Toll-free phone number: 1-866-863-0511
Toll-free TTY: 1-866-863-7868
Phone number GTA: 416-863-0511
GTA TTY: 416-364-8762
Free, anonymous, and confidential telephone and telephone-typewriter hybrid (TTY) crisis telephone line to all women in the province of Ontario who have experience any form of abuse. Provides crisis counselling, safety planning, emotional support, information, and referrals

Sexual Assault/Domestic Violence Care Centre
Operates a 24/7 emergency room response team including sexual assault nurse examiners at the Hamilton General Hospital and the Juravinski Hospital & Cancer Centre to respond to survivors of sexual assault or domestic violence

> **Hamilton General Hospital emergency room**
> 237 Barton Street East, Hamilton
> **Phone number:** (905) 521-2100

Juravinski Hospital emergency room
711 Concession Street, Hamilton
Phone number: (905) 389-4411

Canada Suicide Prevention Service
24/7 National Suicide Prevention Hotline: 833-456-4566

Trans Lifeline
A non-profit helpline offering direct emotional and financial support to trans people in crisis run by and for trans people.
Phone number: 1-877-330-6366

Hamilton Police Services

Call 911 or 905-546-4925

Headquarters address: 155 King William Street, Hamilton

In-person Presentation Notes

Please see the annual meeting web site for presenter guidelines – click here

Podium presenters: Please be present to load your presentation onto the laptop (the machine is a PC) at least 20 minutes before presentations begin in the morning or at the beginning of the coffee/lunch break prior to your talk. A student volunteer will be present to assist.

Podium chairs: Please ensure that all presenters have loaded a copy of their presentation to the laptop provided. Virtual attendees will be able to observe slides, hear presenters, and ask questions via Zoom. Bring your laptop or other electronic device so that you can monitor questions posted in Zoom chat from those not present in the room. So those attending remotely can hear questions please ask presenters to repeat questions asked by those attending in person before providing an answer.

Poster presenters: Please arrive at least 20 minutes before the start of the morning sessions to put up your poster and remember to take it down at the conclusion of the day you are scheduled to be available to answer questions. A student volunteer will be present with supplies for hanging posters and to provide assistance as needed. Posters are assigned by number which the volunteer will distribute.

Policy on Live-Tweeting Presentations:
Session Chairs are encouraged to ask presenters whether they give permission for information from their talks to be shared on Twitter or other social media, and to announce this at the beginning of the session. Anyone live-tweeting presentations should use the conference hashtag: #capa-acap2021.

Notes on 2021 Virtual Conference Events

(thanks to the 2020 virtual conference organizers for permission to use their instructions)

Remote participants can attend virtual sessions and view in person presentations using a ZOOM ACCOUNT. Those of you with existing accounts or educational licenses through your home institutions can log on through

those accounts. **Please make sure that you update ZOOM before the conference.** 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 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 sessions 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 interactions during Q&A sessions, although 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 customized 2021 Gather space. **The password to enter the space is "osteounicorn21".** *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 the opening night virtual social event. Feel free to also explore the Bar, the Lounge, and the Beach when you need a break from the conference.

SYNCHRONOUS SYMPOSIA and POSTER Q&A SESSIONS 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. **Conference presenters and participants should be aware that all in-person symposia Zoom meetings may be recorded. Recordings will be of audio and PowerPoint slides only. All recordings will be posted to Gather and will not be shared to any public channels.** Live links to the recordings will remain available for 30 days after the event, to permit registrants to view any synchronous content they missed.

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.

CAPA – ACAP suggest the use of Black Trowel Collective Microgrants Running Safer Sessions Guidance. A collaboratively produced set of guidelines for creating a safe online environment during virtual conference sessions**.**
Link to online resource: https://blacktrowelcollective.wordpress.com/2021/01/14/running-safer-sessions/

CAPA-ACAP 2021 Schedule at a Glance

Please note that all times are in Eastern Standard Time (EST)

Virtual events are in italics and shaded

Sheraton Hotel Wi-Fi: Sheraton-Special

Wi-Fi password: 2021Exam

WEDNESDAY OCTOBER 27, 2021		**LOCATION**
4:00 - 6:00PM	*Virtual Professional Development & Applied Anthropology Showcase*	*Zoom*
6:00 – 9:00PM	Registration	Ballroom Foyer entrance
6:15 – 9:00PM	**Opening night in person reception**	**Ballroom South/West**
7:00 – 8:00PM	*Virtual opening night reception hosted on GATHER*	*GATHER*
THURSDAY OCTOBER 28, 2021		
7:30AM – 6:00PM	Registration	Ballroom Foyer entrance
8:00 AM	**Opening Remarks and Welcome**	**Ballroom Centre/East**
8:00 – 10:15AM	In person Symposium – Under Pressure: Narratives of Adaptation and Resilience in Biological Anthropology (Session 1)	Ballroom Centre/East
10:15 – 10:45AM	Coffee and In Person Posters (Session 2)	Ballroom Foyer
10:45 – 11:45AM	In Person Podium Papers – Primatology (Session 3)	Ballroom Centre/East
11:45AM – 12:30PM	*Virtual Poster Q&A Panel – Learning and Teaching in Biological Anthropology (Session 4)*	*Zoom*
12:30 – 1:30PM	**Lunch**	
1:45 – 2:30PM	*Virtual Podium Papers – Forensic Anthropology (Session 5)*	*Zoom*
2:30 – 3:00PM	In Person Podium Papers – Medical Anthropology and Skeletal Biology (Session 6)	Ballroom Centre/East
3:00 – 4:00PM	Coffee and In Person Posters (Session 7)	Ballroom Foyer
4:00 – 5:00PM	*Virtual Poster Q&A Panel - Biological Anthropology (Session 8)*	*Zoom*
5:00 – 5:45PM	In Person Podium Papers – Open Session (Session 9)	Ballroom Centre/East
FRIDAY OCTOBER 29, 2021		
7:30AM – 5:00PM	Registration	Ballroom Foyer entrance
8:15 – 9:15AM	Concurrent In Person Podium Papers – Primatology (Session 10)	Ballroom South/West
8:15 – 9:15AM	*Concurrent Virtual Podium Papers – Biological Anthropology and Skeletal Biology (Session 11)*	*Zoom*
9:15 – 9:45AM	Coffee and In Person Posters (Session 12)	Ballroom Foyer
9:45 – 10:30AM	*Concurrent Virtual Poster Q&A Panel – Open Session (Session 13)*	*Zoom*
9:45 – 11:00AM	Concurrent In Person Podium Papers – Medical Anthropology and Forensic Anthropology (Session 14)	Ballroom Centre/East
11:15AM – 12:00PM	*Concurrent Virtual Podium Papers – Biological Anthropology and Medical Anthropology (Session 15)*	*Zoom*
12:00 – 1:45PM	**Student Luncheon – Precarious positions: A discussion on diversity and marginalization in Biological Anthropology**	**Ballroom South/West**

2:00 – 2:30PM	*Virtual Q&A Poster for Session for The Modern Primatologist's Toolkit (Session 16)*	*Zoom*
3:00 – 4:30PM	Concurrent In Person Symposium - The Modern Primatologist's Toolkit: New Approaches and Perspectives (Session 16)	Ballroom South/West
2:00 – 3:30PM	Concurrent In Person Symposium – Advances in Dental Bioindicators Research (Session 17)	Ballroom Centre/East
3:30 – 4:00PM	*Virtual Q&A Posters for Dental Bioindicators Symposium (Session 17)*	*Zoom*
4:00 – 4:30PM	Coffee and In Person Posters (Session 18)	Ballroom Foyer
4:45 – 6:00PM	**CAPA-ACAP Annual Business Meeting**	**Ballroom Centre/East and Zoom**
6:30 – 11:00PM	**CAPA-ACAP Annual banquet at the Art Gallery of Hamilton**	
SATURDAY OCTOBER 30, 2021		
8:30 – 9:30AM	In Person Symposium - Palaeoanthropology Society of Canada (Session 19)	Ballroom Centre/East
9:30 – 10:15AM	Coffee and In Person Posters (Session 20)	*Ballroom Foyer*
10:30 – 11:15AM	*Virtual Poster Q&A Panel – Biological Variation (Session 21)*	*Zoom*
11:30AM – 12:30PM	In Person Podium Papers – Paleopathology, Biological Anthropology, and Medical Anthropology (Session 22)	Ballroom Centre/East
12:15PM	**Closing Remarks**	

CAPA - ACAP 2021 Program

Sheraton Hotel Wi-Fi: Sheraton-Special

Wi-Fi password: 2021Exam

Please note that all times are in Eastern Standard Time (EST)

Papers marked with **"+"** are entered into the student awards competition.

Wednesday 27th October

Virtual Professional Development & Applied Anthropology Showcase (for students and early career members).

Use this Zoom link.

4:00pm – 5:00pm Interactive Skills talks on:

Networking skills with Sarah Lockyer

Networking. This word can be daunting to many of us, especially when on the job market; even more so when trying to transition from one industry to the next, or from one phase of our lives to the next. However, networking is a skill that can help open a number of opportunities that otherwise may not have come our way. Networking can be learned and it doesn't have to fill us with dread. Yes, you will be awkward (I know I have been many times!) but I have had many other people tell me they also feel very awkward in these situations.

During this session, I will talk about some of the networking strategies that have worked for me while working contract jobs in the Canadian federal public service. These include: cold emailing someone for an informational interview; introducing yourself to a speaker before their talk so that you aren't lost in the crowd wishing to speak to them afterwards; and the elevator pitch. These learned skills can easily be tweaked based on circumstances, comfort level, etc. I hope my experiences get you to start thinking about what could work for you and how you can use networking to advance your career opportunities.

Exploring your career options with Lisa Semchuck

Everyone has the potential to do more than one thing in their lives. In today's labour market, you likely will have not just one job but several - therefore it can be advantageous to plan for more than one career possibility. The discipline that you study does not have to define or limit your options, but rather can be a starting point to explore the full range of careers possible to you.

This short interactive session will help participants consider what is important to them in their careers; what key skills, abilities, and qualities they bring; and what career options are possible to them. It is recommended for anyone at any

stage of their career - whether you are a student, recent graduate, or established in your career, you may gain new perspective on what opportunities are possible to you.

Resume writing with Jen Sharman

As an academic, you most likely have a solid CV that you've been building up throughout your master's degree and beyond. These documents can be upwards of 10 pages if you've been an academic for long enough. But what if you end up applying for a non-academic job? That detailed CV, with all of your conference presentations, awarded grants, and published articles and book chapters, isn't going to cut it. A non-academic employer doesn't want a small novel; they want a succinct 1-2 page document that outlines the results you've achieved in your previous work. They want to see how well you fit their job description.

In this session, we'll walk through how to make the change from CV to resume: how to adjust your language to ensure a non-academic employer can understand your valuable skills and the outcomes that you've achieved; how to edit down to a concise 1- or 2-page document; and how to tailor your resume for job applications. Please feel free to bring along your current CV or resume to mark up and whittle down.

Anthropology as a side hustle with Yvonne Kjorlien

Are you happy? There comes a point in everyone's life when we ask ourselves this question. I asked myself this a few years ago and found the answer was no. One of the things that gave me happiness, however, was physical anthropology. And from then on, I tried to bring it back into my life.

This is a brief story of how I went from being a grad student, to consulting archaeologist, to having an alt-academic job to now. Using anthropology as a side hustle, I currently have a blog and a podcast, and offer an online course, with new research collaborations and new opportunities on the horizon.

5:00pm – 6:00pm Discussion panel on Identity Shifting and Emotional Resilience with ACE Mentors (Sarah Lockyer, Aimee Hosemann, Jen Sharman, Yvonne Kjorlien, Lisa Semchuk, Elliott Forsythe, Drew Wade, and Jackie Prime)

6:00pm – 9:00pm Registration

6:15pm – 9:00pm Opening night in person reception at Sheraton Hamilton Ballroom South/West

7:00pm – 8:00pm Virtual opening night reception on Gather. Link to CAPA-ACAP Gather space.

Thursday 28th October

8:00am – 10:15am In Person Podium Papers (Session 1)

Room Location: Ballroom Centre/East. Zoom link for virtual attendees.

***Symposium*: Under Pressure: Narratives of Adaptation and Resilience in Biological Anthropology**

***Chairs*: Madeleine Mant and Allee Holland**

8:00am Welcome and Land Acknowledgement

8:15am Stock JT, Longman D, Muehlenbein M, & Wells JCK. Life history theory and short-term physiological and cognitive trade-offs under conditions of energy deficit: Implications for understanding human resilience and adaptation.

8:30am East K, Brickley M, Van Uum S, and Williams L. Hair cortisol and embodiment: Dynamic stress experience at the end of life in the past and present.

8:45am Gamble J, & Hunter M. Exploring resilience in relation to biological sex in medieval Denmark.

9:00am **+**Hider J, Duggan A, Klunk J, Eaton K, Long G, Fornaciari G, Prowse T, & Hendrik P. 1 part Medieval brucellosis, 1 part stress, and a dash of computational struggles: A recipe for studying disease during a pandemic.

9:15am Mant M. We “could hear the bacteriae groaning”: narratives of institutional care in 19th- century St. John’s, Newfoundland.

9:30am Ali F. Diabetes and the Pandemic: How has diabetes care among Black women been affected by the COVID-19 pandemic?

9:45am Holland A, Aslemand A, Prine A, & Mant M. "I just want this to be over": Young adult perceptions of COVID-19 vaccines.

10:00am Hackett FJP. The Indian residential school (IRS) system in its spatial context: A proposed course of research.

10:15am – 10:45am Coffee and In Person Posters (Session 2)

Location: Ballroom Foyer

2. **+**Atkinson LH, Murray A, & Stock JT. Life history and the female phenotype: Examining skeletal and soft tissue variation in modern humans.

4. Borisov K, & Brickley MB. Iron deficiency anemia during pregnancy in low- and middle-income countries: Modern insight on past peoples.

6. **+**Cosby AE, & Steffens TS. Investigating the ability to use citizen science data to monitor the relative abundance of three species of lemurs in Ankarafantsika National Park.

8. Phillips N. Microbial Influences on early human migration.

10. **+**Poeta LS, & Nelson AJ. Age, disability, and status: A case study in the expression of mortuary identity in Pre-Columbian Peru.

Thursday 10:45am – 11:45am In Person Podium Papers (Session 3)

Room Location: Ballroom Centre/East. Zoom link for virtual attendees.

***Contributed Papers*: Primatology**

Chair: **Travis Steffens**

10:45am **+**St-Onge C, King A, Wikberg EC, Teichroeb JA, Sicotte P, & Bădescu I. The effects of feeding competition, infanticide, predation and mating pressures on behavioral indicators of stress in female *Colobus vellerosus*.

11:00am **+**Landry F, & Teichroeb JA. Why should I get involved? Female and male behaviour during inter-unit interactions: the case of Rwenzori colobus monkeys.

11:15am Lesage CL, Stewart BM, Lazure L, & Turner SE. Social grooming and alopecia in a group of captive Japanese macaques (*Macaca fuscata*).

11:30am **+**Bouarab M, Rissling T, Sicotte P, Melin A, & Bădescu I. Investigating infant feeding transitions in wild ursine colobus using fecal stable isotopes.

11:45am – 12:30pm **Virtual Poster Q&A Panel (Session 4).** Use this Zoom link.

***Contributed Posters*: Learning and Teaching in Biological Anthropology.**

Posters marked* are also displayed at the Sheraton

***Chair*: Rebecca Gilmour**

Gilmour R, & Gamble J. *Bones at home: Teaching and learning human osteology through 'Living room labs'.

Muggridge T, Nelson AJ, & Walsh A. Examining the role of museums as knowledge brokers in the bioarchaeological knowledge mobilisation process.

Ma M, Vandergugten JM, Kumpan LT, Bennett J, & Fukuzawa S. The learning experience of Chinese international undergraduates in anthropological science: A case study from the University of Toronto Mississauga.

Vandergugten JM, Ma M, Kumpan LT, Bennett J, & Fukuzawa S. Engaging students in biological anthropology and archaeology.

Morris E, Hernandez-Bustos I, & Fukuzawa S. What do students in Anthropology know about Indigenous issues?

Kilius E, McKinnon L, & Li MF. Rebuilding a healthy student community: Preliminary survey results from University of Toronto students in Fall 2021.

+Ross JB, Surette C, & Varney T. Virtual forensic anthropology labs: Lessons learned.

12:30pm – 1:30pm **Lunch**

1:45pm – 2:30pm **Virtual Podium Papers (Session 5).** Use this Zoom link.

***Contributed Papers*: Forensic Anthropology**

***Chair*: Shelby Scott**

1:45pm Finaughty DA, Pead J, Adams KS, & Gibbon VE. Measuring mummification: A pilot study quantifying the soft tissue desiccation process in the Western Cape Province, South Africa.

2:00pm Ma M, & Calce, S. From Dust to clay - A comparative study of soft tissue decomposition in clay versus loamy-sand soil.

2:15pm **+**Mackay-Brown A, Cunningham C & Holland E. Back to the drawing board: Reconstructing the Klales 2012 method for the developing pubis.

2:30pm – 3:00pm In Person Podium Papers (Session 6)

Room Location: Ballroom Centre/East. Zoom link for virtual attendees.

***Contributed Papers*: Medical Anthropology and Skeletal Biology**

***Chair*: Jay Stock**

2:30pm Oresnik S, Moffat T, McKerracher L, & Sloboda D. The intersection of food insecurity, gestational diabetes, and mental health conditions: Examining pregnancy from a biocultural perspective.

2:45pm Knaub M, Kushlyk K, DeCaro J, Piperata BA, Schmeer KK, Hoehn N, Brown G, & Wilson WM. Household Food Insecurity and Maternal Health in Rural Nicaragua.

3:00pm – 4:00pm Coffee and In Person Posters 2 (Session 7)

Location: Ballroom Foyer

Posters marked* are also part of a virtual symposium Q&A Panel

1.+Brent KE, & Cameron ME. Beyond the physical behaviour: Investigating non-mechanical modulators of biomechanical and geometric properties of bone through the lifecourse.

3. Muggridge T, Nelson AJ, & Walsh A. *Examining the role of museums as knowledge brokers in the bioarchaeological knowledge mobilisation process.

5.+Nelson JS, Harrington L, Holland, E & Cardoso, HFV. The effects of early life stress on limb proportions in 19th century Bologna, Italy

7.+Roberge É, Nelson A, Waters-Rist A. Interglobular dentin explored through correlative tomography in an Inca population from Farfán (Peru).

9.+Seyler A, Kushlyk K, DeCaro J, Manyama M, Hallgrimsson, & Wilson W. Linking contemporary health and evolutionary history: maternal subjective social status and mental and physical health among maternal-child dyads in urban Tanzania.

11. Waters-Rist A, Crawford A, & Coulthard I. *Short-term seasonal lead (Pb) intake revealed by dentine bands in synchrotron-based x-ray fluorescence (XRF) images of archaeological Dutch teeth.

4:00pm – 5:00pm **Virtual Poster Q&A Panel Biological Anthropology (Session 8)**

Use this Zoom link.

Chair: **Chris Dudar**

Bjola J, & Calce S. High-velocity sharp-force trauma: An experimental study using modern archery equipment.

Dudar C, & Wilson S. Heterogeneity in the growth and development of Upper Canadian children.

+Michelman L, & Lieverse A. Harris Lines as indicators of physiological stress in the Middle Holocene Cis-Baikal.

Parish JM. Interpretation of sex ratios from Pandemic influenza in Cape Breton, Nova Scotia.

+Lamer M, Veselka B, Hoogland MLP, & Brickley MB. Evaluating the diagnostic potential of anterior sacral angulation in the identification of adolescent rickets.

Harris AJT, Garlie M, Munkittrick TJA, Potter J, & Grimes V. An investigation of historical infant feeding practices in Newfoundland using stable carbon and nitrogen isotope analysis of dentine collagen.

5:00pm – 5:45pm **In Person Podium Papers (Session 9)**

Room Location: Ballroom Centre/East. Zoom link for virtual attendees.

Contributed Papers: **Open Session**

Chair**: Karyne N. Rabey**

5:00pm Rabey KN, Duia S, Khetarpal N, Senger JLB, Chan KM, & Webber CA. Post-injury training impact on functional recovery and bone strength.

5:15pm Hertz M, Wollmann J, & Cameron ME. Diverse lower limb biomechanical properties are interrelated among Later Stone Age Southern Africans.

5:30pm Pavelka MS. Our dangerous unconscious allegiance to the Great Chain of Being.

Friday October 29th

Concurrent sessions

8:15am – 9:15am **Concurrent In Person Podium Papers (Session 10)**

Room Location: Ballroom South/West. Zoom link for virtual attendees.

Contributed Papers: **Primatology**

Chair: **Julie Teichroeb**

8:15am Teichroeb JA, Adams FV, Khwaja A, Stapelfeldt K, & Stead SM. Tight quarters: Ranging and feeding competition in a Rwenzori colobus multi-level society occupying a fragmented habitat.

8:30am Bolt LM, Russell DG, & Schreier AL. River edge feeding: Howler monkey feeding ecology in a fragmented riparian forest.

8:45am Turner SE, Pelletier A, Fedigan LM, Moriarity RJ, Kotler A, & Reader SM. Feeding efficiency and disability in a provision-fed group of Japanese macaques.

9:00am Vermey JL, MacDonald SA, & Schoof VAM. Personality assessments in two wild populations of vervet monkeys (*Chlorocebus pygerythrus*).

8:15am – 9:15am **Concurrent Virtual Podium Papers (Session 11).** Use this Zoom link.

***Contributed Papers*: Biological Anthropology & Skeletal Biology**

***Chair*: Creighton Avery**

8:15am **+**McClennon S, Piperata BA, Schmeer KK, Hoehn N, Brown G, & Wilson WM. Exploring two domains of food insecurity: Is access linked to utilization among women in Nicaragua

8:30am Chinique de Armas Y, Mavridou AM, Garcell J, Hanson K, & Laffoon J. Reconstruction of breastfeeding and weaning practices by combining carbon, nitrogen and oxygen stable isotopes from multiple non-adult tissues.

8:45am Sawchuk E, Lipson M, Thompson J, Reich D, & Prendergast M. Ancient DNA reveals complex population structure among Late Pleistocene and Holocene African foragers.

9:00am Parent J, Missihoun T, & Ribot I. Using proteomics to estimate sex in an archaeological context: exploring mortality in the historical cemeteries of Notre Dame (1691-1796), Pointe-aux-Trembles (1709-1843) and Sainte-Marie de Beauce (1748-1878).

9:15am – 9:45am Coffee and In Person Posters (Session 12)

Location: Ballroom Foyer

2. Grogan T, Tait V, Wilson T, & Szpak P. Optimizing demineralization conditions for bone collagen extraction.

4. +Olszewski J, Gibbon VE, & Hemingway J. Assessing the Brabant Index as a user-friendly and accurate method for scoring dental macrowear quantity and direction.

6. Sanchez J, & Hoppa RD. Not all at once: Exploring age-related variation in the appearance and stabilization of sexually dimorphic traits of the subadult pelvis.

8. +Tait V, & Williams, J. Isotopes of the Caribbean: An investigation of pretreatment and human paleodiet at the Escape site (AD 300 - 1000), Saint Vincent, Lesser Antilles.

10. +Welsh H, & Brickey MB. Pathology or expected morphology? Investigating patterns of cortical porosity during infancy.

12. +Wilson T, & Szpak P. Examining the use of EDTA for humic extraction of ancient bone.

9:45am – 10:30am Concurrent Virtual Poster Q&A Panel (Session 13). Use this Zoom link.

***Chair*: Sarah Oresnik**

Checholik C, Anderson K, van der Wielen, & Galloway T. A scoping review of Indigenous food sovereignty in Canada.

Kushnick G, Behie AM, Zuska F, & White, K. Birth outcomes following evacuation from the eruption of Mount Sinabung in Indonesia.

McKinnon L, Kilius E, & Li MF. Social connectivity, health, and accessibility: Preliminary survey results from students returning to campus in Fall 2021.

Sierra-Serrano E, & Albanese J. Working towards a non-binary approach for sex estimation in forensic anthropology.

Spake L, Hassan A, Shaver JH, Shenk MK, Sosis R, & Sear R. Effects of the COVID-19 pandemic on mothers' support networks, work patterns and mental health in the UK and the USA.

9:45am – 11:00am Concurrent In Person Podium Papers (Session 14)

Room Location: Ballroom Centre/East. Zoom link for virtual attendees.

Contributed Papers: **Medical Anthropology & Forensic Anthropology**

***Chair*: Warren Wilson**

9:45am Wilson WM, Rudkoski AK, Brown G, Hoehn N, Schmeer KK, & Piperata BA. Social support and maternal mental health in rural Nicaragua.

10:00am **+**Gardiola AM, & Cameron ME. Hand and finger injuries among rock-climbers: Risk factors and lived experiences.

10:15am Schillaci MA, & Schillaci ME. Sample size and accuracy: Estimating the population variance and standard deviation.

10:30am +Meloro RM. A model for a transgender and gender nonconforming-inclusive deathcare system.

10:45am Mukhra R, & Krishan K. Can body mass index of an individual be estimated from the footprints? Anthropological and forensic implications.

11:15am – 12:00pm Concurrent Virtual Podium Papers (Session 15). Use this Zoom link.

Contributed Papers: **Biological Anthropology & Medical Anthropology**

***Chair*: Lesley Harrington**

11:15am Adams KS, Gibbon VE, & Finaughty DA. Contrasting forensically significant vertebrate scavenging behaviour during the cool season in rural and urban habitats in Cape Town, South Africa.

11:30am **+**Swaters S, Harrington L, & Kurki H. Shape variation in the growing non-adult tibia.

11:45am **+**Dinkele ES, Gibbon VE, Fredlund V, & Ballo R. Temporal trends in the prevalence and demographic distribution of the endemic Mseleni joint disease.

12:00pm – 1:45pm Student Luncheon - Precarious positions: A discussion on diversity and marginalization in Biological Anthropology.

Room Location: Ballroom South/West. Zoom link for virtual attendees.

2:00pm – 2:30pm Virtual Q&A Poster for Session for The Modern Primatologist's Toolkit Symposium - Session 16. Use this Zoom link.

Chair: **Malcolm Ramsey**

Frappier-Brinton T, & Lehman SM. The burning island: Spatiotemporal patterns of fire occurrence in Madagascar.

3:00pm – 4:30pm Concurrent In Person Podium Papers (Session 16)

Room Location: Ballroom South/West.

Zoom link for virtual attendees.

Symposium: **The Modern Primatologist's Toolkit: New Approaches and Perspectives**

Chairs: **Malcolm Ramsay & Fernando Mercado Malabet**

3:00pm **+**Li MF, Smeltzer EA, & Teichroeb JA. Navigating networks: Stronger social bonds correlate with greater feeding tolerance in wild vervet monkeys.

3:15pm Ramsay MS, Sgarlata G, Barratt C, Salmona J, Andriatsitohaina B, Kiene F, Ramilison M, Chikhi L, Lehman SM & Radespiel U. Dispersal and connectivity of an endemic and an invasive rodent in fragmented dry forests of northwestern Madagascar.

3:30pm Stead SM, Smeltzer EA, Kumpan LT, Li MF, Samson D, & Teichroeb JA. Slumber in numbers: Impacts of social hierarchies on sleep in terrestrial mammals.

3:45pm Steffens TS. We are all in this together - leveraging Anthropology and One Health to solve a humanitarian and conservation crisis in Madagascar.

4:00pm Speiran SI. Monkey business: Wildlife sanctuaries as sites of sustainable primate tourism in Costa Rica.

4:15pm Mercado Malabet, F, Chell C, Ramsay MS, & Lehman SM. Data unavailable: Current data available on the social and ecological correlates of lemur extinction risk reveals patterns of phylogenetic and biogeographic bias.

2:00pm – 3:30pm **Concurrent In Person Podium Papers (Session 17)**

Room Location: Ballroom Centre/East

Zoom link for virtual attendees:

Symposium: **Advances in Dental Bioindicators Research**

***Chairs*: Alexis Dolphin & Andrea Waters-Rist**

2:00pm Dolphin AE. We already know that! The distribution of trace elements in teeth.

2:15pm **+**Bartholdy BP, & Henry AG. Exploring dental calculus and diet through an oral biofilm model.

2:30pm **+**Price S, Prowse T, Boldsen J, Kuch M, Eaton K, Klunk J, & Poinar H. Reframing dental calculus in bioarchaeology.

2:45pm **+**Avery LC, Brickley MB, Bondioli L, & Prowse T. Changing childhood diets: Incremental stable isotope analysis of tooth dentin from Imperial Roman Italy (1-4th century CE).

3:00pm Quade L, Gowland RL, & Chazot PL. Dental cortisol, stress and paleopathology: A pilot study.

3:15pm +Van Ankum EM, & Boughner JC. Root form as a dietary biomarker: Investigating archaeological mechanisms with a mouse model.

3:30pm – 4:00pm **Virtual Q&A Posters for Dental Bioindicators Symposium – Session 17.** Use this Zoom link.

***Chair*: Andrea Waters-Rist**

Posters marked* are also displayed at the Sheraton

*Waters-Rist AL, Crawford A, & Coulthard I. Short-term seasonal lead (Pb) intake revealed by dentine bands in synchrotron-based x-ray fluorescence (XRF) images of archaeological Dutch teeth.

Inskip S, Davies-Barrett A, Badillo Sanchez D, Serrano Ruber M, & Morriss S. Using microscopy to improve the detection of pipe use in past populations.

*Coffin J, Dolphin, AE, Jackes M, Yakymchuk C, & Perrin T. Mobility and residence at Roquemissou: A 87Sr/86Sr isotopic analysis of teeth from a Neolithic burial in southern France.

4:00pm – 4:30pm Coffee and In Person Posters (Session 18)

Location: Ballroom Foyer

1. Seymour G, & Dolphin A. Reconstructing life histories of the individuals buried in the rock-cut cave church of St. Georges, in Gurat, France.

7. Teeter MA, Scott A, & Szpak P. Keratin, collagen, and dentine, oh my! A preliminary isotopic analysis of three tissue types at the 18th century fortress of Louisbourg, NS.

9. Nagendran L, & Schroeder L. Mandibular integration in canid hybrids: implications for hominin hybrid studies.

11. +Whitelaw H, & Brickley MB. From rickets to gout: An osteobiography exploring the paleopathological experiences of a 19th century individual from St. Martin's Church, Birmingham, UK.

4:45pm – 6:00pm CAPA-ACAP Annual Business Meeting

Room Location: Ballroom Centre/East. Zoom link for virtual attendees.

6:30pm – 11:00pm CAPA-ACAP Annual banquet at the Art Gallery of Hamilton
(across the street from the Sheraton Hamilton hotel)

Saturday October 30th

8:30am – 9:30am In Person Podium Papers (Session 19)

Room Location: Ballroom Centre/East

Zoom link for virtual attendees.

***Symposium*: Palaeoanthropology Society of Canada**

***Chair*: Mirjana Roksandic**

8:30am Sarah K, Stewart BA, & Dewar G. A late Pleistocene palaeoenvironmental record for Namaqualand, South Africa: Stable isotope analysis and biometrics of ostrich eggshell at Spitzkloof Rockshelter.

8:45am Komza K, Cameron ME, Viola B, & Schroeder L. Quantitative genetics and midfoot evolution in the hominin lineage

9:00am Nowell A, & French J. Growing up Gravettian.

9:15am Roksandic, M, Radovic, P, Wu, X, & Bae, C. Solving the Muddle in the Middle by suppressing poorly defined taxa.

9:30am – 10:15am Coffee and In Person Posters (Session 20)

Location: Ballroom Foyer

Posters marked* are also part of a virtual symposium Q&A Panel

1. *Coffin J, Dolphin, AE, Jackes M, Yakymchuk C, & Perrin T. Mobility and residence at Roquemissou: A 87Sr/86Sr isotopic analysis of teeth from a Neolithic burial in southern France.

4. *Gilmour R, & Gamble J. Bones at home: Teaching and learning human osteology through 'Living Room Labs'.

6. *Morris E, Hernandez-Bustos I, King-Jamieson V, Fukuzawa S, & Laliberte, N. What do students in Anthropology know about Indigenous issues?

10. Palmer T, & Langstaff H. Assessing the reliability of 3D models in sex assessment of the distal humerus: Does 3D scanning provide the same answers as dry bone?

12. Reznikov N, Liang H, McKee MD & Piché, N. A new method for 3D anisotropy mapping applied to µCT images of the calcaneus in modern and historical specimens of the human foot.

10:30am – 11:15am Virtual Poster Q&A Panel (Session 21) – Biological Variation.

Held on Zoom

Use this Zoom link.

Chair: **Michelle Drapeau**

Garnett J, & Strait DS. The impact of dental integration on cladistic analyses of hominin phylogeny: A preliminary study.

+Lindal JA. Taurodontism: Yet another review.

+Malek, S; Gibbon, VE; Sealy, JC. Assessing morphological mandibular traits for sex estimation in Holocene San and Khoekhoe populations.

Walberg P, Schroeder, L. Patterns of morphological integration and evolvability in the pectoral girdle of Homo and Pan.

11:30am – 12:30pm In Person Podium Papers (Session 22)

Room Location: Ballroom Centre/East

Zoom link for virtual attendees.

Contributed Papers: **Paleopathology, Biological Anthropology & Medical Anthropology**

Chair: **Katie East**

11:30am Tripp L, Barber R, & Illes K. The 1918/19 influenza experience in the Fort George area.

11:45pm Siek TJ, Austen J, & Hirst CS. 'Diagnosing the Canvas': A preliminary review of the growing trend in identifying disease in paintings and its indifference to palaeopathology.

12:00pm Lewis M, & Montgomery J. Youth, migration and health in Medieval York: A multi-analytical approach.

12:15pm **Closing Remarks**

Contrasting forensically significant vertebrate scavenging behaviour during the cool season in rural and urban habitats in Cape Town, South Africa

Adams, KS (1); Gibbon, VE (1); Finaughty, DA (1,2)

1. Division of Clinical Anatomy and Biological Anthropology, Department of Human Biology, University of Cape Town, Cape Town, South Africa
2. School of Anthropology and Conservation, University of Kent, Canterbury, United Kingdom

Difficulties in identifying unknown human remains is a serious and persistent problem in South Africa, exacerbated by the country's high murder rate. Establishing identity and accurate post-mortem interval estimates are two of the most important outcomes of forensic death investigations. This information is crucial for narrowing the pool of missing persons to search for a decedent, and for refuting or corroborating testimony. Rate of decomposition is, however, affected by many biogeographically specific intrinsic and extrinsic factors. In South Africa, vertebrate scavenging has been shown to significantly impact the rate of decomposition, and failure to account for this could hinder accurate estimation of the postmortem interval. Knowledge of region-specific and species-typical scavenging behaviours can aid in more accurate taphonomic interpretations of decomposed remains. Patterns of scavenging are highly specific to different environments and there is limited data for the Western Cape province. Two 60kg clothed and uncaged pig carcasses were deployed simultaneously on July 1st, 2021, in two open habitats, one urban and one rural, in Cape Town, South Africa. As 72% of cases examined from Salt River mortuary in Cape Town involved bodies recovered from terrestrial environments, and 39% were either exposed or partially exposed, open habitats are forensically significant and thus used as deposition sites in this study. Additionally, the carcasses were clothed in this study as clothed human remains were recovered in 58% of forensic cases analysed by Forensic Anthropology Cape Town. The carcasses were observed by motion activated trail cameras to record decomposition and scavenger species and activity. To-date, decomposition at the two sites has been marked by considerable disparity in scavenger activity, with none recorded at the urban site. Conversely, the rural site has seen extensive scavenging exclusively by Cape grey mongoose (*Galerella pulverulenta),* despite the on-site presence of corvids.

Diabetes and the Pandemic: How has diabetes care among Black women been affected by the COVID-19 pandemic?

Ali, F (1)

1. Department of Anthropology, University of Toronto

This paper will discuss how Black women with diabetes, have adapted to changes in access to medical care during the COVID-19 pandemic. Due to the pandemic, the government has implemented various policies to minimize the spread of the virus, such as social distancing, self-isolation, and closures of non-essential services. This has resulted in many health services being offered virtually or cancelled. Clinical interactions are no longer occurring within the confines of medical offices, or in medical offices with strict new protocols. Therefore, this paper will examine how clinical interactions have changed and study how the pandemic has impacted self-care among patients. This study takes an ethnographic approach to understand the impact of this changing situation from the perspective of Black women with diabetes and various healthcare providers (diabetes specialists, kinesiologist, chiropodist, and primary care providers).

The project is localized in a community called Jane and Finch, a predominantly multi-cultural neighborhood in Toronto, which also has high rates of COVID-19. Also, this specific community has a high prevalence and incidence

rates of diabetes. This paper examines the intersection of race, ethnicity, and gender to understand the lived pandemic experiences of women living in this community. What practices have they implemented to adapt to their changing realities? What supports exist in their community? Therefore, studying how the pandemic affects diabetic treatment in Jane and Finch will provide insights on how a pandemic affects chronic disease care and how health policies impact individuals and marginalized communities.

Life history and the female phenotype: Examining skeletal and soft tissue variation in modern humans

Atkinson, LH (1); Murray, A (2); Stock, JT (1)

1. Department of Anthropology, The University of Western Ontario
2. Department of Anthropology, University of Victoria

Birth weight (BW) and the age of menarche (AoM) are environmentally sensitive, and variation in these traits has independently been linked to the development of later life disease states. However, there is little evidence of how these life history traits are linked to variation in other aspects of the adult phenotype, including skeletal development, body composition, and soft tissue investment throughout the body. Studies of human variation in development, phenotype, and health have often favoured males in both sample size and composition. Understanding environmental and developmental influences on phenotype among modern, active, women can aid in our understanding and reconstruction of female health and adaptation in the past. Our objective was to test relationships between two indicators of early-life development, BW and AoM, and later-life phenotypic outcomes using phenotypic data from 104 female athletes and non-athletes. To characterize relationships between indicators of environmental variation and phenotypic variation in adulthood, limb volume extracted from 3D surface scans and body composition data from bioelectrical impedance, were compared alongside traditional anthropometric data to life history characteristics reported in a survey questionnaire. BW showed a positive correlation with AoM, stature, and body mass. AoM positively correlated with measures of linear growth and lean mass, with negative relationships to fat mass. Lean mass was positively correlated to decreases in Surface Area/Volume relationships in the limbs and trunk. These results illustrate the underlying plastic relationships between life history traits and phenotypic outcomes and suggest that environment conditions during development may have a broad range of influences on the adult phenotype.

Changing childhood diets: Incremental stable isotope analysis of tooth dentin from Imperial Roman Italy (1-4th century CE)

Avery, C (1); Brickley, M (1); Bondioli, L (2); Prowse, T (1)

1. Department of Anthropology, McMaster University
2. Museo delle Civilta, Rome, Italy

When applied to stable isotope analysis of diet, incremental analysis of tooth dentin allows researchers to investigate dietary change within an individual's life. To date, most studies of incremental dentin use horizontal sectioning protocols, which do not consider the growth patterns of dentin. This study uses a novel method to section teeth along dentin development lines, thus limiting temporal overlap between sections. Applying this methodological approach to dental samples from Isola Sacra (1-4th century CE; Italy), we investigate how diets changed through the life course, from childhood to early adulthood.

Second and third molars from 15 individuals (52 dentin sections) capture dietary signals between 4.5 and 23.5 years of age. Spearman's correlation indicates that δ13C values are not correlated with age ($r_s=0.147$, $p=.358$), while δ15N values exhibit a positive correlation with age ($r_s=0.541$, $p<.000$). These results suggest that children transitioned to

an adult diet through a gradual process rather than a sudden change by consuming more, or higher trophic level, proteins as individuals aged. Although there is significant overlap in both stable carbon and nitrogen values between males and females, males exhibit generally higher δ15N values than females (Mann-Whitney U = 234.0, p<.10, g>0.6), suggesting that males consumed higher trophic level diets prior to adulthood than females.

The use of incremental sections of tooth dentin in stable isotope analysis of diet enhances our ability to study nuanced changes in diets for individuals that survived the period of childhood. However, researchers need to consider the pattern of dentin development in order to sample teeth that maximizes temporal resolution. By carefully sampling dentin sections along developmental lines, we are able to accurately assess variation in childhood and adolescent diets throughout the Roman Imperial life course.

Exploring dental calculus and diet through an oral biofilm model

Bartholdy, BP (1); Henry, AG (1)

1. Archaeological Sciences, Leiden University, The Netherlands

Dental calculus, mineralised dental plaque, has proven to contain a wealth of dietary information in the form of plant microfossils, including starch granules from a dietary origin. Until recently, limited validation has been conducted on the incorporation bias of microfossils in the dental calculus, and these have been limited to studies on modern humans and non-human primates.

Here, we present a model calculus system, which allows experimental research to be conducted on in vitro dental calculus in a controlled laboratory setting. We have grown oral multispecies biofilms, inoculated with whole saliva, and exposed them to common dietary starches (wheat, potato, and a mix of both), over the course of 25 days. The model calculus was dissolved in EDTA, and starch granules were counted under a microscope. Granule counts recovered from the calculus represented a very low proportion (0.064% to 0.161%) of the total granules that were exposed to the model calculus. Additionally, the size ratios of granules within starch species shifted between the input starch solutions and the granules extracted from the model calculus, with large granules (>20 ìm) consistently being underrepresented. These results suggest that the picture of an individual's diet as presented by dental calculus may be biased towards plant species producing small starches (<20 ìm).

This model calculus system can provide the framework to perform controlled experiments addressing fundamental questions and issues concerning dental calculus and diet in the past, which have yet to be explored.

High-velocity sharp-force trauma: An experimental study using modern archery equipment

Bjola, J (1); Calce, S (1)

1. Department of Anthropology, University of Victoria

There is a significant lack of forensic research on the use of modern hunting bows leading to an absence of osteological descriptive data on modern arrow wounds. As gun legislation increases, archery has gained popularity in North American hunting culture, driving the need to obtain such data for forensic purposes. This work aims to understand high-velocity sharp force trauma to bone and examines how such markings may be differentiated from other high-velocity trauma, such as gunshot wounds. Wounds were produced via the experimental firing of broadhead and bullet head arrows from both compound and recurve hunting bows into four pig shoulder cuts. Post experimentation, all specimens were processed via maceration and underwent visual examination.

All trials showed the presence of both sharp force trauma and gunshot wound characteristics on bone, and each bow-arrow pairing produced a unique combination of traits. Most scapulae wounds were perforating, with the exception of one in the recurve-bullet head trial. Bullet-head arrow wounds were the most difficult to discern between gunshot and sharp force trauma characteristics. The broadhead arrow wounds presented the greatest number of sharp force trauma traits due to the cross-blades.

Future research with a larger sample size and documenting wound characteristics at varied distances is needed. In the meantime, this work serves as a preliminary reference for identifying wounds made by the modern bow and arrow.

River edge feeding: Howler monkey feeding ecology in a fragmented riparian forest

Bolt, LM (1,4); Russell, DG (2,4); Schreier, AL (3,4)

1. Department of Anthropology, University of Toronto Mississauga
2. Department of Environmental Science, American University, Washington, D.C., USA
3. Department of Biology, Regis University, Denver, CO, USA
4. The Maderas Rainforest Conservancy, Miami, FL, USA

Rivers are important components of animal habitats worldwide. The area near riparian edge (≤100m from the river) has different abiotic characteristics and vegetation than both forest interior and areas bordering human development, which may lead to differences in animal feeding behaviour. To better contextualize the impact of human-caused habitat destruction on animal feeding ecology, it is important to study both natural riparian and anthropogenic forest edges within the same habitat. We compared howler monkey (*Alouatta palliata*) feeding behaviour and tree use across four forest zones (riparian edge, anthropogenic edge, forest interior, and combined riparian and anthropogenic edge) in a fragmented riparian rainforest in Costa Rica, La Suerte Biological Research Station. We predicted that monkey feeding behaviour and tree use would differ across forest zones, and especially between riparian and anthropogenic edges due to higher vegetation quality near the river. We observed individual focal monkeys for 30-minute periods, collecting data on monkey feeding behaviour and tree use every 2 minutes. We recorded plant parts eaten and feeding tree taxonomy, and measured feeding trees. Monkeys ate more leaves in riparian edge than in other forest zones, and fed from fewer tree families in riparian edge and forest interior compared to anthropogenic edge. Monkeys also fed from trees with smaller DBH in riparian edge compared to other forest zones, but trees of similar height to forest interior and taller than anthropogenic edge. Our results indicate that riparian zones are rich habitats for howler monkeys and conservation efforts should prioritize their preservation.

Iron deficiency anemia during pregnancy in low- and middle-income countries: Modern insight on past peoples

Borisov, K (1); Brickley, M (1)

1. Department of Anthropology, McMaster University

Iron deficiency is currently the leading cause of acquired anemia worldwide and was likely common in the past. This poster will examine the biological, cultural, and demographic factors influencing iron deficiency anemia (IDA) today, and consider how this information can be used to better understand IDA in archaeological contexts. A literature review was undertaken of 8 cross-sectional studies of women of reproductive age, pregnant women, and infants in in low- and middle-income countries (LMIC) from South Asia and sub-Saharan Africa. These regions have the highest global rates of IDA, providing data on both chronic and severe cases in individuals with limited treatment options. LMIC with high reported rates of IDA are also associated with restricted access to healthcare and iron supplementation, which produces conditions similar to those of past groups. The analysis revealed the following

trends in risk for IDA: (1) pregnant women and infants tend to be the most vulnerable groups affected by the condition; and, (2) IDA in mothers increases the risk of preterm labour and accidental hemorrhage (~12% in LMIC relative to 8% in Canada), while in infants can result in preterm birth, low birth weight, and perinatal mortality (with up to 21% of all cases attributable to IDA in LMIC). Finally, further research on current social and cultural practices contributing to increased prevalence of IDA has identified behaviours (such as vegetarianism, alcoholism, and geophagy) that may have increased the occurrence of IDA in past societies. Reporting these trends may allow for establishment of more specific diagnostic criteria for acquired anemia in paleopathology. Understanding current epidemiological and physiological effects of IDA, both globally and regionally, will allow researchers to gain further insight on the prevalence and consequences of IDA in the past.

Investigating infant feeding transitions in wild ursine colobus using fecal stable isotopes

Bouarab M (1); Rissling, T (2); Sicotte, P (2, 3); Melin, A (2); Bădescu, I (1)

1. Department of Anthropology, Université de Montréal
2. Department of Anthropology and Archaeology, University of Calgary
3. Department of Biology, Concordia University

It is important to accurately track weaning ages to understand variation in lifetime reproductive success in females. This is challenging from observational data due to comfort nursing (nipple contact without milk transfer) and night nursing, when observations are not made. Fecal stable carbon (δ13C) and nitrogen (δ15N) isotopes, and fecal nitrogen content (%N) can be used to physiologically track the progression of infants' diets from complete and partial dependence on maternal milk and adult foods, to weaning completion. We analyzed 186 feces collected in 2017 from 8 ursine colobus (Colobus vellerosus) infants (aged 6 to 20 months) and their mothers at Boabeng-Fiema Monkey Sanctuary, Ghana, and compared these to observations of nursing and infant foraging (mean: 113 focal hours/infant, range: 55-131 hours). Due to trophic level effects, the mean maximum elevations of infants above their mothers in δ13C, δ15N and %N were 0.36 ‰, 0.89 ‰ and 0.70 % respectively (between 9 and 10 months old). The first consumption of plants occurred before 6 months old, based on δ13C values, or at 3 months old, based on observations. Mother-infant differences in δ15N showed that 5 infants were weaned at a mean age of 15 months. For 3 of these infants, δ15N values revealed later weaning ages by 1 or 2 months compared to nursing observations, probably due to night nursing, while 2 infants showed similar behavioral and isotopic weaning ages. Two of the unweaned infants were not observed to nurse but showed alternating greater and lower mother-infant δ15N differences from 6 to 9 months old, which may indicate a cyclical weaning process, with infants relying less and more on milk from one month to another. Fecal stable isotopes, a relatively novel approach in field primatology, can be used to establish more accurate life history data for wild primates.

Beyond the physical behaviour: Investigating non-mechanical modulators of biomechanical and geometric properties of bone through the lifecourse

Brent, KE (1); Cameron, ME (1)

1. Department of Anthropology, University of Toronto

Biomechanical analyses are increasingly integral to bioarchaeology and human biology research. Biomechanical research in anthropology includes mobility and physical activity investigations in past and present people. While mechanical modulators of bone biomechanical properties are comprehensively considered in these studies, non-mechanical factors have been far less carefully examined. Non-mechanical factors are those that affect bone biomechanical properties through, for example, metabolic, hormonal, developmental, and other non-physically modulated pathways. This study comprehensively reviews the clinical and anthropological literature to identify six

key non-mechanical modulators of bone biomechanical properties: body morphology and phenotype; age and age-related events; pathological conditions; ontogeny and development; endocrinology and reproduction; and recreational substances and medications. These categories are not discrete, and specific factors may span multiple categories. Greater consideration of non-mechanical modulators of bone biomechanical properties avoids overestimating or underestimating the role of activity and mobility in shaping bone phenotypes. Non-mechanical modulating factors should be considered for both archaeological individuals and living populations, including those used as proxies, and should be explicitly noted in studies. Biomechanical studies need to explicitly acknowledge the role of these factors wherever possible to avoid overreliance on biomechanical properties as being entirely reflective of mechanical modulators. It is further proposed that studies ascertain which non-mechanical modulators are most applicable through comprehensive consideration of biological, environmental, and cultural contexts. Attention should be paid to specific modulators based on relevance, degree of impact, and in the case of bioarchaeological proxies, any variation between modern proxy and archaeological study subjects. The current influence of some prevalent non-mechanical modulators, including recreational substances and medications, on biomechanical properties has not yet been assessed. Future studies must assess the influence of these factors on bone morphologies to clarify their potential impacts on biomechanical interpretations in anthropological studies.

A scoping review of Indigenous food sovereignty in Canada

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Background: This year marks the 25th anniversary of the 1996 World Food Summit where the international peasants' rights group 'La Via Campesina' introduced the concept of food sovereignty as a means of achieving food security. In North America, the movement has been adopted as Indigenous food sovereignty (IFS), a decolonizing tactic aimed at rejecting the current neoliberal agri-food system and returning lands stolen through the process of colonization to Indigenous nations.

Purpose: In collaboration with the Centre for Indigenous Environmental Resources, an Indigenous-led non-profit in Winnipeg, MB, this study examines the factors that influence IFS across Canada, taking into consideration the difference in population characteristics, temporal factors, geographic spread, and research method/methodology. The goal of this study is to influence subsequent community interviews and a national survey.

Method: This scoping review was structured based on the PRISMA-ScR Checklist (Tricco et al., 2018). We searched eight databases in March 2021 and extracted data from peer-reviewed articles that discussed IFS in Canada. Discourse analytical tools were used to analyze prevalent themes among the studies.

Results: Forty-seven articles were included in the review. The majority focused on First Nations populations in the Provinces, and interviewing was the most common methodology. At a proximal level, common limits to IFS include climate change, a loss of intergenerational knowledge, and a reliance on market foods. At a distal level, colonialism continues to be the most influential factor.

Conclusion: Indigenous food sovereignty is an increasingly popular and complex concept that requires attention at multiple scales. Recommendations to improve IFS must take into consideration the scale of the issue, with both community-based interventions and policy change being essential to achieving IFS.

Reconstruction of breastfeeding and weaning practices by combining carbon, nitrogen and oxygen Stable isotopes from multiple non-adult tissues

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This paper explored the potential of combining different isotope systems from different tissues to improve resolution when reconstructing breastfeeding and weaning practices (BWP) in archaeology. Additionally, we tested whether changes in diet can be detected in deciduous teeth. Rib collagen samples from 22 infants/children from the archaeological site of Bacuranao I (Mayabeque, Cuba) were processed for nitrogen (δ15N) and carbon (δ13Cco) stable isotopes and assessed using a Bayesian model (WARN). In addition, enamel of 48 teeth from 30 infants/children were analyzed for oxygen (δ18Oen) and carbon (δ13Cen) stable isotopes. Data revealed that the timing of weaning cannot be characterized precisely by analyzing either δ18O or δ15N. While a depletion in both δ15N and δ13Cco is only evident after one year, the WARN model suggested that the weaning process started at around 3 months and ended around 1.7 years. Most teeth were enriched in δ18Oen compared to deciduous incisors, suggesting a breastfeeding signal. However, a high variability in δ18O was found between similar teeth from the same individuals. Higher enrichment in δ18Oen, and variability, was observed in tissues formed during the first six months of life. A δ13C enrichment of 1.0‰ was observed among deciduous teeth and ribs. While most individuals enriched in δ15N showed enrichment in δ13C, the δ18O values were more variable. Our data suggests that stable isotopes of deciduous teeth, especially δ13Cen, can be used to detect changes in diet during the weaning process. It is also possible that the δ18O enrichment observed in M1 are influenced by the effects of cooking techniques on weaning foods. The combination of multiple isotope systems and tissues overcame some of the limitations posed by single tissue approaches.

Mobility and residence at Roquemissou: A 87Sr/86Sr isotopic analysis of teeth from a Neolithic burial in southern France

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This study uses LA-MC-ICP-MS to analyse and chart the changing ratios of 87Sr/86Sr across the growth bands of six third molars (M3s) belonging to individuals buried in a communal burial from Roquemissou, Southern France, dated to the Late Neolithic. Third molars develop during late childhood, and the incremental nature of enamel deposition along with the lack of remodelling and change to the isotopic composition of enamel after this deposition allows us to reconstruct the changes in isotopic ratios over the several years during late childhood and early adolescence in which these teeth developed in the maxilla and plot the residence and mobility of these individuals over time during this period of their lives. The patterns of changing strontium ratios and the overall average ranges vary significantly among these six individuals. Some exhibit relatively little change over time, while others shift very gradually, suggesting that these people were not seasonally mobile, and when they did move across the landscape they did so very slowly. Despite the lack of seasonal movement, these individuals likely inhabited different landscapes within a roughly 12.5km radius of the site they were buried.

Investigating the ability to use citizen science data to monitor the relative abundance of three species of lemurs in Ankarafantsika National Park

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Madagascar is facing a biodiversity crisis with the majority of lemur species being threatened with extinction. Our study investigated the impact of conservation measures taken by the NGO Planet Madagascar from 2015-2021 on the relative abundance of lemurs. The data was collected by Planet Madagascar's fire management team between September, 2015 and June, 2021 (N = 61) adjacent to three communities in the Ambanjabe Management Zone within Ankarafantsika National Park. We compared the combined relative abundance of Propithecus coquereli, Eulemur fulvus, and Eulemur mongoose from 2015-2021 as measured by mean groups sighted per patrol walk and per month by year. To determine the pattern of relative abundance over time, we visualized the data overall and by community. To test if year was a predictive factor, we performed several poisson regressions. Overall, there is a significant increase in relative lemur abundance amongst the three communities by walk (N = 1239) and by month (N = 61). Within the communities, we found a significant increase (Ambarindahy, N = 473), a significant decrease (Andranohobaka, N = 387), and no difference (Maevatanimbary, N = 397) in the relative abundance of lemurs per walk by year. We also found a similar pattern per month by year except for Andranohobaka (N = 60) where we found no difference per month by year. Since lemurs are long-lived species, it is not surprising that six years of conservation efforts have resulted in slow increases in relative abundance overall and mixed results across communities. Although some analyses did not show significant or positive changes in the relative abundance of lemurs, the overall positive pattern provides evidence that the conservation efforts of Planet Madagascar may be beneficial. However, further analysis is needed to determine if other factors may be playing a role such as seasonality, patrol capacity, and community interests.

Temporal trends in the prevalence and demographic distribution of the endemic Mseleni joint disease

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Mseleni Joint Disease (MJD) is a crippling osteoarthropathy of unknown aetiology that is endemic to a community of Zulu-language speakers in KwaZulu-Natal, South Africa. The geographic localisation of this condition is enigmatic as the affected population is neither geographically, genetically nor culturally isolated. The geographic and familial clustering of MJD with the lack of apparent Mendelian inheritance suggests an environmentally-linked, epigenetic cause. The paucity of information on the prevalence and distribution of the disease presents a challenge to risk factor management and treatment. The aim of this study was to explore the temporal trends in gender and age as risk factors. Prevalence statistics from a meta-analysis of epidemiological studies of MJD from 1970-2020 were compared to findings from a hospital-based prevalence survey conducted in 2019 (n=723). A point prevalence of 9% was estimated in 2019 and female gender was associated with a two-fold increase in likelihood of MJD (OR= 1.88, p=0.03). In those older than 40 years, the likelihood of having MJD increased twofold every 5 years. The overall prevalence and odds of MJD in women decreased between 1970 and 2019, which may indicate a temporal change in a gender-linked risk factor. A significant increase in the odds of MJD from 1970-2019 was detected in individuals older than 51 years of age. This, in addition to the decline of MJD in younger people, may suggest a change in exposure to a risk factor or that an aging cohort was affected by an environmental or epigenetic cause. Further analyses are underway to determine whether variations in prevalence of MJD are associated with changes to

lifeways, ecology or demographics in response to access to technology, transport and socio-economic opportunities in the region.

We already know that! The distribution of trace elements in teeth

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For almost 100 years the trace element (TE) content of human teeth has been of interest to researchers across various fields. Continuing to this day, much of this work involves dissolution of whole teeth or dental tissues in order to get mean concentrations for elements such as Pb, Sr, Ba, Zn, etc. In the past two decades there has been an acceleration in research across disciplines attempting to characterize the distribution of trace elements within dental tissues. Such work has been made possible through development of creative mechanical sampling methods as well as the application of microspatial analytical techniques such as LA-ICP-MS and sXRF. Most often these characterizations comment on the distribution of TEs from inner to outer enamel and in areas surrounding the pulp, in general. Some few consider how TE values vary in relation to life events, as indicated by the presence of accentuated striae of Retzius ("stress bands"), and/or information pertaining to processes such as weaning. Notably, many of these characterizations say the same things over and over but present their findings as novel. This presentation will synthesize basic repeated findings, from bioarchaeology, dentistry, and public health with unpublished TE data collected from Norwegian, Nubian, Egyptian, French, and Mexican (bioarcheological and contemporary) samples in order to comment on what is the universal pattern of TE distributions in teeth. Acknowledging universal patterns, where they occur, helps to set a baseline for better understanding the meaning of variation occurring between populations, between individuals, and across each individual's periods of tooth development. The goal of this work is to acknowledge what we already know, stop reinventing the wheel, and to stimulate positive movement toward fulfilling the interpretive promise of microspatial analyses of TEs in dental tissues.

Heterogeneity in the growth and development of Upper Canadian children

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The Osteological Paradox identified fundamental conceptual problems that confound the interpretation of paleopathological lesions due to demographic non-stationarity, selective mortality, and heterogeneity in the risks of disease and death. Since that seminal publication, productive research has been accomplished by utilizing the biocultural approach to better inform health inferences, a focus on subadults as non-survivors, and through advancements in the study of associations between lesions, frailty, and demographic phenomena. This paper presents preliminary results involving the growth and development study of subadult burials from the Elmbank Roman Catholic Cemetery (1833-1939) relocated from Toronto's Pearson International Airport in 2001, and St. Thomas' Anglican Churchyard, Belleville (1821-1874). The long bone lengths of individuals were plotted against their dental formation age estimate and forensic anthropology growth standards. ANCOVA reveals no significant difference between the growth of pre-weaning age Elmbank and St. Thomas' children; however, post-weaning age Elmbank children have significantly reduced lengths ($p<0.001$) and increased display of chronic paleopathological stress indicators compared to St. Thomas' children. A Lowess smoothing curve reveals a trend in reduced long bone length between one and four years in both cemeteries and is likely the result of weanling diarrhea. The biocultural context of the communities that created these cemeteries, Irish Roman Catholic immigrants and Anglican United Empire Loyalists, will be explored to elucidate the overall trends.

Hair cortisol and embodiment: Dynamic stress experience at the end of life in the past and present

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Stress is dynamic and biosocial. These facts are clear from observing living people, but in the dying and dead, they are more difficult to investigate. Thus, stress in the dying and dead is often viewed as a biological and cumulative phenomenon. Hair cortisol concentration (HCC) analysis can shed light on the dynamic and complex nature of stress, which has implications for understanding cycles of stress and resilience, at the end of life and in the past.

HCC reflects the embodiment of stress experience as stress alters the biochemistry of individual bodies (and hairs). In this study, HCC was analyzed in 1 cm segments (roughly 1 month of growth) in 40 individuals from the Terry Collection (died between 1923-1960 CE) and 40 modern individuals (died between 2016-2017 CE). HCC in both samples of the dead is higher than in living healthy people and varies between individuals and across the last months of life. Ten individuals from the Terry Collection entered the hospital while the available hair samples were growing, and all display decreases in HCC with hospital entry despite limited effective medical treatments at the time.

While the high HCC in samples of the dead indicates that stress is high at the end of life, the substantial variation between individuals and across individual hair shafts suggests that stress experience is still dynamic in this period. Furthermore, the reduction in HCC as a result of hospital entry demonstrates that dying people have the capacity for resilience, dying people still respond to their biosocial environment, and that care can improve stress experience in the dying. Ultimately, HCC is a powerful tool for the study of stress in the dying and dead that reveals that stress at the end of life is dynamic and dying people are resilient, biosocial beings.

Measuring mummification: A pilot study quantifying the soft tissue desiccation process in the Western Cape Province, South Africa

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Decomposition is a generally well-understood process. However, biogeoclimatic variability can impact the normal progression of decomposition and result in alternative states of decomposition. An example of this is natural mummification – a preservative process characterised by desiccation, brittleness, and shrinkage of the body tissues and skin. Of particular interest is precocious mummification: natural mummification occurring in less than one calendar month. Reports of this phenomenon's occurrence in temperate regions are extraordinarily rare, which makes the previous observations of precocious mummification in Cape Town, South Africa a globally significant finding. This presentation offers details on the initial phase of a project aimed at developing a world-first means to quantifiably measure and track the natural desiccation process. Our work is distinguished from previous efforts in that it does not rely on scoring qualitative macroscopic observations of soft-tissue changes; rather, we have developed a custom sensor to directly measure tissue moisture content. Specifically, the sensors take ratio-level measurements of electrical conductivity changes in soft-tissue at multiple depths. Sensors are integrated into a programmable, autonomous control system which can host up to 10 sensors. Thus, the system provides real-time,

remote monitoring of differential onset and progression of soft-tissue desiccation across an entire carcass. The sensors underwent pre-deployment optimisation testing in a soft-tissue model (large pork shoulder joint) beginning May 26th, 2021 (further optimization was on-going at the time of writing). Data were manually downloaded on a daily basis and used to calibrate the sensors and test them for corrosion and weather resistance. The final resistive sense range was settled between 3.5kΩ and 900kΩ, and corrosion and weather resistance were satisfactory for the deployment timelines. A provisional field test in a full-scale model (60kg porcine carcass) will proceed from mid-August 2021 and provide for additional optimisation ahead of the first summer trial beginning January 2022.

The burning island: Spatiotemporal patterns of fire occurrence in Madagascar

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Anthropogenic fire use is widespread across Madagascar and threatens the island's unprecedented endemic biodiversity. 96% of lemur species are already threatened with extinction, and Madagascar has already lost more than 44% of its forests. Previous conservation assessments have noted the role of fire in the rampant deforestation and habitat degradation across Madagascar, but published, quantified data on fire use across the island are incredibly limited. Here, we analyze VIIRS satellite fire detection data to assess which regions of Madagascar had the most prevalent fire use, how fire use is changing over time, and what this means for Madagascar's remaining forest ecosystems. An average of 356,189 fires were detected every year in Madagascar from 2012-2019, averaging 0.604 fires/km2. Fire use was near-ubiquitous across the island, but was most prevalent in the western dry deciduous forests and succulent woodlands ecoregions. Fire frequency in the eastern lowlands was highest around the remaining humid forest, and fire frequency was increasing over time around much of the remaining humid and dry forest. 18.6% of all remaining forest was within 500 m of a fire within a single year, and 39.3% was within 1 km. More than half of remaining forest was within 1 km of a fire in a single year in the dry deciduous forests, succulent woodlands, and mangrove ecoregions. However, fire frequency within national park protected areas was, on average, 65% lower than their surroundings. Only 7.1% of national park forest was within 500m of a fire, and 17.1% was within 1 km, suggesting that national parks are effective at reducing fire frequency in Madagascar's forests.

Exploring resilience in relation to biological sex in medieval Denmark

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The medieval Danish population from the 12th to the 16th centuries experienced a number of challenges, ranging from famine through to disease (the most extreme of which was the Black Death epidemic of the mid-14th century). While earlier work has suggested that males and females responded to stress differently based on dental enamel defects (DEH), how childhood experiences differed between the sexes has remained unclear due to limitations on sex-estimation for non-adults (the non-survivors) and lack of representation in the historical records. Drawing upon amelogenin-based sex estimation, this study will explore the experiences of survivors and non-survivors in Denmark during this period in relation to sex. The results show no significant differences in sex-based survivorship for non-survivors. A higher percentage of males than females had either no DEH or severe DEH amongst non-adults, while the same pattern emerged for adult females, and this was significant ($\chi 2(3) = 9.59$, $p = 0.02$). Rates of mild to moderate DEH were not significantly different between non-adult and adult females. Overall, more males who survived to adulthood had DEH across all severity levels than those who did not survive. Results suggest that males experienced more episodes leading to severe enamel disruption during childhood, and those who developed severe DEH were more likely to enter the mortality sample as non-survivors. A trend towards higher rates of DEH is seen

in the male adult survivors of childhood stress episodes. Female with severe DEH tended to be less heavily represented amongst non-survivors, but significantly more represented amongst survivors. Cumulatively, these results point to a complex pattern of resilience to physiological stress resulting in DEH during childhood, and to sex-based nuances to these interactions amongst the medieval Danish populations.

Hand and finger injuries among rock-climbers: Risk factors and lived experiences

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Background: The sport of rock-climbing has increased in popularity in recent years. Rock-climbing is associated with many injury types due to repetitive overuse and substantial mechanical loading on the hands and upper limbs. Common hand injuries include tendon injuries, fractures, and dislocations.

Objectives: In this project, we: i) reviewed current literature regarding rock-climbing injuries and recovery experiences, ii) investigated years of experience and training intensity as potential risk factors for hand injuries and, iii) examined climber's lived injury experience.

Methods: We conducted a comprehensive scoping review on rock-climbing injuries and recovery outcomes, a retrospective survey of approximately 190 Toronto-area rock-climbers about their experience and training, and qualitative semi-structured interviews of six climbers with past injuries. Survey results were assessed using chi-square tests.

Results: The scoping review identified previous injuries and chronic overuse as injury risk factors and tendon injuries as the predominant injury profile. Our survey indicates that more years of experience are associated with an increased risk of hand injuries ($p=0.000054$,), while training intensity is not a potential risk factor. Interview subjects reported their injury period as a stressful time but provided an opportunity for athletic and personal growth. Climbers displayed hesitancy seeking healthcare services, citing that healthcare practitioners lack the knowledge of rock-climbing-related injuries and treatment practices.

Conclusion: Findings highlight years of experience as a risk factor for hand injuries and a perceived lack of practitioners understanding climbers' injury experiences as barriers to seeking care. By understanding climbers' injury profiles and experience, we can better provide treatment guidance for healthcare practitioners and climbers to ensure a safe and successful return to the sport.

The impact of dental integration on cladistic analyses of hominin phylogeny: A preliminary study

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Morphological integration refers to the coordinated evolution of distinct morphological characters. Such integration presents a considerable challenge to cladistic analyses because this method assumes independence between characters. Covariation between traits due to shared function, genetic architecture, developmental pathways, and/or selective pressures violate this assumption and, as such, their joint inclusion in cladistic analyses may bias purported

relationships between taxa by treating the consequences of a single evolutionary event as separate events. This issue may be exacerbated in paleoanthropological analyses due to the over-representation of dentition within the fossil record. The occlusal topography of interlocking teeth must be integrated for functional occlusion to occur, and as serially homologous structures they are likely to share many genetic and developmental pathways. Therefore, the inclusion of many dental traits in cladistic analyses without proper consideration of their integration may hinder our ability to reliably reconstruct hominin evolutionary relationships. This preliminary study aims to examine the impact of dental integration in this regard. We have constructed a character matrix containing dental traits that are known to vary within hominins and which have traditionally been used in studies of hominin phylogeny. Using knowledge from existing literature on dental development, function, and quantitative genetics to inform hypotheses of integration, we will conduct two cladistic analyses: (1) assuming independence among all traits, and (2) assuming integration between groups of traits. We predict that integration between dental traits will affect tree topology, implying that reconstructions of hominin phylogeny warrant re-examination. Further studies are necessary to quantify integration in this system. Moving forward, the consideration of integration within cladistic analyses of hominin phylogeny will improve our ability to recover accurate relationships and will help to inform models of hominin evolution.

Bones at home: Teaching and learning human osteology through 'Living Room Labs'

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The shift to remote instruction due to COVID-19 led to pedagogical challenges in teaching human osteology laboratory courses. We report the initial phase of a pedagogical project that examines learning outcomes of osteology students educated remotely using take-home skeleton models. Replica skeletons were loaned to every student enrolled in human osteology at Mount Royal University (n=30) and the University of Manitoba (n=24). Different model brands were purchased by each institution. Following course completion, students were invited to voluntarily participate in a challenging survey that tested their knowledge using photos of real human bone in varying states of preservation and completeness. We evaluated participant ability to name and side skeletal elements, identify morphological features, and estimate sex and age. Fourteen students participated and results showed poor correspondence between perceived and actual osteological skill ($r_s(12)=.392$, $p=.166$); students with higher scores were more likely to underestimate their abilities and vice versa. On average, participants scored 56% for bone, feature, and side identification, and 54% for sex and age estimation. Students struggled with questions involving age estimation (40% correct) and identification of fragmentary remains (38% correct). Similarities between institutional scores suggest that the model brand had little effect on learning outcomes. Although take-home models may prove useful in learning bone and feature identification, we suggest that they are limited in their capacity to familiarize students with incomplete remains and with the range of human variation needed to establish a biological profile. In future, we will compare test responses with: 1) human osteology experts and 2) students taught in-person. Current results support the indispensable nature of in-person laboratory education and will facilitate informed pedagogical decisions about laboratory resources and deliveries. This study's observations can also be used to improve accessibility in osteological laboratories and inform approaches to universal design.

Optimizing demineralization conditions for bone collagen extraction

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Numerous studies have tested the comparability of stable isotope data generated using methodologies employed by different labs. While these studies are useful in the context of intra-lab comparability, they can never ascertain the cause of any variation that they observe among methods because there are too many variables (e.g., acid strength, demineralization time, presence/absence of an ultrafiltration step) that differ between labs; these studies also cannot optimize conditions for the same reason. In this study, we isolated two variables (demineralization time with 0.5 M HCl and bone fragment size) to determine: (1) the optimal conditions with respect to collagen yield and (2) the extent to which these variables influence the isotopic and elemental compositions of collagen extracted from bone. We observed a surprising amount of variation for $\delta^{13}C$, $\delta^{15}N$, and atomic C:N. On the basis of comparison with samples demineralized with EDTA and the expected elemental compositions for mammalian bone collagen, we identify the optimal conditions for demineralization time and bone fragment size to be used for collagen extractions using 0.5 M HCl at room temperature.

The Indian Residential School (IRS) System in its spatial context: A proposed course of research

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The recent finding of mass burials at several residential schools using ground-penetrating radar (GPR) has thrust the profound tragedy of school mortality into the Canadian public's consciousness. In so doing it confirms knowledge that has been commonly understood in First Nations communities for many decades. While GPR provides evidence of burials it does little to tie these to the children who passed away and may thereby limit the grieving process. Research in archival and other historical record collections can provide key information to link students to specific schools at specific times. Our proposed research program would use public participatory GIS (PPGIS) to structure this data collection and thereby enable communities to identify the location and status of individual children. Here, the use of PPGIS provides two significant benefits over standard approaches to GIS. First, it can encourage community members to submit personal and family information to enhance and clarify the historical research. Secondly, PPGIS is fundamentally democratic, as it is designed to enable the public to generate and manage spatial information while they claim ownership of their own data.

An investigation of historical infant feeding practices in Newfoundland using stable carbon and nitrogen isotope analysis of dentine collagen

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Family life in Newfoundland and Labrador between the 18th-19th centuries is understudied from an archaeological perspective. Women held economic roles in the cod fishery and had additional responsibilities in household management and subsistence agriculture, but the intersection of these roles with infant care and feeding is only known through anecdotal evidence. Limited access to imported foodstuffs in many Newfoundland outports prompted the development of a food culture, distinct among British colonies, that centred on marine resources, such as codfish and seals. In this paper, we examine the influence of the unique socioeconomic and physical environments of

Newfoundland on infant feeding practices. We conducted stable carbon (δ13C) and nitrogen (δ15N) isotope analysis of the dentine from deciduous (where available) and permanent first molars from 17 archaeological human skeletons that were recovered from four British settlement sites on the Avalon Peninsula of Newfoundland. The molars were sampled incrementally to generate isotopic dietary histories that spanned the period between birth and approximately 10 years of age. The timing of the decrease in δ15N values, usually associated with the introduction of complementary foods, varied among individuals as did the magnitude of the decrease. The isotopic composition of the complementary foods supplied to Newfoundland infants appeared to be very similar across individuals and appeared less marine-focused than the diets of older children and adults. We consider these data in relation to cultural attitudes about infant care and discuss the relationship between infant feeding practices and knowledge transmission among families and lactating people in rural Newfoundland communities.

Diverse lower limb biomechanical properties are interrelated among Later Stone Age Southern Africans

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Long bone cross-sectional geometric properties (CSPs) are frequently used to infer lower limb loading patterns. Femoral curvature, tibial curvature, and femoral anteversion have also been used to infer loading patterns. The relationship between these variables and CSPs have not been explored in Later Stone Age (LSA) Southern Africans, who have lower limb CSP values, indicative of high terrestrial mobility alongside small body sizes and unique body proportions.

Here, we examine intra-individual relationships between CSP variables (including total subperiosteal area, second moments of area, and polar second moment of area), femoral and tibial curvature, and femoral anteversion among LSA Southern Africans from the Namib Desert (n= 17) and the central interior of contemporary South Africa (n= 47). Femoral and tibial curvature are predicted to positively correlate with their respective bones' CSPs. Femoral anteversion is predicted to negatively correlate with CSPs based on observed ontogenetic decreases in anteversion with the onset of bipedal locomotion. Femoral and tibial CSPs, curvature, and femoral anteversion were assessed using whole-bone 3D models. Intra-individual relationships between these variables were assessed using linear regression at 5% intervals along femoral and tibial diaphyses.

There are strong positive relationships among the CSP variables within each bone. Femoral curvature has a significant positive relationship with most femoral CSPs at 50%, weakening at sections proximal and distal to midshaft. Femoral anteversion has a significant negative relationship with CSPs, but only between 70 and 45 % of the shaft. Tibial curvature had a significant positive relationship with tibia CSPs, but only at the proximal diaphysis. This contradicts prior studies and may relate to methodological differences or LSA Southern African body size and shape characteristics. Overall, CSPs, curvature, and femoral anteversion likely reflect the loading environment of the lower limb, and may be used in biomechanical investigations of physical activity patterns.

1 part Medieval brucellosis, 1 part stress, and a dash of computational struggles: A recipe for studying disease during a pandemic

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The COVID-19 pandemic, with its associated lockdowns, uncertainty, isolation, and worry about immunocompromised family members, has been an unexpectedly useful framing device to contextualize the complex stressors affecting a 14th-century Italian monk. The remains of Sante Brancorsini were interned in a church in Montebaroccio, Italy and excavated in the 1990s by Dr. Gino Fornaciari. Nodules sampled from his remains were sent to the McMaster Ancient DNA Centre for pathogen testing with the hypothesis that they might be associated with tuberculosis. Brucellosis has been identified, via ancient DNA, in three calcified nodules from the pelvis. We identified it using a bioinformatic pipeline that I have modified to reduce false positive classifications. Brucellosis is a chronic disease which causes fever, muscle pain, and depression in humans. In addition to having brucellosis, Sante Brancorsini also lost a family member to dueling. According to church record, this event so impacted him that he joined the Order of the Friars Minor. He also lived through the first wave of the Black Death (1347-1351). In researching his disease and stress experience, I examine resilience using the definition employed by contemporary psychologists, with resilience being a process (versus a trait or outcome). I also utilize the idea that resilience is not rebounding back to one's original way of being, but consciously working to move forward in an insightful way, using lessons learned from adverse experiences. As a researcher investigating chronic infectious disease during a global pandemic, I found that my personal experiences of stress have affected my approach to investigating and contextualizing past individuals' building and maintenance of resilience to chronic stressors, drawing upon factors defined by psychologists such as connection, wellness, healthy thinking, and finding meaning. Applying a biocultural approach to ancient DNA evidence has helped me to appreciate the different stressors experienced by Sante Brancorsini.

"I just want this to be over": Young adult perceptions of COVID-19 vaccines

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Vaccines have been lauded as the solution to the current COVID-19 global pandemic. In Canada, especially in Ontario, re-opening plans have been tied to vaccination numbers with the promise of progress toward the resolution of "normal" life as vaccine uptake increases. As part of a larger mixed-methods project on young adult experiences of the COVID-19 pandemic, we surveyed students at the University of Toronto to understand their perspectives and concerns related to COVID-19 vaccination. Participants were surveyed in June 2020, September 2020, and March 2021 to explore their perspectives related to the vaccine as it went from a proposed plan to an available reality. A total of 2817 students were surveyed and 60 were interviewed. In June 77.8% of surveyed students (n = 483) were willing to get the COVID-19 vaccine; in September 79.6% were willing (n = 1269). Multinomial and binary logistic regression analyses found that increasing perception of the severity of COVID-19 predicted the likelihood that a respondent was willing to get the vaccine in both surveys. In the September survey students who indicated they

would be encouraged to get the vaccine if their doctor/pharmacist recommended it were 76 times more likely to be willing to get the vaccine than those who would not be encouraged by medical advice. By March 2021, 80% intended to receive the vaccine and 9% had already received it. While the response was overwhelmingly positive, participants indicated concerns related to speed of development, safety, and efficacy. Reasons for receiving the vaccine were mostly rooted in individual self-interest (e.g., return to normal life, avoid getting sick). As COVID-19 vaccines will likely be part of our long-term COVID-19 plan, understanding how vaccination is viewed and the factors that influence decisions to receive the vaccine is essential in ensuring on-going uptake of vaccines.

Using microscopy to improve the detection of pipe use in past populations

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Tobacco use has a long history in human societies; for thousands of years people have smoked it for medicinal, spiritual and recreational purposes. Pipes, made from various materials, are a preferred mechanism of smoke delivery in both the Americas, and later in post-medieval Europe. The habitual use of pipes can be identified in the past as pipe stems are abrasive leaving characteristic ‘pipe notches’ in the teeth of users. Despite being a means to assess past tobacco use habits, an important and under researched area of past health, there has been scant research that systematically records pipe notches, and none that characterises their microscopic features. This prevents us from knowing the extent of pipe use in past populations. This research aimed to assess whether there are distinct microscopic dental features that can be associated with the use of clay pipes in archaeological skeletal material. Here we assess forty anterior teeth (incisors, canines and premolars) of fifteen British individuals: 5 individuals with evidence for chronic pipe use and 5 individuals with no evidence for pipe use from post-medieval Coventry, one modern non-smoker, 4 pre-tobacco individuals from Medieval Cambridge. Using light microscopy and SEM, we recorded scratching, polishing, chipping and fracturing at the labial, mid and lingual surfaces of opposing teeth. While scratching and pitting was identified in all individuals, key features of pipe notch surfaces was loss of the aprismatic layer of enamel with a smooth and even exposure of the prism structure below demonstrating a ‘keyhole pattern’. There tended to be greater directionality in scratch orientation in pipe notches. Microscopy offers an opportunity to expand our knowledge about the extent of pipe use in past groups by helping to identify users who use pipes infrequently or who died prior to obvious notch formation.

Rebuilding a sense of student community: Preliminary results from a University of Toronto student survey conducted in Fall 2021

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Belonging to a community is intricately tied to the health of an individual, as community support is linked to stress levels, sleep quality, mental wellbeing, and overall social integration. The COVID-19 pandemic has fractured the university student community, as classes became virtual and students were no longer able to access physical campus space. Virtual platforms provided a way to remain physically distant but socially close; however, maintaining a sense of a university community for students remains a particular challenge during remote learning, with students feeling distanced from their social and academic support networks. As the University of Toronto adapts to a mixed in-person/virtual learning model, little is known about how students will regain a sense of a community and feel connected to their student networks as the pandemic continues. We will present preliminary results from a survey conducted in Fall of 2021 with University of Toronto students. Through a combination of survey data and semi-structured interviews, results will illuminate to what extent virtual classes and online activities were effective in

maintaining a sense of community support, how strength of community ties relates to self-reported stress, sleep quality, and health, and whether individual factors such as personality type (e.g., extraversion vs introversion) lead to differential effects of community belonging or social isolation. Results from this study will assist in our understanding of how university community integration affects health and wellbeing, and can inform how to re-establish a sense of community belonging in University of Toronto students in the transition back to in-person classes and campus events.

Household food insecurity and maternal realth in Rural Nicaragua.

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Thirty-two percent of Latin Americans are currently experiencing food insecurity and the rate of food insecurity in the region is increasing faster than any other region of the world. This is concerning as food insecurity is a risk factor for anxiety, depression, dental disease, and more. Despite this, the association between food insecurity and mental and physical health has rarely been studied in Latin America and almost never in rural regions of Latin America. Given the growing frequency of food insecurity in Latin America, it is imperative to gain a better understanding of the relationship between food insecurity and health outcomes. This research is designed to address this knowledge gap by exploring the relationship between food insecurity and maternal mental and physical health. Specifically, this study is designed to evaluate the hypothesis that food insecurity is negatively associated with both maternal mental and physical health. In this study, food insecurity is measured using the Latin American and Caribbean Food Security Scale, maternal mental health is measured using the SRQ-20, and physical health is measured via an allostatic load index which incorporates anthropometric data, C-reactive protein, immunoglobulin-E, systolic blood pressure, and resting heart rate. Regression analysis is used to determine the association between food insecurity and maternal mental and physical health. The findings are supportive of our hypothesis: higher food insecurity is associated with worse mental and physical health. Indeed, 33% of the variation in maternal mental health ($p < 0.001$) is explained by food insecurity. Physical health analysis is still ongoing but expected to be significant. These data begin to fill the gap in our understanding of the relationship between food insecurity and physical and mental health in rural Latin America and suggest that addressing food insecurity may have multiple downstream health benefits.

Quantitative genetics and midfoot evolution in the hominin lineage

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Plio-Pleistocene fossil hominin foot bones demonstrate a range of morphological variability reflective of facultative, habitual and obligate bipedalism. Natural selection likely drove much of this variation, however, the specific evolutionary processes that influenced morphological changes are unknown, as are the individual foot bones that were most strongly affected by selection. Here, we use tests derived from quantitative genetic theory to investigate the evolutionary processes that shaped metatarsal (Mt) and navicular evolution during major transitions in the hominin lineage. Under a null hypothesis of genetic drift, we expect between- and within-population variance to be proportional, with a non-proportional relationship indicating that selection played an important role. Using extant

human and chimpanzee models as proxies for within-population variability in hominins, we apply these tests between Australopithecus afarensis and OH 8 (assigned to Homo habilis), and between H. habilis and Homo sapiens. Results indicate that diversifying selection may have influenced changes in Mt1 morphology between A. afarensis and H. habilis, and that stabilizing selection may have influenced the relative morphological stasis of the Mt4 between these two taxa. In both Mt1 and Mt4, we found no rejection of drift between H. habilis and H. sapiens. Genetic drift also could not be rejected in all Mt3 or navicular comparisons. However, we did find that Mt3 measures associated with the proximal articular surface may have been subjected to some stabilizing selection across all taxa. Our results reveal that: (1) there was a selective influence in the transition from habitual to obligate bipedalism, but not between obligate bipeds, and (2) that the lateral elements of the midfoot experienced some stabilizing selection, potentially making the derived Mt3 and Mt4 proportions hominin synapomorphies. We highlight that different regions of the foot were not equally affected by selection, and that they did not evolve adaptations for bipedalism at once.

Birth outcomes following evacuation from the eruption of Mount Sinabung in Indonesia

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Exposure to natural disasters during pregnancy has been associated with adverse birth outcomes. However, there is currently a dearth of knowledge regarding both how women evacuated during such disasters are impacted as well as impacts in developing nations. In this study we used bivariate and multivariate methods to compare a sample of women (n=97) who were evacuated from their villages due to the eruption of Mount Sinabung with a sample of women from villages nearby the volcano who were not evacuated (n=97). Amongst both, we collected anthropometric data on height and weight as well as structured interviews consisting of questions about maternal and birth characteristics, and subjective and objective stress. Our results found that women evacuated during pregnancy had an almost-five-fold increase in the adjusted odds of an early of preterm birth (OR=4.84, 95% CI: 1.31-17.92) and a 1 cm decrease in birth length of offspring (β=-1.10, 95% CI: -1.96--0.24). The latter was associated with stress in evacuated women. No relationship was found with either birth weight or sex of child. While previous studies have focused on the impact of natural disasters on pregnancy, our study is one of the first to explore evacuation itself. Both negative birth outcomes documented here are similar to those found after natural disaster exposure and are known to have negative influences on health later in life for children. This is an important consideration when exploring policies and protocols for evacuating women during any disaster event. It should also be factored into the resources available for pregnant women evacuated from natural disasters.

Evaluating the diagnostic potential of anterior sacral angulation in the identification of adolescent rickets

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Rickets occurring in infants and children has been thoroughly analyzed by clinicians and paleopathologists. Subadults undergo two large growth spurts, the second of which takes place during adolescence. Vitamin D deficiency occurring during active growth often results in rickets, which is the inadequate endochondral mineralization of newly deposited osteoid. The increased metabolic demand for vitamin D to accommodate rapid growth puts adolescents at increased risk of developing rickets. Rickets occurring in adolescence has been observed

clinically, however, to date there has not been sufficient study in the paleopathological presentation of adolescent rickets. As such, there currently is a lack of diagnostic criteria for the identification of adolescent rickets in archaeological human remains. Clinical literature and reports of possible cases of adolescent rickets in archaeological human remains have indicated that the sacrum of affected individuals may become anteriorly angled. This poster evaluates whether rickets occurring in adolescence results in anterior angulation of the sacrum using two Dutch skeletal collections from Hattem and Middenbeemster (17th to 19th centuries).

A combination of macroscopic and metric analysis was used to identify angled sacra. The histological analysis of second and third molars from Hattem was used to confirm cases of adolescent vitamin D deficiency through the presence or absence of interglobular dentine (IGD), as these teeth form during adolescence. Two of the five individuals sampled for histological analysis had angled sacra and IGD present during adolescence. The metric analysis of anterior sacral angulation was found to more accurately identify individuals with angled sacra than macroscopic evaluation, while removing subjectivity in the analysis. The presence of IGD and sacral angulation in the same individuals indicates that anterior sacral angulation can be used as a possible indicator for adolescent rickets.

Why should I get involved? Female and male behaviour during inter-unit interactions: the case of Rwenzori colobus monkeys

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The behaviours of individuals during group encounters are thought to be explained by their reproductive strategy. Thus, females are predicted to initiate encounters and/or participate to gain or maintain their access to food, while males should do so to gain or defend their access to mates. In this study, we examined the behaviour of males and females during inter-unit interactions in a band of Angolan colobus monkeys (*Colobus angolensis ruwenzorii*). This population forms a unique multi-level society, which was comprised of 14 core units at the time of data collection (7 uni-male/multi-female, 6 multi-male/multi-female, 1 all-male unit). We 1) recorded female and male involvement during inter-unit encounters, 2) investigated whether females took part to gain access to food, and 3) if males took part to gain access to mates using direct or indirect mate defence or by attraction via infanticide. We included interactions from a 3-month period for which we had data on the context, outcome, initiation, and participants' sex and behaviour (n=169), which included the level of aggression and the target of aggression for each individual. We found that females' behaviour was best explained by direct resource defence. On the other hand, males' behaviour during inter-unit interactions could be explained by indirect mate defence via food defence. Little evidence was found for direct mate defence and no evidence was found for mate attraction via infanticide. The influence of the multi-level society context on female and male behaviour will be addressed in this presentation, as studying individual participation in encounters is of particular importance for species where many groups share the same home range.

Social grooming and alopecia in a group of captive Japanese macaques (*Macaca fuscata*)

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Grooming behaviour has important social and physiological benefits for non-human primates. However, the context of captivity may alter grooming behavior and negatively affect the welfare of captive individuals. The adult Japanese macaques (*Macaca fuscata*) at the Granby Zoo in Granby, Quebec, display varying degrees of alopecia, or hair loss. While grooming has the potential to exacerbate hair loss (hairs being pulled out), the influence of grooming, particularly site preference (the selected location of grooming) on the presence and severity of alopecia has not been examined thoroughly. We examined grooming site preference in relation to alopecia, addressing the question: how, and to what extent, do the grooming habits of the Japanese macaques at the Granby Zoo correlate with the locations of alopecia experienced by the adult females? We conducted 154 35-minute behavioural focal animal samples on the adult individuals, indicating site preference during auto and allo-grooming interactions. Photographs were used to determine the total body and location-specific alopecia scores. We examined the associations between the time spent grooming and frequency of grooming behaviours, and alopecia scores using Spearman's rank correlations and Poisson distribution mixed effects models. A greater frequency of received grooming and site preference was associated with greater alopecia in this group. The role of self-grooming was less clear, as for some individuals, a greater frequency of self-grooming was related to lower alopecia in the location of grooming. This suggests other underlying, possibly non-behavioural, factors may also be influencing hair loss in this group. These results indicate a need to incorporate measures to identify individuals who may be over-grooming others, to develop strategies to mitigate these behaviors, and to identify other factors influencing hair loss, to reduce the prevalence of alopecia and optimize the welfare of captive primates.

Youth, migration and health in Medieval York: A multi-analytical approach

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York was an important center in medieval England, acting as a magnet for adolescents seeking a new life and independence. Despite this, few stable isotope studies focus on these young migrants or the intricate nature of their movement. Using a multianalytical approach we explore the impact of urban living on the diet and health of adolescents from a period that spans the pre- and post-Black Death period in Northern England. It challenges some previous assumptions about the diversity of the North and highlights the importance of combining historical, archaeological, palaeopathological and chemical data to understand complex life histories in the past.

Navigating networks: Stronger social bonds correlate with greater feeding tolerance in wild vervet monkeys

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In species with a pronounced dominance hierarchy, subordinates' feeding success can benefit greatly from feeding tolerance of high-ranking group members. Past research on tolerance among conspecifics has shown a connection between grooming relationships and feeding tolerance. In this study, we used social network analysis (SNA) to

investigate how grooming and spatial proximity correlate with feeding tolerance in a group of wild vervet monkeys (*Chlorocebus pygerythrus*). We predicted that individuals with stronger social bonds (i.e., more frequent grooming), and who spend more time in close spatial proximity (0-2 m), will exhibit greater feeding tolerance during a feeding experiment. Using the quadratic assignment procedure, we found that both proximity and grooming networks significantly correlated with the feeding tolerance network. We also found that feeding tolerance was more prevalent between opposite-sex dyads than same-sex dyads. There was a significant positive correlation between individuals' grooming in-strength and tolerance out-strength, grooming out-strength and tolerance in-strength, and grooming and tolerance eigenvector centrality scores. In addition, higher-ranking individuals received more grooming bouts, gave more feeding tolerance, and were more central in both grooming and feeding tolerance networks than lower-ranking individuals. These results are consistent with dominant individuals being attractive grooming partners because they can provide rank-related benefits, such as feeding tolerance at food sites. Taken together, our findings show that individuals who invested more time grooming others also benefited from more frequent feeding tolerance by group members. Although the majority of research on feeding tolerance has focused on dyadic interactions, this study demonstrates that the relationship between grooming and feeding tolerance is also discernable at the network level. SNA offers behavioural ecologists a broad perspective for examining animal social relations, which is useful for comparing behaviours in different groups and within the same group in different temporal and environmental contexts.

Taurodontism: Yet another review

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Taurodontism, the apical enlargement of the body/trunk of molar teeth at the expense of the roots, has been discussed extensively in the endodontic and paleoanthropological literature for over 100 years. Nonetheless, those who venture to explore this literature may come back frustrated by the lack of consistency in the methods and definitions (or at least this has been my experience). Therefore, it seems pertinent to address this topic yet again, paying particular attention to its relevance to the human fossil record. There are two main aspects worth discussing. First, there remains a lack of standardized methodology for measuring taurodontism, probably resulting from the differing contexts in which it is measured and a relative lack of attention to its developmental etiology. Second, while taurodontism has sometimes been taken as a diagnostic Neanderthal trait, its utility in hominin taxonomy remains unclear. This review summarizes the current understanding of taurodontism from a developmental perspective, and outlines a path towards a biologically informed methodology for the application of the concept to hominin taxonomy.

From Dust to Clay - A comparative study of soft tissue decomposition in clay versus loamy-sand soil

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Forensic archaeology and forensic taphonomic anthropology are growing fields which have become central to medico-legal cases, particularly in North America and Europe. This paper will address a gap of knowledge pertaining to cadaver decomposition in terrestrial environments that exists within these fields. Certain factors such as soil moisture content can greatly influence the rate of decomposition as they dictate microorganism motility. Using a pig as a human proxy, this research compares soft tissue decomposition processes in clay versus loamy-sand soil. A decomposition scoring system was created for this research based on previous similar studies in combination with the field results. Two field research periods, lasting four months and eight months respectively, produced results that

were contrary to the initial hypothesis that the clay would act as a preserving agent. Rather, the clay specimens experienced an increased rate of early decomposition which then slowed after the fourth month. The loamy-sand specimens remained in the early stages of decomposition throughout the entire 8-month period, showing only minor signs of intermediate decay. These results only begin to address the gap in knowledge surrounding PMI as related to terrestrial environmental factors and create a basis for further research that can play a vital role in reconstructing the death event.

The learning experience of Chinese international undergraduates in anthropological science: A case study from the University of Toronto Mississauga

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Our study examines the experience of Chinese international undergraduates studying a large core first-year anthropological science course (ANT101) remotely during the Winter of 2021 at the University of Toronto Mississauga. We analyzed both qualitative and quantitative data collected from self-reported course surveys (N = 586) and compared the general experience of Chinese international students versus that of other international students and the domestic student body. Our study shows support, but also challenges some prevailing notions of international students in North America. Specifically, while students felt language appeared to be a barrier, our data suggests that it did not significantly impact their performance and ability to communicate with their TAs and fellow students. This conundrum suggests a need for further research. Educational researchers may want to move beyond the role of language and examine the role of other factors to devise more appropriate strategies to facilitate supportive learning environments for international students in university settings.

Back to the drawing board: Reconstructing the Klales 2012 method for the developing pubis

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The objective of this research was to create and validate a method to assess sexual dimorphism in the human pubic bone prior to sexual maturity. In adult sex assessment, Klales optimized the Phenice method via statistics and added variation. This research seeks to optimize the Klales method for juveniles by recalibrating the statistics for a juvenile population and adjusting for developmental phases of the ventral arc. Using a revised ordinal scoring system that gives full consideration to the growth of the medial pubis, discriminant function and logistic regression equations were devised using 43 juvenile individuals from the Hamann-Todd collection. Testing of this newly calibrated equation was successful in the original sample, with an overall accuracy of 85.4%. The Scheuer collection was an independent sample used to externally validate the equations. Classification accuracy of the validation sample did not meet the 75% threshold for reliable juvenile sex assessment. It was concluded that the inclusion of developmental phases of the ventral arc contributes to accuracy, though confounding variables skew classification attempts between 11 and 12 years old. Nonetheless, there is a promising foundation for the identification of sexual dimorphism in the juvenile pubis as early as 6-years-old. The research identifies the developing ridge and furrow system as a possible skeletal marker indicating the reliability of scoring developmental variants of the ventral arc.

Assessing morphological mandibular traits for sex estimation in Holocene San and Khoekhoe populations

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Skeletal sex estimation is a key element in bioarchaeology and forensic anthropology. The mandible, the largest and most sexually dimorphic facial bone, is resistant to postmortem alterations and has been reported to estimate sex with a high accuracy. However, reliable sex estimation relies on population-specific methods. To date, no such standards exist for the Holocene San and Khoekhoe (S-K) population. Due to this population's characteristic skeletal gracility, markedly small stature, and highly physically active nature, skeletal robusticity differences that generally distinguish sexes are less prominent, making it difficult to estimate sex using existing methods. The aim of this study was to assess the accuracy of morphological mandibular traits in estimating sex for a Holocene S-K sample.

Three commonly assessed morphological traits (mandibular shape, gonial eversion/flaring, mental eminence) were analysed in an archaeological sample of 155 Holocene S-K mandibles to estimate sex. The estimates were compared to the individual's reference sex (determined by pelvic assessment) to determine the classification accuracy of each assessed trait. Results were statistically analysed using chi-square test of independence, and levels of agreement between mandibular sex estimates and reference sex were assessed using Cohen's Kappa testing. Mandibular shape yielded the highest classification accuracy (72%), gonial flaring yielded the second highest accuracy (63%), and mental eminence yielded the lowest (55%). Cohen's Kappa testing showed very little agreement (kappa values between 0 and 0.2) of sex estimates obtained from all three mandibular traits (when compared to the individual's reference sex).

Whilst the mandible is highly sexually dimorphic, existing morphological assessments of mandibular traits are not sufficient for accurate sex estimation in this population. The range of sexual dimorphism exhibited by Holocene S-K populations does not conform to current sex estimation methods, suggesting a need for population-specific optimisation of existing methods, for accurate application in this population.

We "could hear the bacteriae groaning": Narratives of institutional care in 19th-century St. John's, Newfoundland

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This research analyzes the intersectional interplay between two institutions in 19th-century St. John's, Newfoundland and Labrador: the St. John's General Hospital and Her Majesty's Penitentiary St. John's (HMP). Using the recently accessioned archives of these institutions, including admission and discharge records, penitentiary sick rolls, and the jail surgeons' journals from 1872 to 1899, the biocultural consideration of individuals seeking care at the hospital (n = 5995) or falling ill during incarceration (n = 266) is possible. At the General Hospital, 44.4% of male inpatients and 44.3% of female inpatients were discharged from the hospital as "cured" or "convalescent." Trauma, musculoskeletal issues, and respiratory diseases were the most common reasons for admission at the General Hospital, with male inpatients significantly more likely to seek care for trauma, sexually transmitted infections, and kidney/bladder issues. Female inpatients were significantly more likely to be admitted for tumours/cancers, anemia, and digestive issues. Notable were the short hospital stays for tuberculosis, indicating the General Hospital played an important role before the founding of the St. John's Sanatorium in 1918. Institutional intersections between the General Hospital and HMP, represented by identifying recidivist offenders requiring

physician visits in prison and seeking repeated hospital stays, reveal the failures of social welfare in late 19th-century Newfoundland. This was particularly stark regarding women repeatedly jailed for crimes of prostitution and vagrancy, several of whom spent long periods of time as inpatients at the General Hospital with the diagnosis of "no home." This snapshot of late 19th-century morbidity reveals the complex health risks facing citizens of Newfoundland and Labrador, demonstrating the resilience of the population in the face of geographical isolation and limited medical options.

Exploring two domains of food insecurity: Is access linked to utilization among women in Nicaragua?

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Food insecurity is a global problem, affecting one in four people in 2019, and it has only worsened during the COVID-19 pandemic. In Latin America alone, the number of people requiring food assistance tripled during the summer of 2020. Food insecurity, in turn, has been linked with compromised mental and physical health. Food insecurity is a hierarchical, multidimensional concept with four dimensions – availability, access, utilization, and stability – yet the food insecurity-health literature tends to focus only on access. Often missing is the utilization domain, which explores food choice, preparation, and food distribution within the household. Without knowledge of utilization, we compromise our ability to understand the strategies that people use to cope with food insecurity. Data exist for food access and health outcomes, but actual food consumption, the link between food insecurity and health, is generally missing. Our goal here is to explore the relationship between two domains of food insecurity, food access and utilization, in particular food choice, across urban and rural settings in Nicaragua. We hypothesize that as food access worsens, so will food choice. In this sample of 706 mothers, we measure access via the Latin American and Caribbean Food Security Scale (ELCSA), and food choice via a locally developed food frequency questionnaire, converted to dietary diversity scores following FAO. The relationship is analyzed via regression. Food has biological and cultural meaning, so contextual depth is provided via ethnographic data. We find that ELCSA scores are negatively correlated with dietary diversity ($r=-0.308$, $p<0.001$), which supports our hypothesis: in this sample, the perception of access to food is consistent with food choice. This study is among the few for which we have both access and utilization data and starts to fill in the gap in the literature for Latin America.

Social connectivity, health, and accessibility: Preliminary survey results from students returning to campus in Fall 2021

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Social connection and support are critical factors for mental and physical health. For much of human evolutionary history, social isolation likely carried immediate threats to physical health, which may in part explain the connection between social isolation and long-term health consequences. The COVID-19 pandemic has changed the ways individuals can interact, with national, provincial, and university lockdowns necessitating decreased in-person contact and broad reliance on virtual social interaction. As many universities plan to return to in-person classes in the Fall, maintaining positive social networks for all university students will remain a challenge in the return to campus. Of particular concern is accessibility for those who face barriers to long-distance travel and/or local commuting. We will present preliminary results from a mixed-methods survey and interview study, conducted virtually in August and September 2021 with returning University of Toronto students. Our results will highlight the efficacy of

different forms of social interaction on student health and wellbeing, measured through their self-rated physical and mental health, stress, and sleep patterns. We consider types of social activities that students have engaged in during the COVID-19 pandemic, and consider the social implications of virtual vs in-person engagement. We also consider student access to social activities and highlight safety and accessibility concerns that students have as they make the transition back to campus. Ultimately, this project will explore to what extent virtual social connection is an effective proxy for in-person interaction among university students, with the aim of promoting an equitable rebuilding of our social community and informing our transition into a post-pandemic academic world.

A model for a transgender and gender nonconforming-inclusive deathcare system

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Publications by non-government organizations have indicated that anti-transgender violence and homicide have reached epidemic levels in recent years. As such, the need for forensic identification methods that encompass transgender and gender nonconforming (TGNC) populations is high. This presentation reviews current literature regarding forensic identification practices and proposes a path for moving toward a TGNC-inclusive deathcare system.

Results from this review demonstrate that current practices for the identification of decedents are based on power structures and research methods that historically treat sex as a binary. In forensic anthropology, sex estimation is one of the main components of the biological profile presented to death investigators for use in identification efforts yet current methodology is based only on male-female cisgender samples. The development of gender-affirming medical care means that there are significant intersections between sex and gender, and these treatment options may leave identifiable markers of TGNC identity on skeletal remains. While these have begun to be studied, guidelines have not yet been developed for assessment of them in forensic anthropology practice. Identification of TGNC individuals is further hindered by misgendering and deadnaming of individuals by both forensic practitioners and next of kin searching for the deceased, barriers to changing personal information on legal documentation, poor relationships between TGNC communities and law enforcement agencies, and databases for missing/unidentified individuals lacking diverse sex and gender categories.

Transitioning to a TGNC-inclusive deathcare system requires structural overhauling. The use of anthropology in this effort may be key to its success. Anthropological methods would aid in interfacing with TGNC communities to determine what needs are not being met by current power structures. Research utilizing a biocultural lens would be best able to build off current identification methods and devise new methodology incorporating TGNC populations into deathcare practices.

Data Unavailable: Current data available on the social and ecological correlates of lemur extinction risk reveals patterns of phylogenetic and biogeographic bias

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Anthropogenic modification of natural landscapes has negatively affected the viability of lemurs on Madagascar – making them one of the most threatened mammal groups in the world. Owing to growing concern for the conservation of endangered lemurs, it is critically important to identify which species have the greatest probability of extinction. A species' risk of extinction can be determined by modelling how existing populations can respond to

environmental disturbance. Predicting a species' risk of extinction is a sensitive procedure that requires detailed information on the fundamental characteristics of their population ecology, social dynamics, and natural history. The amount of information that is often necessary to complete this kind of assessment, however, can be restrictive for poorly studied species for which little social and ecological information are available. Nonetheless, it is important to evaluate the feasibility and predictive power of predictive assessments for well-studied lemur species. To this end, we present: (1) a summary of current availability of information on the ecology and social dynamics for all lemurs. (2) We also quantify how present variability in the amount of data available for each species is confounded by factors that may have historically affected the amount of research these species have experienced (e.g., phylogenetic inflation and biogeographic data limited to one study site). Our findings suggest that variability in the amount of data available between species is correlated to the lemur's activity pattern, as well as their biogeography; with few data available for nocturnal species or those species that are found in small protected areas that are not close to large towns. For the benefit of current conservation efforts in Madagascar, our findings help to highlight which species should be prioritized for research efforts across the island.

Harris Lines as indicators of physiological stress in the Middle Holocene Cis-Baikal

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Harris lines (HL) are thought to represent osteological indicators of physiological stress during early life but are often critiqued in the reconstruction of life histories. Recent research, including this study, continues to challenge critiques such as a lack of standardized observational methods, loss of HL due to natural bone remodeling processes, and uncertainty if physiological stress is tied to HL formation.

Including only individuals aged 0 – 25 years at time of death, this study examined differences in HL presence and severity across three mortuary populations from the Middle Holocene Cis-Baikal (Russia). Of the three populations, two date to the Early Neolithic (EN) and one to the Late Neolithic – Early Bronze Age (LN – EBA). Previous research demonstrates that EN individuals experienced more frequent and repetitive stress events, likely reflecting reduced access to or availability of resources. In order to test the effect of radiographic orientation on HL visibility, x-rays for this study were captured in both the standard clinical view (anterior-posterior; A-P) as well as an alternative view (medial-lateral; M-L) suggested to result in the identification of more HL.

With the expectation that EN individuals would display higher prevalence and severity of HL than LN – EBA individuals, and that images captured in the M-L orientation would display a higher number of visible HL, this study compared HL prevalence both from an inter-site perspective across the three cemeteries as well as from an intra-site perspective with consideration for both age at death and sex. Findings from this study indicate a significantly higher number of visible HL in the M-L view as well as differences in HL prevalence across mortuary populations. As such, this study challenges critiques regarding HL validity while actively contributing to understandings of overall stress experiences in the Middle Holocene Cis-Baikal.

What do students in Anthropology know about Indigenous Issues?

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This poster is an overview of student responses in pre-and post- course surveys prior to and at the completion of a second-year undergraduate course entitled “Anthropology and Indigenous Peoples of Turtle Island (Canada)” (ANT241H) at the University of Toronto Mississauga (N = 140 respondents; N=67 Fall 2019 & N=73 Winter 2021 iteration). The surveys asked students a range of quantitative (Likert scale) and qualitative questions (e.g. Name one TRC Call to Action) in three different areas 1. Indigenous knowledge (Local and National) 2. Indigenous resources 3. student demographics. The results demonstrate the need for a place-conscious course with local Indigenous communities in post-secondary institutions to give students in anthropology (and across the curriculum) a foundational understanding of local Indigenous knowledges, contributions, initiatives, and issues of sovereignty and appropriate allyship.

Examining the role of museums as knowledge brokers in the bioarchaeological knowledge mobilisation process

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Knowledge mobilisation - the creation, dissemination, and use of knowledge for the purpose of communicating research findings to individuals, organizations, and communities - has become an increasingly emphasized part of the academic world. Institutions and funding agencies regard knowledge mobilisation plans as a vital part of a research proposal. Despite this, there is a paucity of research regarding theoretical approaches to knowledge mobilisation in bioarchaeology, with these discourses mainly being focused on other fields such as public health or policy creation. How might, or should, human remains feature in efforts at ‘mobilizing’ the knowledge that comes from bioarchaeological research? Museums, as dedicated spaces which allow wider audiences to have access to and engage with the knowledge gained from bioarchaeological research, serve as a form of “knowledge broker”. They create a shared language for the accessible communication of ideas.

This study uses qualitative thematic analysis of museum exhibit websites and interviews with museum stakeholders (curators, educators, bioarchaeologists, local community members, etc.) to investigate three questions. How do museum stakeholders conceive of bioarchaeological knowledge mobilisation? What do they think makes it effective? And how they see their role in this process? By examining elements of exhibit websites, such as the use of language and imagery, as well as stakeholder perspectives on the processes of curation and exhibit design, this study explores the ways in which museums fit into the bioarchaeological knowledge mobilisation process and the tools that they use to create narratives of human remains as both once living subject and research object.

Can body mass index of an individual be estimated from the footprints? Anthropological and forensic implications

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Footprints have been used as a part of physical evidence but it's use has not been fully functionalised in India in terms of identification. The real value of footprint is when it can be compared with suspects' footprints to establish individuality. Since it is evident from literature that there is an association of footprints with stature and body weight respectively, therefore, a correlation between body mass index (BMI) and footprints may also exist. The present study deals with the estimation of BMI (using body fat analyzer) from static and dynamic footprints (obtained using ink-paper method), amongst randomly selected 461 (146 normal weighing, 166 pre-obese and 149 obese) Jatt Sikh adults (age 19-32 years) of Indian origin. ANOVA was applied to obtain a generalized view of the variations in footprints between the three BMI groups, walking and standing. In both footprint types, widths (at ball and heel), arch index and footprint contact area showed strong statistically significant differences ($p<0.01$) whereas toe lengths: T-1, T-2, T-3, T-4 and T-5 showed statistically significant differences ($p<0.05$). Additionally, post hoc Scheffe test presented that all the three groups should be separately considered indicating differences in the footprints among all the three BMI categories. To conclude, different BMI categories may influence the morphology of the plantar area of the foot when foot makes contact with the ground during standing and walking. As a result of which, variation in the footprints is observed. This variation is exclusive to each individual and thereby can be used for the identification of an individual and help establish the body profile by studying these individualistic traits.

Mandibular integration in canid hybrids: Implications for hominin hybrid studies

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Morphological integration relates to the coordinated variation of related traits which allow an organism's form to function as a whole. Research on hybrid animal models suggest that levels of integration can be reduced through hybridization and give way to greater morphological variability. This study aims to explore how the magnitude of morphological integration compares between defined modules of the mandible in Eastern coyotes and their parent taxa. Seventeen landmarks were collected from surfaces scans of canid right hemi-mandibles (*Canis lupus*, n=24; *Canis latrans*, n=23; *Canis latrans* var., n=20) to capture the form of the mandible. In addition to examining the mandible in its entirety, levels of integration in the alveolar region/corpus and the ascending ramus were also assessed since these are developmentally distinct. Once all landmark data were retrieved, interlandmark distances were extracted from landmarks and a resampling technique was used to control for the number of traits compared to number of specimens. Integration coefficient of variation (ICV) values were retrieved from standardized interlandmark distances. Mann-Whitney U tests were used to assess the levels of integration within and between groups. Patterns of integration within and between taxa show a reduction of morphological integration within the hybrid sample, and place the hybrid sample intermediate to both parent taxa when comparing modules between groups. This study suggests that hybridization reduces integration in canid mandibles. A reduction of integration may act to decrease stabilizing selection allowing for greater variation which can facilitate evolutionary change. The patterns observed in hybrid canid models may offer insight into patterns of integration of early hybrid hominins. This warrants further investigation through the use of different mammalian models as well as the inclusion of other skeletal elements.

The effects of early life stress on limb proportions in 19th century Bologna, Italy

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Short stature and reduced long bone lengths are frequently used indicators of poor growth conditions during childhood, however research has shown that limb segments do not respond equally to biocultural stressors. This study explores how variability of long bone growth impacts limb proportions in impoverished children (36 females, 25 males) from the Certosa Collection, a documented skeletal assemblage comprised of individuals from the lower socioeconomic class of Bologna, Italy. Previous research has found the absolute long bone lengths of these children to be stunted in comparison to a modern reference standard. The present study aims to increase our understanding of juvenile skeletal stress responses by comparing the limb proportions of these children to those from an accepted normal growth standard. Variation in limb proportions was assessed through brachial, crural, and intermembral indices, using maximum diaphyseal length measurements of the radius, humerus, tibia, and femur, where the shorter measurement is calculated as a percentage of the longer measurement. In comparison to the modern reference sample, the Italian children have a lower brachial index (shorter radius relative to humerus), a higher crural index (longer tibia relative to femur), and a higher intermembral index (shorter lower limb relative to upper limb). These findings demonstrate that the deleterious growth environment of the Italian children did not affect the segments of the limbs equally, resulting in body proportions different from those of children experiencing more favourable developmental conditions. In particular, the distal segment of the upper limb was found to be quite variable, which is in line with existing research on body proportions. The finding of relatively shorter legs in the Italian children is indicative of a reduction in stature in response to detrimental biocultural factors. Future research will examine indices in other documented samples to further evaluate how limb proportions respond in differing growth contexts.

Growing Up Gravettian

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Adolescence is a stage of development unique to the human life course, during which key social, physical, and cognitive milestones are reached. Nonetheless, both the experience of adolescence and the role(s) of adolescents in the past have received little scholarly attention. Here we combine a broad interpretative framework for adolescence among prehistoric hunter-gatherers with direct bioarchaeological (burial) data to examine the lives of teenagers in the European Mid-Upper Palaeolithic or Gravettian (~35-25,000 years ago). Within long-standing models of a distinct, continent-wide European Mid-Upper Palaaolithic funerary tradition, comparisons of the burial practices of individuals of different age classes (infant, child, adolescent, adult), as well as between adolescents who died at different ages, reveal some notable patterns related to adolescence in these communities, including; 1) fewer distinctions based on sex among adolescents compared to adults; 2) differences between the sexes in age-at-death within our ‘adolescent’ age class—with females disproportionally dying later—potentially indicating high risks associated with first pregnancy; 3) distinctions in grave goods and diet among adolescents of different ages-at-death at Sunghir, Russia, which we tentatively interpret as providing an emic perspective on the beginning of adolescence as defined by Pleistocene hunter-gatherers.

Assessing the Brabant Index as a user-friendly and accurate method for scoring dental macrowear quantity and direction.

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The Brabant Index is a widely used descriptive classification system used to score dental macrowear quantity and direction. Studies to date follow a written format and although intended to be a user-friendly system, it relies on one score per tooth and a recurring issue in qualitative classification systems is subjectivity biases between observers. However, its advantage over other methods is the inclusion of wear direction. In this study, the method was assessed for accuracy on southern African precontact remains. All observations were completed twice, first with the original method and then with a modified version. Inter-observations were tested with an observer (O1) lacking experience with teeth, and with a more experienced observer (O2) with teeth. To address the accuracy issues demonstrated through discordant results, the Brabant Index was modified through the creation of a visual guide including both buccal and lingual scores for multicuspid teeth.

Using a weighted Kappa, the original results for intra-observations were 0.94 for quantity and 0.82 for direction, whereas the modified version exhibited 0.97 and 0.99, respectively. For O1, the original results were 0.86 for quantity and 0.25 for direction, the modified version presented results of 0.80 and 0.24, respectively. For the more experienced O2, the original results were 0.87 for quantity and 0.74 for direction, and the modified results were 0.89 and 0.81, respectively. These adjustments greatly improved the accuracy and reliability of scoring with this method for a more experienced observer, while including macrowear direction retains its advantage over other methods.

Overall, some dental experience is advantageous when using the modified method. The reassessment of standardised methods used in current research should be reproduced regularly. These data demonstrate the need for a published visual guide and highlight minor adjustments such as scoring both buccal and lingual sides of multicuspid teeth.

The intersection of food insecurity, gestational diabetes, and mental health conditions: Examining pregnancy from a biocultural perspective

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Pregnancy brings numerous physiological and psychosocial changes, as well as potential health complications. These can include gestational diabetes mellitus (GDM), and mental health conditions. Household food insecurity, or not having access to a diet that meets needs and preferences, may make management of pregnancy complications more challenging. We examined whether food insecurity is associated with a greater prevalence of mental health conditions, or GDM during pregnancy to investigate how food insecurity impacts health and well-being during pregnancy.

The main questions are: (1) Is pregnancy associated with a higher risk of experiencing household food insecurity? (2) Is food insecurity during pregnancy associated with a higher risk of GDM and/or mental health conditions? (3) How does food insecurity impact the management of the above-mentioned issues? (4) What are the experiences of individuals who have had GDM? This study used a mixed methods approach: quantitative analysis of the 2017/2018

Canadian Community Health Survey (CCHS), a survey administered to pregnant people in Hamilton, six focus groups with pregnant people and health and social care workers, and six interviews with pregnant and postpartum people in Hamilton.

We found a syndemic interaction among food insecurity, GDM, and mental health conditions among pregnant CCHS respondents. Those who were food insecure were at least 1.9 times more likely to experience GDM (p=0.001). CCHS participants who identified as having a mood or anxiety disorder were respectively 1.80 (p=0.000) and 1.96 (p=0.000) times more likely to experience food insecurity. The Hamilton survey provided information on environmental barriers. Those who identified time and transportation as barriers to accessing food were 1.97 (p=0.000) and 1.94 (p=0.000) times more likely to experience food insecurity. Focus groups and interviews provided further insights into the complex environments that shape risk for developing and managing one, or more of these conditions during pregnancy.

Assessing the reliability of 3D models in sex assessment of the distal humerus: Does 3D scanning provide the same answers as dry bone?

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The biological profile created by the forensic anthropologist is a key part of identifying unknown humerus remains. Bony elements can be used to generate the biological profile, which consists of ancestry, sex, age and stature. The COVID-19 pandemic has introduced a unique restriction on travel that may necessitate the use of remote methods for forensic anthropology, such as the use of 3D technology. This study tested the reliability of using digital 3D models in place of in-person assessment of dry bone. Two methods of 3D model generation were used, one being a lower cost and easily accessible phone application and the second being an industrial laser scanner. Observers estimated the sex of 10 left distal humeri of unknown sex using visual sex assessment under three conditions, first in-person then on a computer using the two digital models. The shape and depth of olecranon fossa, angle of the medial epicondyle and trochlear constriction and symmetry were all traits used to determine sex. Intraclass correlation and Cronbach's alpha for internal consistency were generated for each observer, using the in-person assessment as a baseline compared to the digital conditions. Both models provided mostly moderate reliability compared to the dry bone, with results varying slightly by trait and more widely by observer. The laser scanner generally provided higher rates of agreement than the phone application. Further research should repeat this methodology with more experienced observers and different methods of 3D model generation.

Using proteomics to estimate sex in an archaeological context: exploring mortality in the historical cemeteries of Notre Dame (1691-1796), Pointe-aux-Trembles (1709-1843) and Sainte-Marie de Beauce (1748-1878)

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In order to better understand the demographic composition of past populations, it is critical to obtain reliable data on both sex and age-at-death. Besides ancient DNA, when sexing an adult skeleton, many methods based on observations or measurements can be useful, although much less are available for immatures as dimorphic traits develop during puberty. Recently, proteomics appeared to be a very reliable approach, as the amelogenin, a protein present in tooth enamel is associated with sex. Our objective was here to test the proteomic method on an

euroquébécois archaeological sample (N=48). Several issues were addressed: i) selection of an appropriate protocol to analyze amelogenin; ii) agreement and/or disagreement of proteomics data with previous osteological ones and/or ancient DNA; iii) proportion of males vs females within each sample in relation to the demographic context.

The dental materials originated from three Saint-Lawrence Valley's historic cemeteries: Notre Dame (1691-1796) (N=10), Pointe-aux-Trembles (1709-1843) (N=15) and Sainte-Marie de Beauce (1748-1878) (N=22). The amelogenin was extracted in a minimally destructive manner, by using acid, it consisted of an abrasion of the crown surface of a molar. The enamel etch, preserved in a liquid solution of acetonitrile (60% v/v) and formic acid (0,1% v/v), was then analyzed with a liquid chromatography mass spectrometer (nanoLC-MS/MS, Université de Québec à Trois Rivières, Institute for Research in Immunology and Cancer of the Université de Montréal). The different chains of peptides that were identified, indicated the probability of an individual being male or female. As the preliminary results already showed a perfect agreement with previous data collected on the skeletons, they confirm their usefulness for bioarchaeology.

Interpretation of sex ratios from pandemic influenza in Cape Breton, Nova Scotia

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Current data for COVID-19 shows illnesses in the province of Nova Scotia have a slightly higher rate in males (androcentric sex ratio = 1.023). The rate of death is significantly higher in females (androcentric sex ratio = 0.824). Without further investigation, one might assume that the disease is slightly favouring making males sicker but killing females more often. However, the living population, from which the sick are drawn, shows an androcentric ratio of 0.84. This suggests then that the death rate is not unusual, but rather the illness rate. Similarly, misleading numbers can emerge from the pandemic flu deaths in 1918-1919 on Cape Breton Island, Nova Scotia. Influenza deaths show a preference towards males (androcentric sex ratio = 1.16) while other respiratory diseases in the same years show a lower preference toward males (androcentric sex ratio = 1.04). However, if one considers two other numbers, the interpretation of these data changes. The ratio among all of the dead, regardless of cause, from those same years also has a higher preference for males (androcentric sex ratio = 1.12). This alone almost makes the flu deaths seem to be more on par for the population on the whole while the other respiratory deaths might actually seem to have a female skew. But the living population from which all of these deaths derive may give the most interesting piece to consider, which is an androcentric sex ratio of 1.04. In other words, the living population already had a male skew that matched the deaths in other respiratory diseases. The ratios for flu and all deaths combined show a further skewness toward males that bears interpretation. This poster will explore the sex ratio differences that are possible to glean from an epidemic and underscore the importance of interpreting them in full context.

Our dangerous unconscious allegiance to the Great Chain of Being

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For centuries, even millennia, life on earth was understood to be organized into a static hierarchy of being, existing today as it did at the time of its creation by a deity. Many of us teach students that this Great Chain of Being was dismissed with the recognition of the operation of natural selection, its static nature and divine creator replaced by a natural mechanism of evolutionary change, and its hierarchy replaced by countless branches as populations adapt to local environments. It is clear, however, that the perception of life as existing on a hierarchy of value, both within and between species, remains quite firmly in place. This is fundamental to the way in which we regard and treat

other species and different human populations. Additionally, and also dangerous, is the difficult-to-avoid treatment of natural selection as an active agent of "positive" change, giving it the qualities of a powerful designer/deity. This contributes directly to the naturalistic fallacy and other errors of reasoning regarding right and wrong. As society is increasingly trying to grapple with our systemic beliefs and practices regarding other species and diversity in human populations, we biological anthropologists could step up our efforts to make ourselves, our students, and the public more aware of these dangerous, often unconscious allegiances to erroneous medieval ideas about life on earth and our place in nature.

Microbial influence on human growth outcomes

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Human-microbial interactions have been shown to alter short-term growth outcomes; however, the impacts of altered microbial interactions in childhood and adulthood growth outcomes are not well established. To examine microbial influences on growth outcomes, this study used antibiotic's capacity to alter microbes' function as a proxy for microbial disruption to compare growth rates and anthropometrics between groups exposed and unexposed to childhood antibiotics. Differences between childhood and adulthood growth outcomes were determined by height and weight measurements at time of birth and ages ten and twenty-five plus years. By using multivariate statistical analysis, two core trends were determined, a negative correlation between antibiotic exposure and adulthood stature, and a positive correlation between childhood and adulthood weights and antibiotic exposure. These trends indicate that microbial disruption, as proxied by childhood antibiotic exposure, influence long-term growth outcomes producing altered anthropometrics during the life course. The establishment of these trends in modern populations allows for the extrapolation of these trends onto the past, which results in an improved understanding of altered growth trends in historical populations.

Age, disability, and status: A case study in the expression of mortuary identity in Pre-Columbian Peru

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Mortuary rituals are complex combinations of an individual's biosocial identity in life and how the survivors choose to express or manipulate that identity in death. We are investigating nonadult identity and experience on Peru's Central Coast (AD 900-1532) and how that identity is expressed in the funerary record. The initial focus is a shift in burial positioning, where the youngest nonadults (age < 5 years) were buried in an extended position, while older nonadults (age > 5 years) and adults were buried in a seated, flexed position.

In examining ethnohistorical literature of the Spanish conquest, we have identified one source, Guaman Poma de Ayala (1615), who identifies life history stages recognized by census documents. He identified a shift at the age of 5 that described the transition from being "useless" to being able to contribute to society. Our hypothesis is that this shift in social roles aligns with the change in burial position, representing the achievement of personhood.

We are including a site called Farfán, an Inca site from Peru's North Coast, as Farfán follows the Central Coast burial positioning pattern, with the exception of an elderly adult female who displays lesions consistent with cerebral palsy with limb contracture. This condition would have compromised her mobility and independence requiring direct support and accommodation from her community. This individual was buried in an extended position, despite being flexed in life. This poster examines this individual's life and death through the lens of the Bioarchaeology of Care and Guaman Poma's census category "sick women of all ages". Women in this category were held in high esteem,

demonstrated here by rich funerary offerings. This burial was among the richest at Farfán. We explore how her disability may have affected her identity, in life and in death.

Reframing dental calculus in bioarchaeology

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Dental calculus is ubiquitous in archaeological skeletal collections that has been used to gain information on past diet, plant use, dental disease, and most recently the oral microbiome. In bioarchaeological research, dental calculus is categorized as a dental pathology when recording information from skeletal material. However, dental calculus is naturally formed in the mouth through the mineralization of dental plaque; it does not directly cause dental disease and is not always present with dental disease. As mineralized plaque, calculus contains the preserved remains of the oral microbiome that once lived on the surface teeth.

This presentation will explore what we have learned about the oral microbiome and dental calculus in recent years and argue why this should be considered when analyzing dental calculus in skeletal material. We present a case study using 42 samples from the medieval site of Tirup, Denmark, to compare the oral microbiome characterized through ancient DNA analysis to dental pathology data. We argue that dental calculus should not be considered a dental pathology as it is not directly causing dental disease, nor is it a reflection of a stress event. The question then lies in where and how should we classify this material?

Our increased understanding of the oral microbiome through the Human Microbiome Project, work from numerous research groups, and metagenomic and proteomic analysis of archaeological dental calculus, has shown that there is great variability in the microbiomes in the body. Specific characteristics have been defined in individuals considered to be in an unhealthy, or ‘diseased’ state; however, much like considerations for differential diagnosis in paleopathology, the whole oral microbiome and bacterial community should be considered in relation to the health status of the individual. This paper will offer some alternatives in hopes of finding a more appropriate classification for dental calculus in bioarchaeological materials.

Dental cortisol, stress and paleopathology: A pilot study

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Stress impacts health and wellbeing through allostatic load, affecting morbidity and mortality. Cortisol, known as ‘the stress hormone’, facilitates the physiological response to stressors, thereby acting as a key pathway to bodily manifestations of adversity. To better understand ‘stress’ in the past, this research tested a new method for accessing cortisol hormone concentrations from archaeological dental tissues. Cortisol has been previously assessed in archaeological hair. However, hair is only rarely preserved in archaeological contexts, whereas teeth represent some of the best-preserved elements of archaeological human remains.

Sixty-nine teeth from 65 individuals from five Roman and Post-Roman sites in France were tested via competitive enzyme-linked immunosorbent assay (ELISA) to assess and quantify the cortisol concentrations present within tooth

dentine and enamel. Relationships between dental cortisol concentrations and skeletal stress markers typically examined in paleopathological analyses were also assessed. These included age-at-death (mortality), dental enamel hypoplasia, periosteal new bone formation, and carious lesions.

In both tooth dentine and enamel, detectable concentrations of cortisol were identified in multiple teeth. However, concentrations were low and not all teeth yielded results that were measurable through cortisol ELISA. Clear patterns or relationships between dental cortisol and skeletal stress markers were not identified in this sample. These results suggest that cortisol is incorporated within tooth structures but requires further investigation. Although still in the early stages of analysis, this research discusses how cortisol could be functioning within the development of skeletal stress indicators, highlighting the complexity of cortisol's many functions within the body. Future analyses should continue to consider how external stressors become embedded biologically and explore cortisol's potential to expand studies of human stress across deep time.

Post-injury training impact on functional recovery and bone strength

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Introduction: Following major trauma, multiple nerves, and their surrounding tissues such as muscles and bones are frequently injured. The slow rate of nerve regeneration often leads to permanent functional impairment. Despite our lab's effort to accelerate nerve regeneration, we have found that full range of motion is never regained, and the associated bones show a reduction of mineralization, making them susceptible to future fractures. To optimize the chances of full recovery, actions targeting the surrounding muscles and bones are needed.

Methods: Rats with foot drop due to common fibular nerve crush were treated with nerve transfer using a branch of the tibial nerve. Half of them were introduced to one-hour treadmill running post surgery. Muscle histology was assessed for reinnervation and phenotypic changes, while micro-computed tomography scans were performed in-vivo and at the post-mortem to quantify mineralization. Weekly gait analyses were performed to assess functional recovery.

Results: Animals treated with exercise had significantly earlier dorsiflexion recovery ($p<0.05$) and restoration of a symmetrical gait was significantly improved ($p<0.01$) In accordance with functional recovery outcomes, the tibialis anterior muscle had significantly greater endplate reinnervation with number of slow-twitch fibres similar to the contralateral muscle, and an increased number of fast-twitch fibres compared to non-exercised animals. Finally, the tibial bone mineral density (BMD) of the affected limb (exercise = 0.24 g/cm3; non-exercised animals = 0.17 g/cm3) was greater among animals treated with exercise (contralateral tibia = 0.31 g/cm3).

Conclusions: The combination of exercise with the nerve transfer enhances functional recovery following injury and has a significant impact on muscular recovery and bone density, unlike our past results where training was not introduced. The combination of these perioperative therapies may be a strategy to significantly and more rapidly improve functional recovery for patients undergoing nerve injury if not immobilized after surgery.

Dispersal and connectivity of an endemic and an invasive rodent in fragmented dry forests of northwestern Madagascar

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Habitat loss and fragmentation are processes of concern to conservation biologists and ecologists worldwide. Animals living in fragmented landscapes potentially have reduced opportunity for dispersal and gene flow between isolated patches of habitat. However, these processes do not affect all organisms equally and thus it is important to study the effects of living in fragmented habitats on different organisms. In this study we examined dispersal and connectivity patterns of rodents, one endemic (Eliurus myoxinus) and one invasive (Rattus rattus), at two sites containing forest fragments and adjacent continuous forest patches in northwestern Madagascar. We generated genomic data for 66 E. myoxinus and 81 R. rattus individuals using RADseq markers. We calculated genetic diversity, inbreeding, and dyadic relatedness values, determined movement patterns with Mantel tests and correlograms, and visualized migration rates with the EEMS program for each species at each site. We found higher levels of inbreeding and lower levels of genetic diversity in E. myoxinus compared with R. rattus. We observed related dyads both within and between habitat patches and positive spatial autocorrelation at lower distance classes for both species, with a stronger pattern of spatial autocorrelation in R. rattus. Across each site we identified areas of higher and lower migration rates for both species, but these did not correspond to habitat-matrix dichotomies. Overall, the lowered genetic diversity despite connectivity in endemic E. myoxinus and the ability of invasive R. rattus to spread throughout the landscape are concerning from a conservation standpoint.

A new method for 3D anisotropy mapping applied to µCT images of the calcaneus in modern and historical specimens of the human foot

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Trabecular bone anisotropy – describing different characteristics in different directions – is a proxy for the long-term loading history of bone. However, trabecular anisotropy varies locally, thus rendering averaged calculations inutile. Here we present anatomic anisotropy mapping using 3D vector fields for normal foot bones, and two examples of abnormally loaded foot bones. Vectors reflect local surface anisotropy: the more locally co-oriented the units of surface are, the larger is the resultant anisotropy vector. 3D anisotropy maps of hundreds of thousands of local anisotropy vectors can be visualized independently by their magnitude or direction. We constructed anisotropy maps using micro-computed tomography of the normal human heel bone (calcaneus) and compared the anisotropy signature with the abnormal loading that occurs in talipes varus (club foot) and talo-calcaneal ankylosis. In normal calcaneus, a pattern of four anisotropy trajectories was consistently identified as dorsal, plantar, Achilles and peroneal bands. Both pathologic specimens deviated from the normal maps. The calcaneus in the congenital condition talipes varus showed very low local anisotropy values and no co-oriented bands. The ankylosed calcaneus

showed generally lower anisotropy than normal calcaneus, but not to the same extent as the club-foot calcaneus. The directionality of co-oriented bands was barely discernable in the ankylosed calcaneus. In conclusion, the anisotropy signature of normal calcaneus – apparent both in terms of magnitude and direction – reflects the loading history attributable to a repetitive and predictable use, with a normal kinematic pattern (walking) which persists throughout life. The loss or alteration of this driving kinematic pattern results in a complete or partial loss of the anisotropy signature. Such anisotropy mapping adds new dimensions to quantitative bioimaging and understanding of skeletal adaptation.

Interglobular dentin explored through correlative tomography in an Inca population from Farfán (Peru)

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The Inca Empire (ca. 1400-1532) created the religious institution of the aqllakuna where "Chosen Women" were selected before puberty to brew and weave in the confinement of their aqllawasi (House of the aqllakuna). Very few aqllawasi have been identified at archaeological sites. Farfán, on the North coast of Peru, is one of them. According to ethnohistorical sources, the aqllakuna were highly regarded by the Incas and therefore are expected to represent an advantaged, homogeneous subset of the population. However, despite this depiction, preliminary bioarchaeological analyses at Farfán suggested the aqllakuna were not different from the rest of the population. Dental analyses can reveal if a different pattern of childhood illness was experienced. A total of 45 teeth from 32 individuals from Farfán were analysed for evidence of disease using two methods. First, non-invasive and non-destructive computed tomography (micro-CT) was performed on all teeth. Second, 15 teeth were selected for comparison with histological analysis. Micro-CT images revealed interglobular dentin (IGD), a developmental defect in dentin associated with vitamin D deficiency, in 75% (n= 9/12) of the aqllakuna and 45% (n=9/20) of the general population (including confirmed and possible cases). The discovery of this defect in Farfán individuals is surprising considering that ample sunlight exposure was possible. This presentation focuses on comparing and mixing the results of micro-CT and histological analyses to explore teeth within the peculiar context of the aqlla institution. This combination of methods through correlative tomography offers a unique perspective on vitamin D deficiency in an Inca population.

Solving the 'Muddle in the Middle' by suppressing poorly defined taxa

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In 2019, we dedicated an entire American Association of Physical Anthropology (AAPA) conference session to defining Homo heidelbergensis. The results of the meeting were: 1) no-one was happy with the taxon; 2) different people assigned a different meaning and a different hypodigm to this taxonomic unit; 3) ignoring this problem will not miraculously lead to a solution and 4) that it was critical to clear up this "muddle in the middle" in order to move the field forward. Here, we propose that H. heidelbergensis should finally be abandoned altogether. and that the western European hominin fossils traditionally assigned to H. heidelbergensis, including the Mauer mandible, should be re-assigned to H. neanderthalensis and considered early Neanderthals.Taxonomic classification has a strong impact on conceptual understanding and the taxonomic practice of reviving old names due to rules of precedence

have played important roles in obfuscating our understanding of the complexity of Middle Pleistocene hominin evolution.

Virtual forensic anthropology labs: Lessons learned

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The necessity to develop and deliver course content, including lab sessions, virtually in the 2020-21 academic year was challenging for staff and students alike. For a class such as Forensic Anthropology, with an emphasis on teaching osteology, the development of virtual lab sessions was complicated by the commonplace notion that the human skeleton cannot be learned without hands-on manipulation. In an attempt to best overcome this issue, various free online software programs, including MeshLab, MeshMixer, BioDigital, and Sketchfab, were used to teach using 3D models of real or cast human and non-human bone. These models were created by scanning specimens from the university collection as opposed to using pre-existing models. This study analyzes feedback collected from students in a third-year Forensic Anthropology course at Lakehead University as well as perspectives from educators to examine the success and outlook of the implemented teaching techniques. A future of continuing to integrate 3D models in teaching seems plausible as this reduces deterioration of specimens while continuing to relay the necessary techniques to learners. These models also provide at-home study aids for students. These methods are not without challenges, however, solutions to some of these have been identified. A major challenge with no clear answer is the ethics of digital archaeology including the use as well as sharing of 3D models. Continued discussion in the area of ethical access and curation is crucial to the success of this field. Overall, it has been found that 3D digital modelling is one way to modify teaching while ensuring high-quality instruction is delivered and rewarding learning occurs, especially in these changing times.

Not all at once: Exploring age-related variation in the appearance and stabilization of sexually dimorphic traits of the subadult pelvis

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Sex estimation using visual methods remains one of the most problematic areas of analyses in juvenile osteology. Current morphological methods of subadult sex estimation have been deemed unreliable due to inconsistent levels of accuracy between studies. One avenue to improve subadult sex estimation methods is to develop an understanding of the age at which sexually dimorphic traits appear and stabilize, and how that may differ between the sexes. The aim of this research was to explore potential age-related variation in the appearance and stabilization of morphological pelvic traits commonly used for adult and subadult sex estimation. Eighteen pelvic traits were examined on a sample of 128 subadult individuals, aged 4 months to 20 years of age, from the Hamann-Todd and Terry collections. The results showed that age-related trends exist in the appearance of sexually dimorphic pelvic traits, where traits either showed a male “default” expression, a female “default” expression, or concurrent sex expressions by birth or by the time fusion of the pelvis begins. Moreover, the average age of trait stabilization varied among the 18 pelvic traits, but generally occurred in the teenage years. The minimum age of stabilization commonly occurred earlier than the average age of stabilization. Further research using other documented skeletal collections with large subadult sample sizes is recommended to determine whether the patterns observed in this research are also observed in other collections.

A late Pleistocene palaeoenvironmental record for Namaqualand, South Africa: Stable isotope analysis and biometrics of ostrich eggshell at Spitzkloof A Rockshelter.

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This study applies stable light isotope analysis (δ18O and δ13C) and an examination of biometric measures on ostrich eggshells spanning Marine Isotope Stages (MIS) 2 and 3 from Spitzkloof A Rockshelter in the semi-arid coastal desert of Namaqualand, South Africa. These data are the first terrestrial palaeoenvironmental proxies from Spitzkloof A, a site with rich archaeological deposits representing time periods that are rare in South Africa yet cover periods of major global climate change. Human occupation of the site occurred in three major pulses with a MIS 3 layer dated to ~52-51 kcal BP; and two MIS 2 layers, one is pre Last Glacial Maximum (LGM) at 23 kcal BP, and one post dating the LGM from 19-17 kcal BP. The results indicate that ostrich diets remain consistently focussed on C3 plants with slightly elevated values in the LGM layers. This can be interpreted as a small contribution of C4/CAM plants due to increased summer rains, or more likely an artefact of pCO2 during glacial periods. The oxygen isotopes and biometric data also signal a generally arid environment through time. Variability in the oxygen isotopes suggest a slight increase in relative humidity through reduced evaporation, after the LGM. Overall, the results suggest similar environmental conditions at Spitzkloof when the site was occupied during the late Pleistocene.

Ancient DNA reveals complex population structure among Late Pleistocene and Holocene African foragers

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Multiple lines of evidence suggest major demographic changes in Late Pleistocene Africa, coinciding with the Middle to Later Stone Age cultural transition ~50,000 years ago (~50 ka). It is difficult to explore these changes using genetic data from present-day Africans because further demographic shifts in the past 5 ka have largely erased more ancient population structures. While ancient DNA (aDNA) holds immense potential for reconstructing deeper demographic histories, its availability from sub-Saharan contexts >5ka is limited. Here, we present genome-wide data for six individuals from the Late Pleistocene and Early Holocene of eastern and south-central Africa—doubling the time depth of sub-Saharan DNA—analysed alongside published aDNA from 28 additional individuals. Their ancestry can be modelled as a geographically structured mixture of three highly divergent source populations, with all individuals harbouring deeply divergent eastern and southern African lineages, plus previously unappreciated central African ancestry, likely reflecting Pleistocene interactions ~80-20 ka. Once established, this structure remained highly stable with limited long-range gene flow, sharply contrasting with patterns observed among contemporaneous European foragers. Our results reveal reduced gene flow among divergent African populations toward the end of the Pleistocene, adding weight to Later Stone Age archaeological evidence for increasing regionalization.

Sample size and accuracy: Estimating the population variance and standard deviation

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Small sample sizes are often used in physical anthropology to estimate population parameters such as the mean, variance, and standard deviation. Determining how well sample estimates represent population parameters is essential for establishing confidence in the inferences made using those samples. Here, we present methods for determining a priori the probability that the sample variance and sample standard deviation are within a specified fraction of the population parameters, based on Cochran's theorem. We validate these methods using random resampling with replacement of a single variable from a commonly used large craniometric data set comprising modern human population samples from around the world. Our results indicate that large random samples comprising hundreds of observations, rather than tens of observations, are needed to be confident that the sample estimate is a reasonably accurate approximation of the true population variance. Smaller sample sizes on the order of tens of observations, however, are sufficient for estimating the population standard deviation. Our findings based on Cochran's theorem are validated by random resampling with replacement.

Linking contemporary health and evolutionary history: Maternal subjective social status and mental and physical health among maternal-child dyads in urban Tanzania.

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The divergence of contemporary, stratified, human societies from the egalitarian societies that characterized 95% of human history may explain some extant health disparities. Indeed, in today's hierarchical societies, individuals' perception of their own social status, known as subjective social status (SSS), have been positively associated with physical and mental health outcomes in affluent nations. This association has received almost no attention, however, in low-and-middle income countries. To address this gap in the literature, we explore the relationship between maternal SSS and both maternal physical and mental health and child physical health in an urban region of Tanzania. Specifically, we hypothesize that a mother's SSS will be positively associated with her physical and mental health and the physical health of her child. Among 148 maternal-child dyads, we measured SSS with the MacArthur SSS scale, maternal mental health with the Hopkins Symptom Checklist-25, and physical health via an allostatic load index, incorporating anthropometric measures and C-reactive protein (CRP) for mothers and anthropometric measures, CRP, and transferrin receptors for children. We calculated allostatic load using principal components analysis and calculated bivariate linear regressions of SSS and health outcomes. There was a significant, positive association between maternal SSS and maternal mental health ($p = 0.001$), while the relationships between maternal SSS and maternal physical health ($p = 0.229$) and child physical health ($p = 0.799$) were nonsignificant. For this sample, we consequently find support for the hypothesis that maternal SSS is positively associated with maternal mental health but fail to support the hypotheses that SSS is associated with maternal or child physical health. Taken together, our findings suggest a link between social inequality and mental health while illustrating the need for further consideration of context-specific dimensions that may mediate the relationship between SSS and health outcomes.

Reconstructing life histories of the individuals buried in the rock-cut cave church of St. Georges in Gurat, France

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In the 1960s and 1970s eighteen individuals were excavated from the monastic cave church of St. Georges, located in Gurat, France, and dated to the Middle Ages (1001-1300AD). This research represents the first reconstruction of osteobigraphies for these individuals, including estimations of sex, age-at-death, and an in-depth examination of pathology and trauma. Special attention is given to severe to life threatening fractures some individuals suffered and other pathological conditions that provide information about the lives and circumstances that led to their burial at Gurat. These fractures include a C2 fracture and a fracture of the calcaneus on the same individual, a pelvic fracture, and multiple rib fractures. The trauma present on these individuals has been well-healed, indicating a high level of care. Many of the individuals also exhibit signs of pathology, such as extensive dental abscesses, periostitis of the tibiae, periostitis of the interior ribs, and early fusion of the parietals which has produced a bulbous occipital in one individual. While the exact identity of each of these individuals is unclear, the kinds of trauma and pathology present suggest that the site may hold individuals who lived as monks at St. Georges, and/or those who arrived as pilgrims seeking care. There is very little published bioarchaeological research on remains from French monastic churches of this period, thus this research represents a valuable first step toward better understanding the experiences of care sought out at these centres.

‘Diagnosing the Canvas’: A preliminary review of the growing trend in identifying disease in paintings and its indifference to palaeopathology

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The incorporation of clinical data in differential diagnosis has always been a hallmark of palaeopathology. However, this relationship may be one-sided as clinicians do not often confer with palaeopathological research when considering disease in the past. This is exemplified by a growing interest amongst clinicians sometimes referred to as ‘diagnosing the canvas’, a practice whereby pathological conditions are identified in works of art. What originated as an exercise in minute, clinical observation eventually became published diagnoses in peer-reviewed medical journals. This gave their conclusions an artificial credence that rested solely on the observation of a non-photographic image, usually without any other form of testing or contextual data. Through a palaeopathological perspective, we reviewed twenty-eight clinical publications that diagnosed pathological conditions from 38 paintings. Our preliminary findings showed diagnoses of external conditions, such as skin disorders, as well as internal conditions, including blood disorders and cancers. In some of these publications, ‘diagnosing the canvas’ was presented as a parallel or form of palaeopathology, as both focus on identifying disease processes in non-living humans. However, there has been little to no conferral between palaeopathology and ‘diagnosing the canvas’, making this comparison problematic. While palaeopathology compiles a differential diagnosis utilising a combination of clinical and anthropological data, ‘diagnosing the canvas’ is based solely on a passive, visual observation of a single, two-dimensional image, in a highly subjective medium. Moreover, the certainty in which ‘diagnosing the canvas’ is presented may lead to the assumption that its findings are based on more robust methodologies and expert knowledge than palaeopathological research. Our study aims to identify the problems with this popular diversion among clinicians, stimulate more dynamic interactions between clinicians and

paleopathologists, and encourage the critique of these diagnoses to promote more rigorous study of diseases in the past.

Working towards a non-binary approach for sex estimation in forensic anthropology

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In forensic anthropology, a successful identification is one that respects the identity of the deceased while providing information that may facilitate the procedure. Transgender individuals are disproportionately the victims of violence and their identification should be appropriately researched. In this paper, we present a theoretical framework for developing methods to assist in the identification of transgender individuals.

The term "transgender" includes a variety of individuals in which sex assigned at birth does not align with gender identity. Gender is framed socially at different times and places, it may be fluid for an individual, and it is connected to personal experiences related to race, ethnicity, class, sexuality, etc. Sex should also be considered a construction, based on biological criteria instead. The number of sexes will vary with the criteria used to define them. Both gender and sex constitute separated facets of personal identity, and both are better understood to be expressed on a spectrum. Historically, there has been a predisposition to group individuals into binary gender and/or sex, accompanied by erasure and disinterest of those falling outside such scope. As a result of this narrow approach, our understanding of variation has been hindered in forensic anthropology. A deeper understanding of human variation will produce more suitable methods that work reliably in death investigations. This more progressive approach to discussing sex and gender will also help the living to overcome transphobia and other structural barriers.

Following a critical review of how sex and gender have been used in forensic anthropology, we propose some suggestions for moving forward. A non-binary probabilistic approach to sex estimation can be used in conjunction with other evidence, including a range of gender-affirming interventions visible on skeletal remains, to achieve the goal of individual identification.

Effects of the COVID-19 pandemic on mothers' support networks, work patterns and mental health in the UK and the USA

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The lockdowns and restrictions imposed by governments as responses to COVID-19 have impacted social networks and limited social support. For example, there is evidence that mothers have disproportionately taken on additional childcare and domestic work during the pandemic, during the closure of schools and childcare facilities. This increased burden of care has consequences for women's socio-economic status and health. Using survey data collected in August 2020 from 1528 UK and US mothers with at least one child under 5 years of age, we describe shifts in maternal childcare and social support networks during the pandemic and examine links between these shifts and mothers' paid work and self-reported mental health. Mothers reported receiving less help with childcare than prior to the pandemic (44%). Most mothers reduced in-person contact with their social network (77%), but

somewhat fewer of them increased contact through virtual means (55%). Women who reported receiving less childcare help from both unpaid and paid sources had greater odds of reducing their participation in paid work. Women who experienced an increase in the need for childcare were more likely to report poor mental health, although changes in the receipt of childcare help were not related to mental health. In the UK, women who reported increased in-person contact with their social network had increased odds of reporting poor mental health. Overall, women experienced a nuclearization of their support networks, wherein childcare came increasingly from co-resident individuals such as fathers and siblings, and social connections with close kin were more likely to be strengthened than those with more distant kin and non-kin. These patterns were stronger in the UK, where pandemic control measures were stronger through the spring and summer of 2020. Our findings have implications for policy makers seeking to support children and their parents in a continuing pandemic.

Monkey Business: Wildlife sanctuaries as sites of sustainable primate tourism in Costa Rica

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Primate tourism is a global phenomenon and the demand for ethical encounters tracks this growth. Research increasingly shows, however, that the tourism industry has largely detrimental effects on the welfare and conservation of involved species. There is mounting public awareness around the ethical issues underlying primate tourism, and a rising demand for mutually safe encounters and sustainable operations. My transdisciplinary research posits that sustainable wildlife tourism must consider animal welfare and conservation outcomes to count as sustainable– to which I have created a transdisciplinary assessment framework to assess animal sanctuary sustainability. I have applied this framework to Neotropical primate sanctuary tourism in Costa Rica in the form of a preliminary case study of three sanctuary sites in different conservation areas and provinces. My findings reveal positive welfare outcomes for all sanctuary monkeys, as well as positive impacts both directly (rehabilitation and release) and indirectly (tourist education, local community engagement) on the conservation of monkeys at Costa Rican sanctuaries. As such, Costa Rican sanctuaries have potential as sites of sustainable primate tourism and may, in turn, serve as baseline sites for future research.

The effects of feeding competition, infanticide, predation and mating pressures on behavioral indicators of stress in female *Colobus vellerosus*

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Self-directed behaviors (SDB) such as self-grooming, scratching, and yawning can be indirect stress indicators in mammals. Understanding whether a behavior associated to stress co-occurs with social or ecological stressors ("stressors") should help in allowing us to identify the elements of group life that cause more stress for females. To understand which pressures of group-living may lead to stress in female *Colobus vellerosus* at Boabeng-Fiema Monkey Sanctuary (BFMS), Ghana, we investigated whether SDBs varied according to: H1) Feeding competition, which may increase in intensity with the number of conspecifics competing for the same nutritional resources; H2) Infanticide risk, which increases with the number of adult males because male dominance relationships are often contested in multi-male groups in this population; H3) Predation pressure, which may increase with fewer total

individuals, if this reduces predator detection; and H4) Mating pressure, which increases when females are in estrus and engage in copulations, and may lead to males being aggressive and coercive toward females. We collected data on scratching, self-grooming and yawning from 64 adult females at BFMS from 2004 to 2019. We compared female monthly SDB rates according to group size, the interaction between number of males and whether a male group takeover occurred, and presence of female sexual behaviors. While self-grooming and yawning did not vary significantly with our predictor variables, females scratched themselves more during months in which more males were present and/or a takeover occurred (Generalized Estimating Equations: $P < 0.01$), as well as when more sexual behaviors occurred ($P < 0.01$). Our results support the infanticide risk and mating pressure hypotheses and suggest that the reproductive strategies of adult males best explain female stress. This provides further evidence that infanticide pressure, already known to influence group composition and offspring development in *C. vellerosus*, affects female behaviors and their stress response.

Slumber in numbers: Impacts of social hierarchies on sleep in terrestrial mammals

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Sleep is ubiquitous across the Animal Kingdom, yet expression in sleep behavior varies widely across animals. Moreover, there is evidence from many species that sleep phenotypes vary widely across populations and individuals, and even in the same individual over time. Much of our scientific knowledge of sleep processes has been acquired under lab conditions, but there has been a recent push to investigate sleep in the environments in which it evolved. Most of this focus has been on physical aspects of the environment, such as light and temperature, as well as predation risk. Though in many species, sleep occurs and evolved in a social context, and thus social factors, like status, are important to consider. Social status within a group may predict when an animal sleeps, where they sleep, who they sleep with, and how they sleep. Access to high-quality sleep is a valuable yet often overlooked resource that is impacted by the social environment. Here, we provide evidence across mammals of social status driving sleep architecture and quality through (1) access to high-quality sleeping sites and (2) changes in physiology. While much research has focused on how dominance hierarchies impact access to resources like food and mating opportunities, differential access to sleeping opportunities has been largely ignored despite its potential fitness consequences. We conclude with suggestions for future research directions.

We are all in this together – leveraging Anthropology and One Health to solve a humanitarian and conservation crisis in Madagascar

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Humans and non-human primates (NHP) co-exist throughout the entire geographic range of all NHP species. As the world enters its sixth mass extinction, NHP and especially lemurs are some of the most endangered groups of animals in the world. NHP are increasingly endangered because of anthropogenic habitat loss and fragmentation, extraction for pet trade, increased prevalence of disease, and changes to habitat because of anthropogenic climate change. Humans have always been agents of change in ecosystems and have had positive, negative, and neutral effects on biodiversity and ecosystem function. Thus, understanding how NHP respond to humans and how to reduce the impact humans have on the habitats they share with NHP requires a holistic approach such as One Health. The

One Health approach considers the inextricable link between human, animal and plant, and environmental health. While much of One Health research has focused on human health outcomes there is an opportunity for research to consider animal and plant as well as environmental health outcomes. Anthropology is singularly suited to engage in a One Health approach as its breadth allows for research that considers health outcomes of humans, NHP, and the habitats they share. Merging Anthropology with One Health can provide a greater understanding of how NHP are impacted by people but also aid in providing solutions to conservation issues NHP are facing. Madagascar presents a unique situation to leverage an interdisciplinary approach to studying and solving two linked crises, a humanitarian and conservation crisis, facing people and lemurs respectively. Madagascar has been separated from Asian and Africa for 90 and 160 MY respectively, humans only arrived recently and did not co-evolve with lemurs and thus were not exposed to the same pathogens, lemurs are highly endangered, humans are facing high levels of food, health, and income insecurity, and lemurs and people co-inhabit the same landscapes. I will investigate how NHP research can leverage the other sub-disciplines of Anthropology within a One Health research program to understand how humans have impacted lemurs and the solutions to solving both a conservation and humanitarian crises affecting lemurs and people.

Life history theory and short-term physiological and cognitive trade-offs under conditions of energy deficit: Implications for understanding human resilience and adaptation

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Resilience is the capacity to recover from difficulties, and through a relationship to reproduction and survivorship, it plays an important role in natural selection. Physiological and cognitive plasticity are components of resilience and key characteristics of our species that play a vital role in human adaptability. In this context, biological anthropology provides unique opportunities to study human resilience. Life History Theory provides a helpful theoretical framework, in that it suggests that energetic resources available to the body are finite and constrained by alimentary limits of digestion which must be variably deployed to different physiological functions to maximize survivorship in response to physiological stress. Here we provide preliminary results of a study of ultra-endurance athletes to investigate physiological trade-offs that occur in response to high energy expenditure related to physical activity, and a sustained negative energy balance. The results demonstrate that these energetic conditions lead to a reduction in testosterone production and reproductive drive, but increases in serum measures of immune function. These results highlight that internal endocrinological systems are controlled to prioritize immediate short-term survival as a component of human resilience. We have recently applied the same Life History model measures of standardized cognitive performance in conditions of chronic energy deficit. The results demonstrate acute trade-offs in cognitive performance, with decreases in episodic memory associated with increases in spatial working memory. These results demonstrate that upregulation of cognitive processes associated with survivorship work in tandem with underlying physiological trade-offs to promote human resilience, and they likely played important roles in human adaptation and evolution.

Shape variation in the growing non-adult tibia

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The degree of diaphyseal curvature in the human tibia has been shown to significantly correlate with activity levels in archaeological populations. Specifically, tibial anteroposterior curvature is greatest in physically active populations and decreases in less active sedentary populations. Recent research has shown that the tibial anterior crest's sigmoid curvature increases as diaphyseal anteroposterior curvature decreases. Tibial curvature is theorized to be the product of developmental plasticity during non-adult growth. This hypothesis was tested with geometric morphometrics to determine if the non-adult anterior crest demonstrates age-related shape variation, and if a consistent pattern of shape change is identifiable with dental age. A cross-sectional sample of non-adults (n = 41) from four archeological populations was analyzed. A second cross-sectional sample of adults (n = 24) from the four populations was included as an endpoint in a maturation analysis of crest size and shape, and to determine if sexual dimorphism was present in the adult anterior crest. Age estimates were calculated from dental age atlases. A portion of the anterior crest was traced between 70-40% of tibial diaphyseal length. Twelve sliding 3D semi-landmarks were derived from these traces to capture the shape and outline of the anterior crest. Statistical tests of age (dental age) and size (Csize) were conducted on the semi-landmark data to determine the possible presence of growth-related shape variation. Age had a non-significant correlation with non-adult anterior crest shape variation. Age and size were significantly correlated. No significant differences were detected between adult male and female anterior crests. Non-adult shape maturation continued into adulthood as size maturation levelled off during adolescence. The results show that non-adult anterior crest shape variation was not significantly correlated with dental age, despite shape maturation continuing into adulthood. This suggests that non-adult anterior crest shape variation may be influenced by other factors of developmental plasticity.

Isotopes of the Caribbean: An investigation of pretreatment and human paleodiet at the Escape Site (AD 300 - 1000), Saint Vincent, Lesser Antilles

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This research presents the first stable isotope analysis (δ^{13}CCOL and δ^{15}N) of diet at the Escape Site (AD 300 - 1000) from Saint Vincent in the Lesser Antilles using 29 human long bone samples representing 27 unique individuals. As a two-pronged investigation, this work had two primary objectives: (1) determining the best collagen isolation protocol for poorly preserved bone specimens and (2) establishing paleodiet at the Escape Site. By altering bone fraction size and demineralization duration, the useable specimens were effectively doubled from established protocols with collagen yields notably increasing. Despite this, it is not clear that the overall quality of collagen improved with procedural modifications. Ultimately, only 15 specimens had sufficiently preserved collagen that could be used for paleodiet producing a mean δ^{13}C and δ^{15}N of – 17.03 ± 1.23 ‰ and + 11.46 ± 1.31 ‰ respectively. These results are limited by the absence of critical contextual data concerning biological sex and age, however, when comparing carbon and nitrogen isotope ratios by individual there are two distinct non-overlapping groups. Interestingly, the two groupings are consistent with different island environments with one cluster broadly aligning with St Thomas, St Lucia, Grenada, Guadeloupe and Cuba while the other only overlaps with Puerto Rico. This could suggest that the sample set of individuals analyzed represents populations of different origins or perhaps different time periods. Due to the lack of archaeological evidence currently, this hypothesis cannot be fully evaluated at this time. Regardless of individual groupings, the isotope data at this point suggests a broad subsistence pattern incorporating both terrestrial and marine resources, which was not expected given the vibrant reef systems and

prolific marine life in the area. Likely, given the lush soils on Saint Vincent due to the Soufrière volcano, early Saladoid populations were better able to substantiate their diet with terrestrial cultigens.

Keratin, collagen, and dentine, Oh My! A preliminary isotopic analysis of three tissue types at the 18th century fortress of Louisbourg, NS

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Through the sampling of multiple tissue types that form during different periods of life (e.g., hair, bone, teeth) it is possible to explore changes in isotopic signatures throughout the life course. Here we present a preliminary isotopic investigation (stable δ13C and δ15N) of seven individuals from the 18th century Fortress of Louisbourg, Nova Scotia – selected based on preservation of bone, hair, and teeth. Bone collagen and hair keratin were isolated from all seven individuals, and dentine collagen (M3) for three of the individuals. Additionally, hair keratin was sequentially sampled from one individual and the dentine collagen from all three individuals. The three different tissues sampled represent different time periods of the individual's life course. The third molar begins to form during early to late adolescence and finishes in early adulthood. The bone collagen represents an average of the proteinaceous portion of the diet over roughly the last decade of life. Finally, the isolated keratin from hair can represent the last month to years of life (depending on hair length, where ~1cm = 1month). The δ13C, δ15N values and isotopic range from the different tissues, both inter- and intra-individually, indicates a variable diet throughout the life-history of these individuals, as well as between them. Because access to food resources was similar between those living in the colonies and Europe during this period, it is likely these dietary differences reflect different geographic origins rather than stratified dietary practices at Louisbourg. Despite its French origins and periods of English occupation, the Louisbourg population was diverse with many migrating to the fortress for work as soldiers, fishermen, and general labourers; therefore, these result support the historical understanding of who was living and dying at the fortress while also providing a more nuanced understanding of the individual life course and dietary changes related to migration.

Tight quarters: Ranging and feeding competition in a Rwenzori colobus multi-level society occupying a fragmented habitat

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Multi-level societies are widespread across the animal kingdom and we are just beginning to understand many of them at a time with increasing anthropogenic pressures. Determining how animals respond to habitat restriction is vital to species conservation, but to our knowledge, how multi-level societies adapt to forest fragmentation is unknown. We followed 12 core units of Rwenzori Angolan colobus monkeys (*Colobus angolensis ruwenzorii*) within one band in a 280 ha forest fragment at Nabugabo, Uganda (n=139 colobus). We analyzed GPS points collected over two-years and scan samples collected over 10-months to compare sex- and core unit-specific activity budgets and near-neighbour distances. We found that the 95% home range size estimate of this band was 1.75 km2, many times smaller than the ranges of similar-sized bands of primate multi-level societies in continuous habitats. The colobus rarely utilized the matrix and core units' home ranges overlapped by 93%. Indicators of scramble competition included more time spent feeding in larger core units, near-neighbours at greater distances when feeding relative to resting, and greater feeding for females compared to males. A quadratic relationship was found between

core unit size and home range size, core area size, and day range length. Intermediate-sized units showed the least movement and energetic costs (i.e., indicating a "Goldilocks effect" and an ideal core unit size). While large core units appear to suffer greater scramble competition, small units may be displaced more often in inter-unit contests within this constricted area.

The 1918/19 influenza experience in the Fort George area

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As the current COVID-19 pandemic has surpassed a year, the variation in disease experience has become apparent. One such example is the strikingly high rates of infection and mortality in rural and/or isolated communities. During the last 'Great pandemic,' from over 100 years ago, similar patterns in elevated rates of influenza in rural and isolated communities have been observed, especially on island populations.

One isolated Canadian community was the Fort George are of northern British Columbia. To date this population has only been explored via the context of newspaper reports and oral histories. The Fort George area was a cosmopolitan population. Numerous inhabitants of Prince George were male immigrant labourers; many were involved in building the Grand Trunk Railway or employed in the local sawmill industry. Using funeral records, police records, and local newspaper accounts, we hypothesized that influenza death experience would not follow age and sex patterns observed in in major cities located in the northern hemisphere. In particular, the deaths would be male dominated primarily among those in their reproductive prime.

The 1918/19 influenza death rate was 8.36 per 1000 living, and although more than half of the deaths were male, the death rates among females was still considerable at 8.01 per 1000 living. Further, the age distribution displayed a classic "W," and surprisingly a large portion of these death were in children under 5 years of age. The fact that influenza first appeared in the northern region of the province in September, and did not appear in Vancouver until October, means the disease most likely spread in a southward fashion. Further, we found that elevated rates of 1918 influenza First nations communities were a result of a syndemic with tuberculosis. The influenza experience of the blue-collared population of migrants was similar to many other Canadian cities.

Feeding efficiency and disability in a provision-fed group of Japanese macaques

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Manual dexterity is a central component of many primate behaviours, including foraging. For animals with manual impairments, survival can require behavioural adjustments. The capacity for such behavioural plasticity is not uniform among species, and measuring behavioural plasticity can inform our understanding of the influence of disability on our closest relatives. A group of Japanese macaques (*Macaca fuscata*) on Awaji Island, Japan, provides a unique opportunity to examine behavioural plasticity and disability-associated behaviours in a free-ranging nonhuman primate species. Since the 1960s, about 16% of infants have been born with malformations of the limbs and digits. These physical impairments range from the absence of a digit to extensive effects on all four limbs. In this study we quantified details of a specific feeding task – picking up and eating provisioned grains – to measure feeding efficiency and assess compensatory behaviours. We used 30-second focal animal videos of the feeding behaviour of

11 disabled adult females and 12 nondisabled controls. We analyzed our data using linear mixed effects models and found that monkeys with manual impairments compensated for their disabilities by using individually appropriate feeding styles, and obtaining more grains per feeding gesture, compared to nondisabled monkeys. We discuss these results in relation to previous research findings that have shown that behavioural plasticity often allows disabled monkeys to compensate well for their physical impairments by adjusting the type and duration of behaviours to suit their individual physical circumstances.

Root form as a dietary biomarker: Investigating archaeological mechanisms with a mouse model

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Variation in tooth root form arises from various intrinsic and extrinsic causes. Root form may be a useful biomarker for diet: e.g., roots vary between species with different dietary niches, and during tooth development diet can alter root form. While diet texture and vitamin D content both alter cell activity in tooth and surrounding bone during their formation, how vitamin D and diet texture affect root size remains unclear. We can observe root variation in archaeological humans, but have limited capacity to test for the underlying causes. Using a mouse model of human molar formation, we quantified the influence of diet on root size. We hypothesized that a soft, vitamin D deficient diet would result in smaller third molar (M3) roots, the part of the tooth that developed in mice during our experiment. At 3 postnatal weeks, C57BL/6J pups were weaned and raised to adulthood on a soft or hard diet with vitamin D (n=40; n=48), or a soft diet without vitamin D (n=39). Post-sacrifice, mouse heads were scanned with a Skyscan1172 micro-CT system. 3D scan files were rendered in Amira, where we measured the M3 buccolingual and mesiodistal root widths, and total tooth length (root apex to cusp tip). We used One-Way ANOVA and post-hoc analyses in SPSS to test for between-group differences ($p < 0.05$). Compared to mice fed the hard vitamin-D deficient diet, mice fed the soft vitamin D-deficient diet had buccolingually wider M3 roots ($p=0.015$). These results indicate that vitamin D influences molar root morphology, and that root form is a promising bioindicator of diet chemical composition. Animal models allow us to directly test the influence of potential biomarkers on tooth development, enriching our understanding of how the environment influenced archaeological human dentitions.

Engaging students in biological anthropology and archaeology

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The political shift to “performance-based” education in post-secondary education has left many disciplines, like anthropology, to defend their relevance in the current job market. This struggle begins with student enrolment and retention in core introductory anthropology courses. Our team collected data using self-report pre- and post-course surveys distributed to students taking a large core introductory course in biological anthropology and archaeology (ANT101H) over three academic sessions from 2019-2021 at the University of Toronto Mississauga. The surveys covered both in-person and online iterations of the course due to the COVID-19 pandemic. Student demographics were relatively stable for both iterations with most students in their first undergraduate year with limited knowledge about anthropology. Post-course surveys revealed subject matter preference for primatology as a specialization within biological anthropology at course end, and overwhelming preference for active learning engagement (online and in-person) in weekly practical group exercises. The surveys revealed differences between in-person and online

student interests in course material, and preference for online over in-person tests but valued in-person over online collaboration on a problem-based learning project. We also present data demonstrating how group collaboration in the Virtual Mystery Project helped students apply and appreciate the practical nature of the field.

Personality assessments in two wild populations of vervet monkeys (*Chlorocebus pygerythrus*)

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Research into animal personality has been of growing interest in the past two decades. One valuable tool that has been used to examine personality in non-human primates is the Hominoid Personality Questionnaire (HPQ), which is comprised of a list of 54 distinct personality traits. We evaluate the validity of the HPQ in wild vervet monkeys and examine variation within and between a protected population at Lewa-Borana Conservancy in Kenya and an unprotected one along the shores of Lake Nabugabo in Uganda. Two field assistants used the HPQ to rate adults, subadults, and juveniles from two habituated groups of vervets (N=27) at Lewa and 63 individuals from three habituated groups (N=63) at Nabugabo. Intra-class correlations (ICC(3,k)) indicate that 48 and 44 of 54 personality traits evaluated at Lewa and Nabugabo, respectively, are suitable for consideration. However, inter-rater reliability was higher for a greater number of traits at Lewa than at Nabugabo; inter-rater reliability at Lewa ranged from poor (0-0.4; N = 15), fair (0.4-0.59; N = 7), good (0.60-0.74N = 8), and excellent (0.75-1.00; N = 18), while at Nabugabo, they ranged from poor (0-0.4; N = 30), fair (0.4-0.59; N = 8), good (0.60-0.74; N = 5), and excellent (0.75-1.00; N = 1). Principal components analysis indicates that the traits cluster along three components at Lewa and four at Nabugabo (three at both sites combined). We will also evaluate if/how these components reflect overall behaviour by examining differences in dominance rank, sociality, and overall activity. In recent years, some personality research has shifted to explore how personality profiles can assist in conservation efforts through identification of potentially problematic individuals or through reflection of population genetic diversity. Our research will support this work by exploring how personality varies in different habitats.

Patterns of morphological integration and evolvability in the pectoral girdle of Homo and Pan

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Skeletal variation among primates has been shaped by a complex interaction of evolutionary processes. Historically, studies of postcranial skeletal variability make comparisons of traits of single bones and assume an independence of the traits and associated skeletal members. Although a growing number of studies include traits of homologous anatomical, functional, and developmental modules measuring variance-covariance matrices to evaluate morphological integration, these have been applied only sparingly to the pectoral girdle. Employing these techniques to evaluate pectoral girdle variability across living clades can provide a way to tease apart competing hypotheses regarding the microevolutionary processes likely to have been at play in the past, providing a strategy where we lack sufficient fossil evidence.

In this context, this study employs distance matrices of traditional landmarks of humeri and scapulae to evaluate integration and evolvability indices of the anatomical modules as well as functional modules of Homo sapiens and Pan troglodytes. Following the methodology of previous research, results are then compared to an integration

analysis of *Macaca fascicularis*, adding a pronograde locomotor pattern to the database of the two orthograde locomotor repertoires.

Supportive of other research this study found all modules of the pectoral girdle in Pan had lower levels of morphological integration than in Macaca. Contrary to previous research on hominoids, the modules of Homo were found to have higher levels of morphological integration than those of Pan. Conditional evolvability indices were found to be higher in Pan in three of the four modules indicating greater evolvability while under stabilizing selection. Evolutionary flexibility indices were consistently higher across all modules in Pan indicating more variance available for selective pressures than in Homo. These findings challenge results from previous integration studies among hominoids.

Short-term seasonal lead (Pb) intake revealed by dentine bands in synchrotron-based x-ray fluorescence (XRF) images of archaeological Dutch teeth

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Lead intake impairs health, especially in infants and children. Lead has been widely researched in archaeological human remains using reliable methods to differentiate biogenic from diagenetic uptake. Archaeological dental enamel has been widely shown as a reliable chronicle of biogenic lead, however, less is known about tooth dentine. This research uses synchrotron-based x-ray fluorescence mapping of element concentrations in modern and archaeological teeth to explore the presence, timing, and duration of lead intake recorded in dentine. None of the modern teeth (n=4) have discernable lead deposits. The dentine from all archaeological deciduous (n=3) and permanent (n=8) teeth contains prominent discrete bands of higher lead deposits that follow growth lines thus indicating biogenic uptake. The archaeological individuals come from the 19th century Dutch village of Beemster. Once under water, this area was raised by using manure and lead-contaminated refuse from urban centres. Lead could have been ingested from food or water from contaminated soils. Lead bands are less common in prenatal dentine, but their presence demonstrates its occasional passage from mother to fetus. Histological analysis of growth lines permits calculation of the duration of higher lead deposition. Most lead bands formed over the period of a few weeks. All permanent teeth exhibit seasonal variation in lead uptake. Eight archivally identified individuals with a known date of birth reveal the seasons most associated with lead bands are winter and summer. The existence of short-term seasonal episodes of increased lead is proposed to be predominately related to (a) increased time spent inside smoky houses with lead-filled ash in winter, and (b) skeletal mobilization of lead during periods of weight loss because of gastrointestinal illnesses common in summer. This method details patterns of short-term seasonal variation in hazardous lead intake as recorded in the dentine of archaeological nonadults.

Pathology or expected morphology? Investigating patterns of cortical porosity during infancy

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Increased bone porosity during infancy has been suggested as an indicator of developmental stress and growth disruption. Measures of growth disruption are important for interpreting childhood health in the past. To assess cortical porosity as an indicator of infantile growth disruption, this study examines the relationship between femoral midshaft porosity and growth faltering using femoral lengths (FL) and body mass (BM) estimates. A sample of 45

infant (fetal-2.99 yrs) femora from the 10th-13th century St. Étienne cemetery, France was evaluated. Histological sections were prepared and imaged using light microscopy. Pore volume was calculated using BoneJ and BM was estimated using femoral metaphyseal breadth measurements and polar second moments of area. FL and BM z-scores were created using the means and standard deviations (SDs) from the Denver Growth Study. Infants below -2 SDs for body size variables were considered small, while individuals who met body size expectations were considered average. No statistically significant differences ($p>0.05$) in porosity were observed between average and small individuals for either growth variable. However, increased porosity was significantly ($p<0.05$) associated with age, being almost exclusively present in individuals aged 6-months to 1.49 yrs. Infants typically begin engaging in regular femoral loading through behaviours such as sitting and hand-and-knees crawling at 6 months of age. Therefore, the increase in porosity recorded is interpreted as resulting from the reorganization and redistribution of cortical bone, stimulated by increased growth velocity and the onset of weight-bearing activities. The later reduction in porosity (after 1.49 yrs) may indicate that infants are approaching some sort of homeostasis as their femora adapt to consistent loading. This study, therefore, contributes to the literature by providing evidence for a pattern of transient midshaft porosity during infancy. Understanding what expected infant development looks like is necessary for recognizing pathological bone when conducting paleopathological and bioarchaeological studies.

From rickets to gout: An osteobiography exploring the paleopathological experiences of a 19th century individual from St. Martin's Church, Birmingham, UK

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The St. Martin's Church, Birmingham, UK site excavation occurred in 2001, with most of the 857 burials recovered dating to the end of the Industrial Revolution in England (1760-1840). Burials came from earth-cut graves, brick-lined graves, and family vaults. This osteobiography offers a life narrative on individual HB 792 exhumed from Vault 30, a known individual from a family vault of high status. Recent developments in paleopathology facilitate considering skeletal plasticity and a life course approach, and data available for the individual has been re-evaluated using an osteobiography. The site report and associated photographic archive were used to evaluate the pathology present on Campbell Lloyd Haines who died in 1878 at age 42. A biological profile and a biocultural analysis were undertaken to investigate the lived experiences of the individual. Campbell Lloyd Haines displayed multiple lesions indicating childhood stress, traumatic events linked to varied adult experiences and potentially development of conditions linked to the metabolic syndrome gout towards the end of life. The evidence suggests that the pathological experiences throughout the individual's lifespan were affected by differential factors. As the individual had a wealthy upbringing, the early pathological experiences were likely affected by factors related to location and industrialization whereas the individual's higher socioeconomic status likely played a significant role in their later pathological experiences. The evidence proposes that pathology is affected by lived experiences interacting with individual identity and that socioeconomic status can be a prominent factor in impacting health. Potential limitations of the evidence include disease diagnosis being limited by working from previously obtained photographs and unknown biocultural factors operating at an individual level. This osteobiography offers a unique opportunity to evaluate how the use of developed theoretical approaches when interpreting evidence can be used to demonstrate the involvement of locational, cultural, and socioeconomic factors in paleopathological experiences.

Examining the use of EDTA for humic extraction of ancient bone

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We examined the efficacy of ethylenediaminetetraacetic acid (EDTA) for removing humic contaminants in ancient bone collagen samples. Humic contaminants must be removed to obtain a reliable isotopic and elemental signature from ancient bone collagen, given that humic acids have consistently lower δ13 C values than collagen. The purpose of our research was to examine if EDTA treatment could effectively remove humic contaminants from bone collagen and thus could be used as an alternative to the commonly implemented sodium hydroxide (NaOH) treatment, which can be associated with large collagen losses in poorly preserved samples. We compared the isotopic and elemental composition of ancient samples treated with EDTA alone, samples demineralized in hydrochloric acid (HCl) and rinsed in EDTA, samples treated with HCl alone and samples demineralized in HCl and rinsed with NaOH. The samples used in the analyses were selected because they presented evidence of substantial humic contamination. We found that NaOH was the most effective agent for reducing humic contaminants as evidenced by the samples treated with this agent having higher δ13 C values and lower C:N ratios relative to the other treatments. The results from samples treated with EDTA suggest that this chemical agent cannot effectively remove humic contaminants given that these samples were characterized by significantly higher C:N ratios and lower δ13 C values relative to the HCl/NaOH treatment. Our results demonstrate that when performing stable isotope analysis of ancient bone collagen suspected to be contaminated with humic acids, NaOH is the most effective chemical agent to ensure complete removal of humic contaminants, while EDTA cannot perform this task.

Social support and maternal mental health in rural Nicaragua

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Depressive and anxiety disorders, collectively termed common mental disorders (CMDs), result in considerable losses in health and functioning and are the number one cause of Years Lived with Disability both globally and within low- and middle-income countries (LMICs), with women burdened with CMDs at significantly higher rates than men. Notably, poor mental health among mothers is not only a burden for themselves, but also has detrimental sequalae for their children. This problem is exacerbated LMICs where mental health care is practically non-existent. The protective effects of social support for mental health are well-documented in high-income countries and appear to have evolutionary roots. However, there is a paucity of research on this topic in LMICs. To begin to address this gap in the literature, we conducted a cross-sectional analysis of mental health and perceived social support among 229 mothers from rural Nicaragua to evaluate the hypothesis that increased perceived social support (PSS) is associated with improved mental health. Mental health was assessed using the Self-Reporting Questionnaire-20 (SRQ-20) and PSS was measured using a locally-developed instrument. We analyzed our data in two steps: 1) principal component analysis (PCA) to determine the underlying dimensions of PSS in our cohort and 2) hierarchical multiple regression analyses including 10 control variables and principal components of PSS as identified by PCA. Our results were not supportive of our hypothesis: in our hierarchical multiple regression, PSS accounted for roughly 2% of the variation in SRQ-20 scores. This may be explained by 1) the instruments used, 2) the fact that in this analysis, unlike others on the topic, we control for multiple potential confounders, or 3) the cultural context in which these research participants live.