❖ CANADIAN ASSOCIATION FOR PHYSICAL ANTHROPOLOGY ❖

❖ L'ASSOCIATION CANADIENNE D'ANTHROPOLOGIE PHYSIQUE ❖

Program and Abstracts

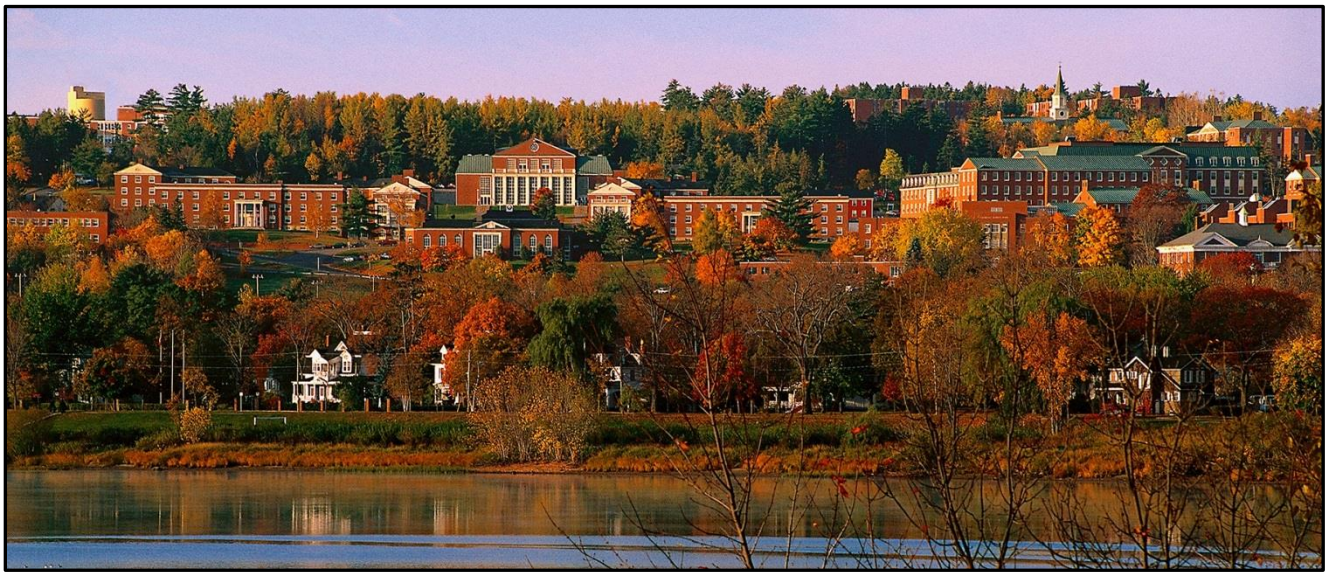
Programme et résumés

42nd Annual Meeting hosted by

Department of Anthropology, University of New Brunswick, Fredericton

November 6-8, 2014

Du 6-8 novembre, 2014



The Canadian Association for Physical Anthropology · L'association canadienne d'anthropologie physique

caPa acap

UNB FREDERICTON

The Organizing Committee would like to thank all of our generous sponsors for their support of the 42nd annual CAPA conference:

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Welcome!

Dear Colleagues,

We would like to welcome you to the 42nd Annual Meeting of the Canadian Association for Physical Anthropology – L'association Canadienne d'anthropologie physique in Fredericton, New Brunswick. Fredericton is New Brunswick's riverfront capital, that offers the comfort of a small town and variety of a cosmopolitan centre. With a friendly atmosphere and historical setting it makes an ideal destination for this conference.

The University of New Brunswick, Fredericton campus overlooking the picturesque St. John River Valley, was established in 1785. It is among the oldest public universities in North America and the oldest English-language University in Canada. The Department of Anthropology was formally established at the University in 1966. Today, we offer undergraduate studies and Master's degrees with a focus in sociocultural anthropology, archaeology, and biological/biomedical anthropology.

This year's meeting has two full days of podium presentations with many interesting topics relevant to the discipline. Outside of the podium sessions we have several additional topics being covered in the poster session available for your perusal during the coffee breaks. We would like to take this opportunity to thank our sponsors. Due to their generosity, we are able to provide lunch and two coffee breaks for Friday and Saturday. If you have any questions or concerns feel free to contact one of us or our team, indicated by the blue stripe on their name badges.

We would like to acknowledge and thank all those who assisted in making this conference possible and a success, Mr. R. Cole, Ms. T. Brown, Mr. M. Basque, Ms. J. Babin and all of the student volunteers; Graduate: Mr. N. Brewer, Ms. S. Carlson, Ms. L. Cudmore, Ms. M. Horne, Mr. G. Innamorato, Ms. A. Redmond; Undergraduate: Ms. Z. McCarron, Mr. Z. Ellis-Carr, Ms. J. MacLean, Ms. M. Miller, Mr. K. Saunders, Ms. L. Simpson, and Ms. A.N. San Jose Vasquez.

Sincerely,

Victoria Gibbon, PhD
Conference Organizer
Assistant Professor
Department of Anthropology
University of New Brunswick

Koumari Mitra, PhD
Conference Organizer
Professor
Department of Anthropology
University of New Brunswick

A Request:

It would help facilitate the day's events if you could arrive between 8:00-8:30 or 12:30-12:50 to download your presentation and/or hang your poster. A volunteer will be available in the Kent Auditorium and in the Wu Centre Foyer between 8:00 and 8:30 and again in the Kent Auditorium at 12:30-12:50 to assist with this.

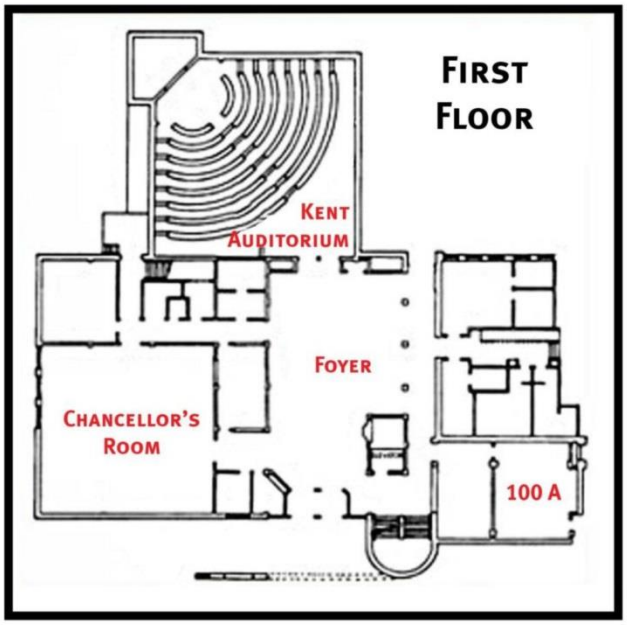
Please see our website for information on tourism, restaurants and transport

CAPA-ACAP 2014 website: http://www.unb.ca/conferences/capa/

Email: capa2014@unb.ca

Conference at a Glance

	Thursday	Friday	Saturday
Morning		Food & Nutrition --- Human Biology	Stable Isotopes --- Bioarchaeology --- Student Luncheon - Chancellor's Room 12:00 pm - 1:30 pm
Afternoon		Human Evolution --- Genomics vs Proteomics --- Crossing Streams	Bioarchaeology Forensics & Human Osteology --- Primatology
Evening	Registration 5:00 pm - 8:00 pm & Welcome Reception 6:00 pm - 8:00 pm Wu Centre Foyer	CAPA Business Meeting 4:30 pm - 6:30 pm --- Picaroons Beer Tasting 6:45 pm - 8:00 pm Wu Centre Foyer Ticket Cost: $12	Banquet 6:00 pm - 9:00 pm Chancellor's Room Wu Centre



PODIUM SESSIONS: SCHEDULE OVERVIEW

(* indicates student prize eligibility)

Start	End	Friday Nov. 7	Saturday Nov. 8
		Kent Auditorium	Kent Auditorium
8:00	8:30	PRESENTATION SET-UP FOR DAY REGISTRATION (8:00 am - 4:30 pm)	
8:30	8:50	WELCOME	Leatherdale A., et al.
8:50	9:10	Hackett P., et al.	Harris A., et al.
9:10	9:30	Galloway T.	Curtis C.K., et al.
9:30	9:50	Holland A.	Hewitt B., et al.
9:50	10:10	Fujita M., et al.	Munkittrick J., Grimes V.
10:10	10:30	COFFEE BREAK	COFFEE BREAK
10:30	10:50	Bergstrom M., et al.	Keenleyside A., et al.
10:50	11:10	Hogan J., et al.	Scott A., et al.
11:10	11:30	Sellen D.	Alarie K.R.
11:30	11:50	McKerracher L., et al.	Gibbon V.E., Grimoud A-M.
12:00	1:00	LUNCH	LUNCH
1:00	1:20	Gibbon R.J., et al.	Kulatilake S.
1:20	1:40	Plomp K., et al.	Young J.
1:40	2:00	Viola T.B., Krivoshapkin A.I.	Saly A.
2:00	2:20	Holmes C., et al.	Peckmann T., et al.
2:20	2:40	COFFEE BREAK	COFFEE BREAK
2:40	3:00	* Bishop K.	Rozendaal A., Bowes M.J.
3:00	3:20	Bower M.	Solomon W.
3:20	3:40	* Mant M.	Vayro J., et al.
3:40	4:00	Holland A., Livins K.	Holmes A.C., Begun D.R.
4:00	4:20	Medeiros P.	Schillaci M., et al.

PODIUM SESSION

(* indicates student prize eligibility, presenting author is bolded)

Start	End	Friday Nov. 7 MORNING	
		Kent Auditorium	
8:00	8:30	PRESENTATION SET-UP FOR MORNING REGISTRATION (8:00 am - 4:30 pm)	
SESSION: Food and Nutrition – Human Biology, CHAIR: Dr. C. Moffat			
8:30	8:50	**Welcome**	
8:50	9:10	**Hackett** P., Abonyi S., Dyck R.	Body mass index of First Nations children and youth on first entering Manitoba/Saskatchewan residential schools – 1919 to 1953
9:10	9:30	**Galloway** T.	Socioeconomic and cultural correlates of diet quality in the Canadian Arctic: Results from the 2007-8 Inuit Health Survey
9:30	9:50	**Holland** A.	An exploration of actual versus perceived nutrient intake in young adults
9:50	10:10	**Fujita** M., Lo Y., Baranski J., Brindle E.	In endemically vitamin A deficient northern Kenya, undernourished mothers allocate a higher proportion of blood vitamin A to breast milk than better-nourished mothers, with effects moderated by the lactation hormone prolactin
10:10	10:30	COFFEE BREAK: Sponsored by AMEC, Engineering, project management and consultancy company, Fredericton, NB	
10:30	10:50	**Bergstrom** M.L., Myers M.S., Fedigan L.M.	Diet and nutrition in female white-faced capuchin monkeys (*Cebus capucinus)* at Sector Santa Rosa, Costa Rica
10:50	11:10	**Hogan** J., Melin A., Fedigan L.	Flowers as fallback foods for white-faced capuchin monkeys
11:10	11:30	**Sellen** D.	Micronutrient-rich complementary foods: Enhancing ancient hominin solutions in contemporary human contexts
11:30	11:50	**McKerracher** L., Collard M., Henrich J.	Unfitness of fatness: Body mass and risk of developing nausea and vomiting of pregnancy (NVP) in a small-scale Fijian population
12:00	1:00	LUNCH: Sponsored by College of Extended Learning**,** University of New Brunswick, NB	

Start	End	Friday Nov. 7 AFTERNOON	
		Kent Auditorium	
12:30	12:50	PRESENTATION SET-UP FOR AFTERNOON	
SESSION: Human Evolution – Genomics vs. Proteomics, CHAIR: Dr. K. Plomp			
1:00	1:20	**Gibbon** R.J., Pickering T.R., Sutton M.B., Heaton J.L., Kuman K., Clark R.J., Brain C.K., Granger D.E.	Cosmogenic nuclide burial dating provides age range for Paranthropus robustus and indicates appearances of hominin technologies in South Africa
1:20	1:40	**Plomp** K., Vidarsdottir U.S., Weston D., Collard M.	Ancestral aches? Vertebral morphology, locomotion, and human spinal health
1:40	2:00	**Viola** T.B., Krivoshapkin A.I.	Sel'ungur – Middle Pleistocene hominins from Central Asia?
2:00	2:20	Holmes C., **Carlson** S., McDonald F.	Post-genomic science and society: Genomics, proteomics and personhood
2:20	2:40	COFFEE BREAK	
SESSION: Crossing Streams, CHAIRS: Ms. A. Holland & Ms. M. Mant			
2:40	3:00	*** Bishop** K.	Health risks among the elite? Uniting food, bones, and literature in ancient Pompeii
3:00	3:20	**Bower** M.	The importance of using multiple lines of evidence when investigating health: A case study from southern Ontario, Canada
3:20	3:40	*** Mant** M.	Fracture prevalence at the Royal London Hospital: Archival and skeletal evidence
3:40	4:00	**Holland** A., Livins K.	Food categorization through cognition research: What cognitive Psychology can bring to Anthropology
4:00	4:20	**Medeiros** P.	Barriers to the uniting of community-based Research and the use of peer research assistants in HIV research in Atlantic Canada
4:30	6:30	**CAPA MEMBERSHIP BUISNESS MEETING**	
6:45	8:00	**PICAROONS BEER TASTING**	

Start	End	Saturday Nov. 8 MORNING	
		Kent Auditorium	
8:00	8:30	PRESENTATION SET-UP FOR MORNING REGISTRATION (8:00 am - 4:30 pm)	
SESSION: Stable Isotopes, CHAIR: Dr. B. Hewitt			
8:30	8:50	**Leatherdale** A., Maggiano C., White C., Longstaffe F.J.	Intra-individual variation in stable isotopes of carbon and nitrogen measured in collagen across a single section of human diaphyseal bone
8:50	9:10	**Harris** A., Marshall I., Jerkie S., Poiner H., Grimes V.	A population on the run: Investigating the Beothuk population collapse using stable carbon and nitrogen isotope analysis of human bone collagen
9:10	9:30	**Curtis** C. K., Katzenberg M.A., Wilson W., McLennan J.	Utility of $\delta^{13}C$ and $\delta^{15}N$ ratios in determining nutritional status of children in a Dominican *batey*
9:30	9:50	**Hewitt** B.R., White C.D., Longstaffe F.J.	Friend or foe? Who lies beneath the Templo de la Piedra Segrada at Túcume, Peru?
9:50	10:10	**Munkittrick** J., Grimes V.	Diet and geographic origins of British Royal Navy Sailors: Life histories from the Southside Naval Hospital Cemetery, St. John's, NL
10:10	10:30	COFFEE BREAK: Sponsored by the Dept. of Anthropology, St. Thomas University	
SESSION: Bioarchaeology, Forensics, and Human Osteology, CHAIR: Dr. K. Mitra			
10:30	10:50	**Keenleyside** A., Stenton D.R., Park R.W.	The 'Boat Place' burial: New skeletal evidence from the 1845 Franklin expedition
10:50	11:10	**Scott** A., Choi K.Y., Mookherjee N., Larcombe L.	A preliminary analysis of osteocalcin extraction and implications for the archaeological study of stress
11:10	11:30	**Alarie** K.R.	Pre-Columbian dental modification complex at the site of Canimar Abajo, Matanzas Cuba
11:30	11:50	**Gibbon** V.E., Grimoud A-M.	Using radiography in dental pathology and trauma analyses from archaeological samples
12:00	1:00	LUNCH: Sponsored by Dept. of Anthropology, University of New Brunswick Student Luncheon Chancellor's Room 12:00 pm – 1:30 pm	

Start	End	Saturday Nov. 8 AFTERNOON	
		Kent Auditorium	
12:30	12:50	PRESENTATION SET-UP FOR AFTERNOON	
SESSION: Bioarchaeology, Forensics, and Human Osteology, CHAIR: Dr. V. Gibbon			
1:00	1:20	**Kulatilake** S.	Cranial diversity and affinities among circum-Indian Ocean populations
1:20	1:40	**Young** J.	Are colour and preservation of submerged bone useful indicators of taphononic history?
1:40	2:00	**Saly** A.	A new metric technique for assessing ancestry from the femur
2:00	2:20	Peckmann T., **Logar** C.J., Garrido-Varas C., Meek S., Miller P., Toledo Pinto X.	Sex determination using mesio-distal dimension of permanent maxillary incisors and canines in a modern Chilean population
2:20	2:40	COFFEE BREAK	
SESSION: Bioarchaeology, Forensics, and Human Osteology – Primatology, CHAIR: Dr. A. Keenleyside			
2:40	3:00	**Rozendaal** A., Bowes M.J.	The Nova Scotia medical examiner service skeletal reference collection: Curating a skeletal collection for medico-legal investigations
3:00	3:20	**Solomon** W.	Canada's two death investigation systems in review
3:20	3:40	**Vayro** J., Ziegler T., Sicotte P.	Female life-history characteristics in ursine colobus monkeys (*Colobus vellerosus*)
3:40	4:00	**Holmes** A.C., Begun D.R.	A quantitative analysis of anthropoid radiocarpal morphology
4:00	4:20	**Schillaci** M., Klegarth A., Switzer W.M., Shattuck M., Engel L.J., Hollocher H.	Evolutionary relationships of long-tailed macaques from Singapore revealed by detailed phylogenetic analyses of mitochondrial DNA sequences
6:00	9:00	**BANQUET DINNER**	

POSTER SESSION

Note: Authors of posters will be present during coffee breaks

(* indicates student prize eligibility, presenting author is bolded)

POSTER SET-UP Friday 8:00-8:30		
1	*** Richer** S.M.	Investigating three-dimensional surface variation in the frontal sinuses: A pilot study
2	*** Beauchamp** A.M.	Cortical thickness in a sample of Danish subadults from the Middle Ages and Early Modern Periods
3	**Hoi** A.G., Salvante K., Altman R., Venners S., Roitberg B., Valeggia C., Nepomnaschy P.	Influence of the sex of a newborn on a mother's resumption of fertility
4	Tennant H., **Nelson** A.	The assessment of osteoarthritis in mummies: Promise and challenges
5	*** Saly** A.	3D images and their use in metric analyses of ancestry from the femur
6	*** Kamckey** J.	Determining the presence of lead toxicity in post emancipated Antigua with the use of death records dating from 1863-1873
7	Choi H.J., **Garlie** T., Mitchell K.B.	Effects of anthropometrics and body size changes on the development of personal protective equipment (PPE) sizing systems in the US Army
8	Mitchell K.B., **Garlie** T., Choi H.J.	Anthropometry and range of motion (ROM) of the encumbered Soldier
9	**Porter** T., Gibbon V.E., Xiujie W., Wu L.	Craniometric analyses of Chinese Bronze Age populations
10	**Brown** T., Mitra K.	Role of traditional medicine in primary health care: Isolating gaps in the WHO traditional medicine 2013-2024 policy and challenges for its application in India
11	**Rand** A., Munkittrick J., Harris A., Bower M., Burchell M., Grimes V.	Comparing three collagen extraction procedures for stable carbon and nitrogen isotope analyses of archaeological and modern bone
12	**Brickley** M., Buckberry J.	More is not always better: Partial human remains in the hunt for vitamin D deficiency in paleopathology
13	**Ingram** J.	An evaluation of cranial lesions in possible cases of scurvy in adults
14	**Maggiano** C., Maggiano I., Tiesler V., Stout S.	A comparison of novel point-count and hand-drawn histomorphometric techniques for analyses of primary bone deposits in human diaphysis
15	*** Giffin** K.	Comparison of biogenic lead levels in human skeletal remains from the cemetery of the British Royal Navy hospital (A.D. 1793-1822) at English Harbour, Antigua, West Indies: An investigation into the relationship between age and ancestry on lead exposure level

ABSTRACTS OF THE 42ND ANNUAL MEETING CAPA-ACAP

(* indicates student prize eligibility, presenting author is bolded)

Pre-Columbian dental modification complex at the site of Canimar Abajo, Matanzas Cuba

Alarie K.R.

Dept. of Anthropology, University of Manitoba

Dental modifications occurring in the Caribbean archaeological record are predominately considered to represent African individuals brought into the region as a result of the colonial slave trade in post-contact times. An individual recovered from the Pre-Columbian site of Canimar Abajo (1066 B.C.E.-574 A.D.), Matanzas Cuba radiocarbon dated to 970-790 cal B.C.E (AA101059) exhibits dental modification of the upper central incisors, similar to West African styles of dental modification, yet clearly predates the African Diaspora. An additional 13 individuals recovered from both cemetery components at Canimar Abajo separated by a 1500 year burial hiatus exhibit the same type of dental modification. This type of dental modification has not been previously identified in Pre-Columbian Caribbean groups, even though it represents a long persisting cultural tradition at Canimar Abajo. This presentation discusses the significance of this tradition, primarily the role that it may have played in concepts of group identity, beauty, and social position, while highlighting the cultural diversity of early pre-Columbian Cuban populations.

Cortical thickness in a sample of Danish subadults from the Middle Ages and Early Modern Periods

*** Beauchamp** A.M.

Dept. of Anthropology, University of Manitoba

Assessment of cortical thickness in archaeological samples is frequently done by using X-rays or cross sections of physical bone. In this study, computer tomography is used; this offers a non-destructive alternative that enables analysis of the samples in 3D. The study of cortical thickness, as a measure of appositional growth is a valuable indicator of childhood stress and subsequent growth faltering. Appositional growth may be more sensitive to external stress than the more frequently studied longitudinal growth indicators such as long bone length and less susceptible to the effects of catch-up growth.

A sample of humeri, femora, and 2nd metacarpals from 49 subadults were scanned. The sample originates from three cemeteries; Ole Wormsgade (12-16th centuries), Odense Black Friars (14th-17th centuries), and Horsens Klosterkirke (17th-18th centuries), representing the tail end of the Early Middle Ages into the Early modern period in Denmark. Analysis using Materialise MIMICS^{TM} medical imaging software allowed for the measurement of medullary and bone diameters and area. This study presents the results of the cortical thickness data with respect to age and the more traditional long bone length.

Historical records document that the Middle Ages were a period of socioeconomic change and the observation of nutrition and disease-related stress is expected. Studies comparing longitudinal growth variation seldom find significant differences. As a more sensitive measurement, cortical thickness measured using CT scans may offer a more promising method to determine periods of physiological stress in subadults.

Diet and nutrition in female white-faced capuchin monkeys (*Cebus capucinus*) at Sector Santa Rosa, Costa Rica

Bergstrom M.L., Myers M.S., Fedigan L.M.

Dept. of Anthropology, University of Calgary

Nutrient acquisition affects the health and reproductive success of female primates. We describe the dietary profile, nutritional composition of food items, and patterns of food consumption by adult female (N=25) *Cebus capucinus* from three habituated groups in Sector Santa Rosa, Costa Rica. We conducted focal animal samples to measure activity patterns and feeding behavior during three 4-month periods (September 2009–April 2011). We collected samples from 53 plant foods and 10 invertebrate categories to analyze macronutrient content. We used these data and published values to compare the nutritional composition across food types and to calculate energy intake. The annual diet included 68 fruit and seed species, nine flower species, four pith species and 15 invertebrate groups. Protein ($H=43.704$, $df=4$, $p<0.001$) and sugar content ($H=33.833$, $df=4$, $p<0.001$) significantly differed across food types. On a dry matter basis, caterpillars ($p=0.002$) and other insects ($p<0.001$) contained significantly higher crude protein concentrations than did fruit, but fruit contained significantly higher water soluble carbohydrate concentrations than did caterpillars ($p=0.036$) and other insects ($p<0.001$). Females spent the most time foraging for invertebrates (70.3%) and fruit (20.0%). Despite less foraging time by females and its lower energy density ($H=12.330$, $df=4$, $p=0.015$), fruit comprised a higher percentage of total energy ingested (57.6%±2.1) than did invertebrates (39.1%±2.0). We plan to investigate how food size, moisture content and ingestion rates affect the profitability of different food types as well as how seasonal changes in resource availability affect dietary composition to better understand food competition, nutritional outcomes and female life-history strategies.

Health risks among the elite? Uniting food, bones, and literature in ancient Pompeii

*** Bishop** K.

Dept. of Anthropology, McMaster University

In ancient contexts, diet and health have been analyzed according to food remains, paleopathological indicators on skeletal materials, and ancient literature. Researchers rely on evidence of grave goods or poor health to attribute an upper or lower class association. Recent investigations at the archaeological site of Pompeii, Italy, have determined that poor health is no longer restricted to individuals of lower socioeconomic status. I will argue that members of higher socioeconomic status in ancient Pompeii were at an increased risk of developing specific illnesses and diseases because of their associated diet. Ancient Pompeii provides a unique

context for analyzing many material remains due to the excellent preservation caused by the volcanic eruption of 79 CE. In particular, food artefacts from the drains below residences establish status-based nutritional accessibility. Such remains illustrate causal links between diet and certain diseases found in the human osteological material. The skeletal remains from the eruption site of Pompeii demonstrate evidence of many health issues, including pathogen-causing maladies (e.g. brucellosis), and metabolic conditions (e.g. fluorosis). Based on well-preserved food remains and ancient documentation of diet of the elite class, I explore the negative health impacts of living the "upper-class life" in Roman antiquity

The importance of using multiple lines of evidence when investigating health: A case study from southern Ontario, Canada

Bower M.

Dept. of Archaeology, Memorial University of Newfoundland

A variety of methods have been used in the interpretation of health in past populations including paleopathology, paleodemography, stature, enamel defects and isotopic investigations of diet. Despite the number of different methods that are available, traditionally only one or two lines of evidence are used. This practice of employing a minimal number of methods to discuss health can result in a biased perspective leading to inaccurate conclusions. Rather, it is preferable to use multiple lines of evidence in order to present a more holistic image. This paper presents a case study wherein the health of eight individuals, recovered from traditional Huron-Wendat territory in southern Ontario were investigated using five different methods in conjunction with archaeological and ethnohistoric evidence. The results from each method were assessed in relation to each other in order to obtain a more comprehensive representation of these individuals' wellbeing. A young average age at death and high rates of pathology and dental defects suggests that these individuals were unhealthy; however, the isotopic data indicating consumption of a variable diet and tall stature suggests the opposite. If only a single line of evidence had been considered in this study, an erroneous conclusion would have been reached. This research thus illustrates the complexity of reconstructing health in past populations and emphasizes the importance of using multiple methods.

More is not always better: Partial human remains in the hunt for vitamin D deficiency in paleopathology

Brickley M.[1], Buckberry J.[2]

[1]Dept. of Anthropology, McMaster University; [2]Dept. of Archaeological Sciences, University of Bradford

With pressures on time and resources available to those undertaking research in paleopathology, poorly preserved archaeological human remains can often receive limited attention or be completely excluded from the analysis of archaeological sites. Although incomplete skeletons often yield minimal demographic information and can complicate the diagnosis of some pathological conditions, this is not universal. Significant information can be obtained even in

partial remains on metabolic bone diseases (where, by definition, the whole skeleton is involved), and for conditions such as osteoarthritis and fractures which can be diagnosed in isolation. We present an example of a highly incomplete skeleton which provided valuable new information on pathological changes associated with osteomalacia, a condition that has been little studied to date in paleopathology. This skeleton also contributes to our understanding of the factors surrounding the classification of fractures, and provides new insight into the full range of circumstances in which eburnation can develop. The example discussed demonstrates the value of including partial and poorly preserved skeletons in paleopathological analysis, and the extent of information that can be obtained.

Role of traditional medicine in primary health care: Isolating gaps in the WHO traditional medicine 2013-2024 policy and challenges for its application in India

Brown T., Mitra K.

Dept. of Anthropology, University of New Brunswick

Traditional medical practices are an important part of the primary healthcare systems in the developing world. Traditional medicine is based on indigenous beliefs and practices, which predate the development and spread of biomedicine both in the Western and non-Western world. In India, traditional medicinal practices have existed along with biomedicine. However, the efficacy and continuity of indigenous systems of medicines, coupled with the reluctance of biomedicine to accept these systems, has raised questions about how these alternative systems can be incorporated into existing centralised health infrastructure. Of central concern is how the relationships between the practitioners of different coexisting systems of medicine can be navigated and how safety and efficacy can be maintained.

In this context, there is a critical need to mainstream traditional medicine into public health care to achieve the objective of improved access to healthcare facilities. However, evidence suggests there is a disparity between the integration of Traditional Medicine (TM) and Complementary and Alternative Medicine (CAM) into local health systems and WHO policy formulation and implementation. Some of the major challenges include safety and efficacy, rational use, education, accessibility and cost effectiveness of traditional medicine.

This poster presents an overview of TM & CAM, its global presence, policy measures for promotion, their role in primary health care and major contemporary challenges for integration of TM & CAM into public health. This research is part of a larger project funded by a SSHRC insight grant awarded to Dr. Costanza Torri and Dr. K. Mitra. An aspect of this project seeks to examine the practices of CAM in tribal and rural areas of India and Indonesia and how these practices are being used as empowerment strategies.

Effects of anthropometrics and body size changes on the development of personal protective equipment (PPE) sizing systems in the US Army

Choi H.J.[1, 2], **Garlie** T.[1], Mitchell K.B.[1]

[1]Natick Soldier Research, Development, and Engineering Center (NSRDEC); [2]Oak Ridge Institute for Science and Education (ORISE), NSRDEC

Understanding body size and shape information of military personnel is critical for the design and development of clothing and individual equipment, and especially personal protective equipment. Recently, the U.S. Army performed an Army-wide anthropometric survey of the current U.S. Army population, the previous data set was collected in 1988. When the body dimensions from the ANSUR 1988 and ANSUR II 2012 datasets were compared, there were clear increases in weight and circumferences, since 1988, for both males and females; but no meaningful increases in heights. These increases in weight and circumferences have a significant impact on the development of sizing systems. The impact of these changes are (as theoretically demonstrated here) that legacy size charts, based on the ANSUR 1988 data, would not accommodate the current U.S. Army population. Based on previous sizing system methodologies, a customized process was developed focusing on the unique requirements of the military acquisition lifecycle and the requirements for PPE. This methodology was made up of three steps: 1) Investigate the design problems, related to design concept and function of the item along with the interrelationship among the population anthropometrics, the fit of the item, and the target accommodation rate; 2) Develop a prototype and perform iterative testing, where each size of the prototype is developed and modified as the sizing system is completed; 3) Produce final products related to sizing systems, including prototypes in all sizes that accommodate the target population, the sizing chart for the item, and the size tariff for the production of the item. This optimization process should result in high accommodation rates for a combined male and female population with a reduced number of sizes.

Utility of $\delta^{13}C$ and $\delta^{15}N$ ratios in determining nutritional status of children in a Dominican *batey*

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The health of children is one of the most sensitive measures of health in a population, as children are highly susceptible to environmental and nutritional stress. As these stressors may negatively impact childhood growth, anthropometric data such as child weight and height provide an indicator of the acute and chronic stress experienced, respectively. Alternatively, in archaeological populations, stable isotope analysis is used to evaluate dietary composition, which can be used to provide insight into dietary quality. Based on many studies of non-human species, and several studies of human patient populations, $\delta^{15}N$ ratios have been indicated as a means to assess nutritional or metabolic stress. If stable isotope analysis is a valid measure of dietary adequacy, measured $\delta^{15}N$ ratios should correlate with anthropometric markers of nutritional status. To better understand the association between anthropometric and isotopic markers of diet, this study explores the relationship between these outcomes in a contemporary population of children from Batey Lecheria in the Dominican Republic. Height-for-age, weight-for-age, and body mass index z-scores were compared to $\delta^{13}C$ and $\delta^{15}N$ ratios of keratin in the hair of 53 individuals, aged 2-12 years. We hypothesized that $\delta^{15}N$ ratios would vary inversely with increased anthropometric z-scores, but were unable to support this hypothesis in all cases. Hair keratin from children experiencing acute nutritional stress (BMI<14.0) was enriched in ^{15}N

compared to children with a Low BMI (14.0 – 18.5); however, keratin from children with a Normal BMI (18.5 – 25) was also enriched in ^{15}N compared to children with a Low BMI. While these results carry a low p-value ($p = 0.0596$), the marked difference in $\delta^{15}N$ ratios between individuals of differing nutritional status described in the literature was not observed in this study. It is possible that the relationship between nutritional status and stable isotope ratios is not as clear as has been understood from its applications in non-human species, and that this area of research requires additional study before it may be a useful tool in archaeological research.

In endemically vitamin A deficient northern Kenya, undernourished mothers allocate a higher proportion of blood vitamin A to breastmilk than better-nourished mothers, with effects moderated by the lactation hormone prolactin

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Vitamin A (VA) deficiency claims one million young lives every year. An improved understanding of mother-infant VA transfer through breastmilk holds a key to a more effective intervention and prevention. We previously reported the trade-off relationship between maternal hepatic VA reserve and breastmilk VA concentration that is consistent with the predictions from the life-history theory and the notions of maternal reproductive strategy and resource allocation. Here we present a follow-up study to clarify maternal dietary, nutritional, and endocrine factors related to the prioritized maternal reproductive investment, measured by the proportion of VA allocated to the breastmilk. We tested hypotheses that 1) prolactin will be a positive predictor of the prioritized breastmilk retinol over serum retinol, and 2) this effect will be conditional to the maternal hepatic VA status. The lactation hormone prolactin has been implicated as a factor involved in the distribution of VA between maternal hepatic reserve and blood circulation, but no empirical study has evaluated this possibility thus far. A sub-sample (n=109) of data from our original study among Ariaal breastfeeding mothers was used. The relationship between the outcome, breastmilk retinol priority index ($\frac{milk\ retinol}{milk\ retinol + serum\ retinol}$), and a host of maternal factors was evaluated using a regression model, adjusting for breastmilk fat concentration and maternal age. The predictors included maternal chronic energy deficiency, retinol intake, β-carotene intake, hepatic VA deficiency, serum prolactin concentration, and the interaction between VA deficiency and prolactin. Results: Significant positive predictors of breastmilk retinol priority included VA deficiency ($p=0.001$), chronic energy deficiency ($p=0.018$), and β-carotene intake ($p=0.042$). The VA deficiency-prolactin interaction was marginally significant ($p=0.077$), indicating that mothers having low VA hepatic stores and low serum prolactin put the greatest priority in breastmilk VA. In this dataset from the endemically VA deficient geographic region, undernourished mothers allocated a higher proportion of blood VA to breastmilk than better-nourished mothers, but how high was moderated by prolactin. This hormone may indeed serve as a physiological signal behind the maternal conditional allocation of VA between liver, blood, and milk and thereby contribute to the strategic maternal investment of VA between competing biological domains.

Socioeconomic and cultural correlates of diet quality in the Canadian Arctic: Results from the 2007-8 Inuit Health Survey

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We examined the impact of socioeconomic and cultural factors on dietary quality in adult Inuit living in the Canadian Arctic. Interviews, 24-hour dietary recall and food frequency questionnaires were administered to 805 men and 1292 women from Inuit regions in the Canadian Arctic. We examined the effect of age, sex, education, income, employment and the cultural variables on respondents' energy and macronutrient intake and healthy eating index. Logistic regression was used to assess the impact of socioeconomic status (SES) on diet quality indicators. Age was positively associated with traditional food (TF) consumption and greater energy from protein but negatively associated with total energy and fiber intake. Associations between SES and diet quality differed considerably between men and women and there was considerable regional variability in diet quality measures. Age and cultural variables were significant predictors of diet quality in logistic regression. Increased age and use of the Inuit language in the home were the most significant predictors of TF consumption. Our findings are consistent with studies reporting a nutrition transition in circumpolar Inuit. We find considerable variability in diet quality and complex interaction between SES and cultural variables producing mixed effects that differ by age and gender.

Cosmogenic nuclide burial dating provides age range for *Paranthropus robustus* and indicates appearances of hominin technologies in South Africa

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Research at the Early Pleistocene fossil- and artefact-bearing site of Swartkrans (South Africa) has produced an array of notable findings that have contributed significantly to our understanding of hominin evolution. Using the cosmogenic nuclide burial dating technique, we were able to determine the first and last appearance dates for the extinct hominin, *Paranthropus robustus*, from Members 1 and 3 of the Swartkrans Formation. These new radiometric dates demonstrate that this archaic megadont species occupied the southern African landscape both with early, and then more derived species of the genus *Homo* (2 to 1 million years ago). Our results also provide crucial data on early hominin cultural activities, including the manufacture and use of bone and stone tools, as well as the controlled use of fire.

Using radiography in dental pathology and trauma analyses from archaeological samples

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Traditionally, dental analyses of pathology and trauma from archaeological samples have relied on the use of morphological analyses. Necessity of radiographic methods in dental analyses from archaeological samples will be demonstrated. Dentitions of 24 individuals from Ingombe Ilede and Isamu Pati Iron Age archaeological sites located in Zambia were examined. To test for statistical significance between results in our study, analysis of variance was conducted using SAS 9.2 statistical software. Linear enamel hypoplastic lesions, radicular resorption, periapical lesions, fractures, dental modification, and carious lesions were some interesting dental conditions observed. Many of these features were found on the interproximal surfaces at the cement-enamel junction (CEJ) and lower; thus, 63% (66/104) of the conditions were diagnosed using radiography. To assess the effectiveness and value of radiography vs. morphology, pathological and traumatic lesions were combined, and methods of diagnosis and location above or below the CEJ were compared. All conditions below the CEJ were diagnosed using only radiography. To ensure that a comprehensive picture of dental health is derived from archaeological remains, radiography is necessary in addition to morphological methods. Without radiography, a more robust understanding of health may be missed or misunderstood. As digitised radiography is inexpensive and easily accessed, its use should be standard for dental studies on archaeological samples.

Comparison of biogenic lead levels in human skeletal remains from the cemetery of the British Royal Navy hospital (A.D. 1793-1822) at English Harbour, Antigua, West Indies: An investigation into the relationship between age and ancestry on lead exposure level.

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Though lead has been known to be a cause of human poisoning since ancient times, it was a widely used metal, appearing through history as a sweetener, in medicinals, and in many types of metalwork. The relationship between ancestry or age and lead exposure in the Colonial period of Antigua, West Indies was explored by comparing the lead levels in bone samples from individuals of two different ancestries, African and European, from a cemetery associated with a British Royal Navy hospital (A.D. 1793-1822) at English Harbour in Antigua, West Indies. The non-segregated nature of this cemetery is believed to have been unique for the period, and allowed for more direct comparisons between ancestral groups in this study. This special circumstance of inclusive burial at this site may have arisen due to the presence of the "King's Negroes", a specially-trained group of enslaved labourers owned by the Royal Navy at that time. Cortical samples from the fibular diaphysis of 24 individuals were analyzed for lead by ICP-MS. The mean lead levels were found to be 74.3±51.8ppm for the African population, and 87.7±78.6ppm for the European population. The mean lead levels of the two ancestries were compared using the Wilcoxon Rank Sum test, a nonparametric statistical method. No significant

difference was found between the mean lead levels of the two ancestries. Furthermore, no discernible pattern in lead levels was found in relation to the individuals' ages. Possible post mortem contamination was dismissed by scanning the bone samples using synchrotron radiation x-ray fluorescence (SR-XRF). Visible evidence of incorporation of lead into the microstructures of bone indicated that lead uptake likely occurred during the individuals' lifetimes. These results are in contrast to previously published studies comparing lead levels of individuals from similar and contemporaneous populations. The outcomes suggest naval personnel of both African and European ancestry at English Harbour in Antigua, West Indies had very similar experiences with regards to lead exposure. Their exposure to the toxic metal was not consistent over time, however, as steady exposure would likely have resulted in a positive correlation of lead level with individual age.

Body mass index of First Nations children and youth on first entering Manitoba/Saskatchewan residential schools – 1919 to 1953

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Historical research documenting nutritional experiments performed on First Nations residential school children in Canada beginning in the 1940s, indicates that these students experienced hunger and malnutrition and suffered from overall poor health. To further put these findings into context, our study investigated Indian residential school entrance examinations that included height and weight data for approximately 1,700 children attending seven schools in Manitoba and Saskatchewan between 1919 and 1953. The cross sectional entrance examination data is significant because it captures the health of First Nations children prior to their exposure to the residential school environment, reflecting instead conditions in their home communities. Age-specific BMIs were calculated and categorized as underweight, normal weight, and overweight/obese by age, sex, time period and residential school site. We also compared height and weight quartiles with a 1953 Canadian survey and BMIs with current Canadian growth charts. On admission to residential school, First Nations children/youth were more likely to have normal BMIs than Canadian children today, and to have lower rates of overweight/obesity and higher rates of underweight. There was an overall trend for diminishing levels of underweight and increasing levels of overweight/obesity over time. The highest rates of underweight occurred before the Depression with significant variability between schools. These findings are consistent with reports of malnutrition in some communities during the study period. Overall, however, results suggest that many children were not leaving their home communities in a significantly malnourished state, providing further evidence of the negative impact of Indian residential school attendance.

A population on the run: Investigating the Beothuk population collapse using stable carbon and nitrogen isotope analysis of human bone collagen

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Prior to the arrival of European fishermen in Newfoundland, the Beothuk and their ancestors, the Little Passage culture, were generalized hunter gatherers whose subsistence economy featured maritime and inland adaptations. Faunal remains and site distribution provide evidence for seasonal movement between the inner and outer bays and river systems of the island. The preponderance of coastal sites compared to inland sites point to the importance of marine mammals and birds to the Beothuk and Little Passage subsistence economies. Personal accounts by European contemporaries report that the increasing European presence in coastal areas of Newfoundland restricted Beothuk access to the marine resources crucial to their subsistence. The disruption of the traditional Beothuk seasonal round has been identified by Beothuk scholars as a significant factor in the collapse of their population, however, the extent of the disruption is not fully understood. In this paper, we report on the initial results from a diachronic study that seeks to assess the degree to which the subsistence economy and settlement patterns of the Beothuk and their ancestors may have altered over the past 1300 years. We apply stable carbon and nitrogen isotope analysis to the skeletal remains of 21 individuals representing the Beothuk, Little Passage and earlier Cowhead cultural complexes. While preliminary, the data suggest a reduction in high trophic level marine foods in the eighteenth and nineteenth centuries, coincident with a change in the Beothuk seasonal round.

Friend or foe? Who lies beneath the Templo de la Piedra Segrada at Túcume, Peru?

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It is rare that bioarchaeologists are presented with the opportunity to test the veracity of the ethnohistoric record or can confidently speak to group affiliation and/or cultural identity of individuals recovered from archaeological contexts. Identification of social roles is often based upon an examination of mortuary treatment and associated cultural materials, but in cases of human sacrifice burial norms are frequently disregarded and grave goods are often absent. As such, determining the cultural identity of victims is often difficult, if not impossible. A mass grave in northern Peru presents an opportunity to both test the veracity of ethnohistoric data and to reconstruct social biographies of specific individuals.

Two competing hypotheses exist that can account for the burial of over 90 individuals at the base of the Templo de la Piedra Segrada at Túcume. The first stems from Spanish records dating to the Inca period, which recount the practice of local individuals volunteering themselves and their children as sacrificial offerings during times of intense social upheaval and stress. The second comes from reports that the Inca used individuals captured during battle as human sacrifices. Using oxygen and strontium isotope analyses to identify non-locals within a subset of this burial population, we seek to determine which 'story' most closely fits with the data. By examining the isotopic data within the framework of existing bioarchaeological and ethnohistoric information

concerning these ancient practices, we can begin to better understand the cultural and social implications of this remarkable burial site.

Flowers as fallback foods for white-faced capuchin monkeys

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Fallback foods, typically defined as lower-quality foods only consumed during preferred food shortages, have shaped many aspects of primate evolution. While many fallback foods are utilized in small quantities annually, they are often important seasonally, and may be crucial for survival in harsh environments. Much of Área de Conservación Guanacaste (ACG), Costa Rica, is tropical dry forest, and many animal species emigrate during the dry season when plant productivity is minimal. White-faced capuchin monkeys are highly omnivorous but prefer ripe fruits when available. In ACG, they have also been noted to consume flowers. The purpose of this study was to determine what role flowers played in their diet, specifically whether flowers are fallback foods. We observed three habituated, individually identifiable groups for 107 days from June 2013 until April 2014, recording all instances of flower foraging observed as well as conducting routine scan sampling. Phenological cycles of known capuchin plant foods were also recorded bi-weekly. Flower foraging was highly seasonal: monkeys ate flowers on 58% of dry season days and 7% of wet season days. Flowers only comprised 3% of the plant food diet annually but 26% of the plant diet in December was flowers. However, there was no correlation between flower foraging and flower or ripe-fruit availability. Overall, this research suggests flowers should not be considered to be exclusively fallback foods, and that they may be consumed in the dry season for reasons beyond a shortage of preferred ripe-fruit foods.

Influence of the sex of a newborn on a mother's resumption of fertility

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In mammals, male offspring tend to be more costly for mothers to produce. Sons, for example, grow more rapidly *in utero* and have higher birth-weights than daughters, indicating higher levels of maternal energetic investment. Following this line of reasoning, we hypothesized that, when energy is limited, energy allocation during post-partum amenorrhea (PA) will differ depending on the sex of the nursing infant. We predicted that, in energy-constrained populations, women who had daughters would experience a shorter period of PA than those who had sons. To test this prediction we analyzed data from two populations: the Kaqchikel Maya women of Guatemala and the Toba women of Formosa, Argentina. These populations differ in dietary

caloric intake, the Toba being better nourished than the Maya. We predicted the energy-constrained Maya would have longer periods of PA when the nursing child is a boy than when it is a girl. Conversely, we predicted the Toba would not exhibit these sex-dependent differences in PA duration. PA duration was calculated as number of days elapsed between each participant's last parturition and her first menstrual cycle post-partum. Resumption of fertility was determined via self report and confirmed through the quantification of circulating reproductive hormones. Our preliminary analyses show that PA was longer in the Maya than the Toba, and that sex of the last offspring was associated with PA duration in the Maya but not in the Toba. These results highlight the salience of reproductive ecology, including access to resources, in shaping the reproductive trajectories of women.

An exploration of actual versus perceived nutrient intake in young adults

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Nutrition research is often concerned with assessing individual or population-level nutrient intake in order to identify possible deficiencies or excesses. Reported intake is compared to set daily recommended intakes that are population and age specific. While this comparison can identify over- and under-nutrition, it does not assess individual perceptions of intake. Individuals' beliefs about their nutrition serve as an important motivating factor to adjusting their consumption. If people perceive their intake to be adequate they will not change their consumption behaviours, which is the ultimate desired goal of nutrition studies. The purpose of this study was to investigate the relationship between nutrient intake and the perceptions regarding intake of Canadian young adults. A food frequency questionnaire was used in conjunction with individual interviews to compare how young adults consumed two nutrients, calcium and vitamin D, and how they viewed their consumption. Young adult beliefs about their nutrient intake were found to vary considerably when compared to their intake and were influenced by their overall beliefs about food and nutrition.

Food categorization through cognition research: What cognitive psychology can bring to anthropology

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This paper presents an exploratory investigation into the integration of anthropology with cognitive psychology to examine food meanings and categorization. The process that people use to place food into categories, specifically healthy versus unhealthy, has important implications for consumption behaviours. Most anthropological investigations into food categorization rely on self-reported data from participants concerning their views on food. Cognitive psychology offers innovative methods, specifically the measurement of reaction times, which can be used in conjunction with self-reported interview data to elicit if participants are accurately reporting their

beliefs about food categories. However, conducting interdisciplinary work can pose significant challenges. This paper will focus on a discussion of the process of collaboration between two disciplines that have inherently different expectations for research. The discussion will center on the methodological, theoretical and conceptual problems and concerns that were experienced during the design of this experiment and finish with an overview of the solutions (and compromises) that were achieved.

A quantitative analysis of anthropoid radiocarpal morphology

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Studying anthropoid radiocarpal joint anatomy allows us to better understand the relationship between morphology, locomotion, and phylogeny. Previous research on this structure noted various morphological differences among anthropoids, yet some of these observations have remained unquantified. This study presents a quantitative analysis of the anthropoid radiocarpal joint with an emphasis upon the proximal articular carpals (scaphoid and lunate). It is demonstrated that there are quantifiable morphological features that can be used to distinguish among platyrrhines, cercopithecoids, and hominoids. These features, which relate to both function and phylogeny, can be further used to discriminate among Hylobatidae, Homininae, and Ponginae. The incorporation of Miocene fossil apes (*Proconsul*, *Equatorius*, and *Rudapithecus*) in this analysis allows for the examination of evolutionary changes that have taken place over the past 20 million years as hominoids transitioned from above-branch quadrupedalism to below-branch suspension. We can see that although *Pongo* evolved an extremely unique mode of quadrumanous locomotion, they retain some primitive radiocarpal characteristics that have disappeared in the African apes. In *Pan* and *Gorilla* the scaphoid occupies over 50% of the carpal portion of the radiocarpal joint. In *Pongo* and *Rudapithecus* the opposite is true, and it is the lunate that dominates the wrist joint. This particular feature suggests greater dorsoventral flexibility for *Pongo* and *Rudapithecus*, and greater wrist stability for *Pan* and *Gorilla*. Conversely, the unique morphology of the hylobatid radiocarpal joint suggests a derived condition and an independent evolution of suspensory locomotion. In gibbons and siamangs the lunate and scaphoid articulate at a near right angle and form a socket-like wrist joint with the radius. This allows for a greater range of movement. The methods applied in this study strengthen previous qualitative research by providing an empirical basis to test evolutionary hypotheses. The results contribute to our understanding of the relationship between radiocarpal morphology and locomotion among anthropoids.

Post-Genomic science and society: Genomics, proteomics and personhood

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Genetics and genomics have created a powerful narrative, enabling the public imagination to integrate basic understandings of genetics into individual and societal accounts of personhood. This paper examines whether the other omics sciences, notably proteomics, can capture the public imagination in similar ways. Science has what we term (adapting from Lewontin's work) explanatory and manipulatory powers. Using qualitative interviews and participant observation with proteomics scientists and interviews with regulatory scientists and clinicians, we critically examine and compare proteomics to genetics and genomics to assess whether proteomics has the potential to define our understandings of what it is to be a person in the same way genomics does and what implication any differences might have on the public perceptions of omics science.

An evaluation of cranial lesions in possible cases of scurvy in adults

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Scurvy results in weakening of connective tissues leading to porotic or hypertrophic bone development and dental loss. As none of these indicators are specific to scurvy, identification of this disease in the paleopathological record is difficult, particularly in adults. The reduced turnover of bone and strengthened periosteum of mature bone decreases the osteological response to scorbutic processes. Previous studies of scorbutic manifestations in cranial bones found bilateral lesions produced by the hemorrhaging of the cranial artery and movement of facial muscles are the most suggestive indicators of scurvy. The use of these criteria on a sample of seven adults from Casernes Royales prison, Quebec City 1746-1747 are examined. Living conditions of the prisoners were consistent with other historical scorbutic populations. Cranial lesions were examined at eleven locations. The locations were classified as highly indicative, indicative, and suggestive based on their relation to previously noted scurvy. The presence of bilateral lesions occurred most often on the greater wings of the sphenoid, alveolar process, and palate; lesions at other cranial locations only occurred sporadically. Based on the bilateral presence of highly indicative lesions, the presence of scurvy in these individuals was determined as probable, possible, or absent; four probable and three possible cases of scurvy were identified. Determining a definitive case of scurvy in the Casernes Royales prisoners based on scorbutic lesions was not possible as adult bone is less reactive to the effects of vitamin C than juvenile bone. While the lesions suggest these individuals were likely exposed to vitamin C deficiencies, a more holistic approach would be required for a more definitive diagnosis.

Determining the presence of lead toxicity in post emancipated Antigua with the use of death records dating from 1863-1873.

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Death records for 9834 individuals who died between 1863 and 1873 in two of five Antiguan parishes were examined. The objective was to focus on cause of death to determine if lead

exposure could have had a considerable impact on health in post emancipation era Antigua. Historical information on the health of Antiguans in this era, the past uses of lead and the effects it can have on the human body, and data from the 1871 census were collected and incorporated into this study (Total population: 35, 157 in 1871). Of the 9834 individuals recorded, approximately 1300 (13.24%) could have died of causes that may have been associated with lead exposure. Historical research from 19th century West Indies reveals that lead poisoning had been a known health issue prior to emancipation, but understanding that individuals were exposed to the toxic element through their occupations and environments was limited. This is supported in the records as 0.99% of the 1300 individuals had lead poisoning listed as the cause of death. The other 99.01% with non-specific causes of death that could be linked to lead shows that lead exposure was not easily recognizable during the 19th century, difficult to diagnose, but definitely present and impacting life. This analysis of the historical death records reveals how even deaths recorded as non-specific causes can give insight into the lived experiences and health of past populations. In this study, greater understanding of the potential impact of lead on the post-emancipation population of Antigua is revealed.

The 'Boat Place' burial: New skeletal evidence from the 1845 Franklin expedition

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In 2013, a burial feature associated with the last expedition of Sir John Franklin was excavated on the Erebus Bay coast of King William Island. Excavation of the feature, which was marked by a cranium partially buried in a thick patch of vegetation and surrounded by ten boulders, revealed human skeletal remains representing a minimum of three individuals. One of these individuals was determined to be a young adult male, and the remains of a second individual were significantly larger than those of the other two individuals. Little evidence of pathology was noted in the remains. Four bones displayed cut marks, some of which may have occurred during the process of removing the skeletons from a boat in which they are believed to have originally been found. The number and composition of the bone assemblage suggest that it includes two crewmen discovered in a ship's boat in 1859 by the McClintock search expedition, and buried by Frederick Schwatka in 1879.

Cranial diversity among South Asians and their affinities with other circum-Indian Ocean populations

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Evidence from genetics and palaeoanthropology indicate an early and specifically southern movement of modern humans out of Africa, as well as subsequent dispersals that populated the circum-Indian Ocean regions. South Asia, centrally located in this hypothesized dispersal route is

denoted as a palimpsest of people who have migrated in successive waves from prehistoric through recent times. While cranial shape can be subject to certain environmental influences, the strong hereditary basis for cranial shape is established, and cranial shape can be used to infer affinities and distances between populations. In this study, I focus on the cranial metric variation among selected recent South Asian groups. The focal sample includes crania from Northwest India, Northeast India, South Central India, the Vedda and the Sinhalese. Craniometric data was collected using the standard Howells' methods and the variation among the selected groups is investigated using multivariate statistical analyses. I describe the cranial shape of South Asian subpopulations and show striking similarities between these groups. The results of the analyses suggest that the South Asians are a relatively homogeneous regional population with subpopulations within South Asia sharing close affinities. Next I compare the South Asians with selected recent circum-Indian Ocean populations and demonstrate the affinities South Asians share with certain adjacent populations, while being clearly different from others. Early and more recent dispersals, gene flow between adjacent peoples, genetic drift due to isolation, as well as local adaptations, explain the observable similarities and differences among these populations.

Intra-individual variation in stable isotopes of carbon and nitrogen measured in collagen across a single section of human diaphyseal bone

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This study tested an optimized bulk sampling technique for cortical bone collagen used in stable isotopic analyses. The strategy combined polarized light microscopy and histomorphological analysis with principles of skeletal biology to direct the sampling of cortical transections from humeral diaphyses. Conventional bulk sampling techniques under-utilize embedded isotopic information within cortical bone by not conforming to its biology as a tissue. The cortex of a human long bone repositions itself through endosteal and periosteal modeling in response to changing mechanical demands during musculoskeletal development; this phenomenon is referred to as "modeling drift". In the present study, primary bone deposits resulting from modeling drift on the periosteal and endosteal surfaces of mid-shaft thin sections from human humeral diaphyses were sampled for isotopic analysis using a computerized milling machine. The un-remodeled, primary bone samples from each individual were used to assess intra-individual isotopic heterogeneity through stable isotopic analysis of collagenous carbon and nitrogen. A total of four left humeri from the Odd Fellows skeletal collection were studied using this technique. The $\delta^{13}C$ and $\delta^{15}N$ values of each collagen sample were measured with a precision of ± 0.1 ‰ for both carbon and nitrogen. The observed isotopic variation within each individual ranged from 0.3 to 2.0‰ for carbon and 0.4 to 2.9‰ for nitrogen. Thus, this technique may be useful for assessing dietary variation during osseous drift, which generally occurs between adolescence and early adulthood in humans. Moreover, our study demonstrates a novel application of within-individual stable isotope analysis for corroborating histomorphological observations of bone.

Comparing novel point-count and hand-drawn histomorphometric techniques for analyses of primary bone deposits in human diaphyses

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This study develops and compares two methods permitting quantitative analyses of cortical bone distributions for applications in biological and forensic anthropology as well as anatomical and medical research. Particularly in anthropology, we rely on a detailed understanding of bone morphology as an informant on past growth and mechanical adaptation to inform us on various aspects of the lived experience of past populations. Unfortunately, most microscopic inquiries focus exclusively on secondary bone resulting in easily observed features such as osteons, the layered sheaths of bone enclosing vessels that accompany processes of tissue maintenance and maturation. Primary bone deposition, however, accounts more directly for bone strength and shape, but, until now, has not been quantified with comparable rigor. Two novel techniques for achieving this goal are presented and compared in this report, permitting the statistical comparison of cortical tissue distributions about the diaphysis, at the population level. The starburst point-count and hand-drawn techniques, interrelate microscopic and cross-sectional geometric data to compare processes previously unquantified such as bone modeling and cortical drift. Both methods identified similar trends when applied to histological analysis of modern and archaeological skeletal population samples from Yucatán, Mexico. Each, however, has their own advantages and disadvantages. For applications considering a wide range of histological variables that would benefit from simultaneous analysis of primary tissue distributions, the starburst point-count technique is recommended; whereas, targeted quantification of cortical drift can be accomplished much more rapidly using endosteal tissue as an indicator assessed by the 45° stitched image hand-drawn technique.

Fracture prevalence at the Royal London Hospital: Archival and skeletal evidence

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This paper discusses fracture prevalence at the Royal London Hospital during the late eighteenth and early nineteenth centuries in London, UK as a vehicle to examine both the complementary possibilities of using disparate lines of data to study the past, and the limitations and biases of these datasets. The hospital, founded in 1740, was one of London's charitable hospitals, which cared for the working poor. Admission and discharge records exist for 1760, 1791, 1792, and the latter half of 1805. Of a total of 4174 entries, 439 individuals entered the hospital due to fracture. Data patterns concerning individuals' age, sex, fractured body area, length of stay in hospital, and result of stay were analyzed to reveal fracture prevalence in relation to sex, age, and seasonality. Of the skeletal remains of 123 individuals buried at the Royal London Hospital in the early nineteenth century (curated by the Museum of London), 63 were determined to have suffered one or more fractures. The two datasets contribute to an understanding of medical treatment at the Royal London Hospital; however, comparison of fractures by body area (dictated

by the diagnostic labels used in the archival records) revealed statistically significant differences ($p < 0.01$) in the fracture prevalence between the archival and skeletal results for the leg, rib, foot, hand, nose, spine, wrist, ankle, and hip areas. This study highlights the contradictions that may be encountered whilst incorporating multiple lines of evidence in the study of past lives.

Unfitness of fatness: Body mass and risk of developing nausea and vomiting of pregnancy (NVP) in a small-scale Fijian population

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Nausea and vomiting during pregnancy (NVP), associated with appetite suppression, presents an evolutionary puzzle. NVP and related symptoms impose substantial energetic and nutritional costs, yet continue to affect most pregnant women in most populations.

Several hypotheses from the literature propose that NVP persists because it offers fitness benefits that outweigh its costs. All such adaptive hypotheses share the underlying assumption that NVP imposes lower relative costs on well-nourished mothers, since these women possess larger energetic and nutrient buffers against NVP-related declines in food intake. This reasoning suggests that obese women should be more likely than other women to express NVP symptoms because they can more easily afford to do so. While some Western epidemiological evidence supports this prediction, it has previously not been directly tested and it has not been investigated in a non-industrialized context.

So, we evaluated this prediction using data from 26 women from Yasawa Island, Fiji. Yasawa Islanders represent a small-scale society undergoing a nutritional transition, with very high prevalence of overweight and obesity. We used bootstrapped Chi square tests and logistic regression (controlling age and parity) to assess whether Yasawan mothers with larger energetic reserves, proxied by high Body Mass Indexes (BMIs), were more likely to report experiencing NVP than women with lower BMIs.

Counter to expectations, all analyses indicated that women with obese BMIs (above 30) were less likely than women with lower BMIs to report NVP and far more likely than thinner women to report no NVP.

There are two possible explanations for these findings. First, the adaptive hypotheses for NVP may be inadequate. However, overwhelming evidence – including other lines of evidence from Yasawa – suggests that NVP generally yields fitness benefits, casting doubt on this first explanation. Second, the high incidence of "no NVP" responses among obese Yasawan women may represent pathology. Consistent with this second view, the only two women in our sample that experienced late term fetal loss had BMIs greater than 35. We suspect that potential buffering benefits offered by fatness may be overridden by health complications associated with extreme obesity. This pathology hypothesis should be explicitly tested in future work.

Barriers to the uniting of community-based research and the use of peer research assistants in HIV research in Atlantic Canada

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Anthropological and health-related disciplines use the community-based research approach (CBR) as a strategy to develop trust and build rapport with communities to gain access to vulnerable populations. Community-based research has evolved as a multidisciplinary approach to involve the use of peer researcher assistants (PRA) in the research decision-making process and gathering of data. Specifically, PRAs may be trained in a variety of data collection methods to assist in a community-based project. Recent work on the meaningful use of PRAs focuses on ethical issues related to supporting PRAs, accessing the authentic experiences of those being studied, and understanding the interrelationships between vulnerable populations and health disparities. I argue that the uniting of CBR and PRA is region-specific by nature and may not be appropriate for the studying of women living with HIV in Atlantic Canada. Although the use of PRAs has proven to be effective in studying sensitive issues because they may share similar values of the culture or relate to their peers, I argue that this approach is a methodological challenge for researchers to incorporate in HIV research in Atlantic Canada. The financial limitation of researchers or NGOs to hire PRAs and the continuing stigmatization of people living with HIV are challenges to overcome for the inclusion of PRAs. Collaborative efforts and ongoing dialogue between researchers and study populations may assist to provide solutions to this methodological barrier. Some of the examples in this paper draw on my fieldwork experiences of working with AIDS Service Organizations in Atlantic Canada.

Anthropometry and range of motion (ROM) of the encumbered Soldier

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Limited information and data currently exists characterizing space and movement requirements for fully encumbered Soldiers. Studies have focused on minimally clad individuals, therefore introducing many integration, safety, and comfort issues for individuals who are required to wear multilayered Clothing and Individual Equipment/Personal Protective Equipment (CIE/PPE). This study describes the fully encumbered Soldier via his/her anthropometry and range of motion. A total of six configurations were chosen: a Semi-nude (anthropometry only) configuration; a Baseline (duty uniform) configuration; a plate carrier Rifleman configuration (2R); a plate carrier Grenadier configuration (2G); a body armour vest Rifleman configuration (5R); and a body armour vest Grenadier configuration (5G). Across all four encumbered configurations there were significant increases in key circumference, breadth, and depth measurements related to the CIE. This increased body size (i.e., bulk) and additional weight (13-23 kgs, depending on body armour system and duty position) had a significant decrement on the Soldiers' range of motion for many body movements. The increased weights are not well-distributed around the body, but

concentrated around the torso. When Soldiers are encumbered, their range of motion degrades from 6-27 degrees for the majority of the goniometer measurements obtained and from 16-159 millimetres (mm) for the majority of reach measurements taken, depending upon the movement, body armour system, and duty position. From this study, 1) we now have a standardized methodology for collecting both encumbered anthropometry and range of motion data and 2) a dataset which informs us about the space and movement impacts from two different body armour configurations (plate carrier and vest) and the impacts from two different load configurations (Rifleman and Grenadier). This information adds to the body of knowledge which will improve future designs of CIE and military workspaces as well as improving the understanding that Soldier load/bulk have on performance, comfort, and survivability.

Diet and geographic origins of British Royal Navy sailors: Life histories from the Southside Naval Hospital Cemetery, St. John's, NL

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The British Royal Navy protected a vast maritime territory during the 18th and 19th centuries, creating difficulties in sustaining a dispersed group of sailors. During this time Newfoundland had a small but important British naval presence that protected the lucrative cod fishery and convoyed merchant ships across the Atlantic. In order to maintain their numbers, the British Royal Navy routinely conscripted fishermen who were working in Newfoundland waters. British Royal Navy history is inherently biased towards the literate upper ranks and there are few details regarding the lives of sailors. Although, the navy had strictly defined rations, their effectiveness in controlling sailors' diets, particularly alternative foods, is not well understood. Stable isotope analysis of human bone collagen and tooth enamel bioapatite is an effective tool for determining sailor origins and diets. A cemetery on the south side of St. John's harbour, associated with the British Royal Naval Hospital (ca. 1725-1825), was excavated in 1979 producing a minimum of 18 individuals. Here we present preliminary results of the diet and geographic origins of these individuals through the use of stable carbon, nitrogen, and oxygen isotope analyses of skeletal tissues. These results are compared to existing isotopic data from other historic British Royal Navy hospitals and Newfoundland civilian cemeteries in order to better understand naval dietary variability. Assessing the origins and diets of these individuals within the context of Newfoundland will speak to the broadness of nationalities and availability of foods within the British Royal Navy during the 18th and 19th centuries.

Sex determination using mesio-distal dimension of permanent maxillary incisors and canines in a modern Chilean population

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The purpose of this study was to determine if sexual dimorphism is present in the maxillary central and lateral incisors and maxillary canines of a modern Chilean population. Moulds from128 males and 177 females were selected from the Instituto Nacional de Ortodoncia in Santiago, ranging from 13 to 33 years of age.To determine the presence or absence of sexual dimorphism a two-sample *t*-test was used to test for statistical difference between means. Pearson's correlation coefficient, *r,* was calculated to measure the effect size of the relationship between mesio-distal dimensions and sex. Canonical discriminant function coefficients were used to develop formulas to estimate sex from the teeth that exhibited sexual dimorphism. The results of this investigation showed that although the mean measurements of the teeth were all greater in the male population, only statistically significant sexual dimorphism was present in both paired central incisors and canines. The right canine had the highest overall correct classification percentage with 78.5% correct female identification and 49.2% correct male identification. This research demonstrates that sexual dimorphism is present on the maxillary canines and central incisors but that the formulas derived from the mesio-distal measurements are of limited use because of the low correct classification of males. No previous research on teeth dimensions has been done on the Chilean population with the purpose of estimating sex. This study has contributed to the characterization of this population and could help correctly identifying sex in a small percentage of cases involving unknown individuals.

Ancestral Aches? Vertebral morphology, locomotion, and human spinal health

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Humans are afflicted by back problems more frequently than other primates and researchers have suggested that bipedalism may be the cause. This hypothesis has been widely discussed, but never properly tested. There is reason to think that vertebral shape may be an important component of a stable bipedal spine and that particular shapes may be inadequately adapted for the strain generated by upright locomotion. Accordingly, we examined the relationship between vertebral shape, locomotor behaviour, and Schmorl's nodes. Schmorl's nodes are depressions on the vertebral body resulting from vertical herniation of the intervertebral disc, which is one of the most common causes of back pain among contemporary humans. We used geometric morphometrics to analyze the shape of the final thoracic and first lumbar vertebrae of humans, chimpanzees, and orangutans. These species were chosen because they all exhibit different locomotory behaviours.

We found that chimpanzee, orangutan, and healthy human vertebrae were statistically distinguishable, which suggests that vertebral shape is influenced by locomotory behavior. We also found that pathological human vertebrae were statistically indistinguishable from chimpanzee vertebrae. These results indicate that human vertebrae with Schmorl's nodes share similarities in shape with chimpanzee vertebrae, and offers tentative support for the hypothesis

that back pain may, in part, be due to individuals having a plesiomorphic vertebral shape which is relatively poorly suited to bipedalism.

This research was funded by Mitacs and the Social Sciences and Humanities Research Council, Canada Research Chairs Program, Canada Foundation for Innovation, British Columbia Knowledge Development Fund, and Simon Fraser University.

Craniometric analyses of Chinese Bronze Age populations

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Bioarchaeological analyses using craniometrics is a useful tool to examine population variation, and has been used to show diversity within and between geographic regions. For our study we focused on Northern China where we can test if populations in this region have similar cranial morphology through time. Gibbon obtained 24 cranial measurements of 62 crania from Northern Chinese populations during the Bronze Age; 37 from Longxian, China dated to 3000 BP during the Shang Dynasty, and 25 from Qi Li Cun, China dated to 1600 BP during the Eastern Han Dynasty. In addition, Howell's data for two Chinese populations were used; 42 crania from Anyang, which are dated approximately to 3000 BP during the Shang Dynasty, as well as 83 crania from Haikou City, Hainan over a broad time period. Variation of cranial morphology within and between these populations was assessed using statistical analyses in SPSS version 21.0. Discriminate analysis showed clustering of Qi Li Cun and Longxian separate from Anyang and Hainan. This was unexpected as Anyang is from a similar region and time period as Longxian and Qi Li Cun. The Kruskal-Wallis test indicated few measurements were significantly different statistically between Qi Li Cun and Longxian. Due to their temporal difference we expected regional changes in the sociopolitical environment to reflect greater variability. However, both populations are of Mongolian descent which may explain their similarity, and their variation from the Anyang sample of similar time period but are descendant from a local Chinese population.

Comparing three collagen extraction procedures for stable carbon and nitrogen isotope analyses of archaeological and modern bone

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Stable carbon and nitrogen isotope analysis of bone collagen has become a standard method of palaeodietary research in archaeology. However, laboratories use various procedures for the extraction of collagen. This is problematic because different methods may produce varying carbon and nitrogen isotope ratios, which may affect the comparability of isotope data and interpretation of palaeodietary information. In this study, three collagen extraction methods (the

Sealy method and two modifications of the Longin method) are compared in order to determine whether one method is optimal for extracting collagen. Animal bone collagen from different archaeological ages and states of preservation were extracted and analyzed then the isotope data were compared with consideration of diagenetic indicators including collagen yield, wt % C, wt % N, and C:N ratio. Our results indicate the two modified Longin methods produce comparable collagen yields despite the inclusion of a filtration step in one of these methods. In contrast, the Sealy method consistently produces higher collagen yields due to a lack of filtration and/or a gelatinization step. The results of stable carbon and nitrogen isotope analysis presented in this poster will provide a better indication of the comparability of these three bone collagen extraction methods. Furthermore, this research allows for factors such as sample preservation, amount of sample, as well as time and funding to be considered when approaching a new stable isotope project.

Investigating three-dimensional surface variation in the frontal sinuses: A pilot study

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Identification of unknown individuals is an important aspect of forensic cases. The frontal sinuses are one skeletal region that has been used to aid identification because they are considered unique to each individual and show a high degree of morphological variation. Basic superimposition and side-by-side comparison approaches have given way to quantification methods.

A recent test of the three previously published techniques (on an independent sample) revealed that these methods were not able to produce correct unique matches for all cases. One possible explanation is the reliance on two-dimensional data. To date, three-dimensional variation in the frontal sinuses has only been explored in a single study.

This study utilized an anonymised postmortem CT sample of 130 individuals (males n= 70, females n=57, unknown n=3) from the University of Copenhagen. The age range of the sample is 19 to 88 years (mean males = 49.88 years, mean females = 54.93 years). Three-dimensional rendering of the frontal sinuses was carried out using Materialise MIMICS™ for all individuals twice, permitting comparisons to be made between the same individual (different renderings). Point cloud data were down-sampled to 100 surface coordinate points per individual. The data were transformed using Procrustes fitting; principal components analysis (PCA) and discriminate function analysis was used to investigate shape and form.

This pilot study illustrates the potential for three-dimensional surface analysis of variation seen in the anatomy of the frontal sinuses. Preliminary results show that the variation in shape and form is not confined to specific regions of frontal sinus anatomy. These findings highlight an important limitation to consider when developing and assessing methods and establish an explanation for why two-dimensional methods are not fully capable of capturing the individual uniqueness present in these structures.

The Nova Scotia medical examiner service skeletal reference collection: Curating a skeletal collection for medico-legal investigations.

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After attending this presentation, attendees will recognize the value in creating, maintaining and utilizing regional specific faunal skeletal reference collections for comparative skeletal analysis in medico-legal investigations. The purpose of this project was to develop a comprehensive reference collection that contained complete skeletons of indigenous fauna from the province of Nova Scotia. This collection will allow forensic anthropologists to rapidly identify complete and poorly preserved human and non-human skeletal remains recovered during forensic investigations; this allows police to quickly clear scenes that are not of medico-legal interest. The Dr. William D. Finn Centre for Forensic Medicine, Dartmouth, Nova Scotia, houses the Nova Scotia Medical Examiner Service (NSMES) Skeletal Reference Collection. This growing collection is currently comprised of over 15 species and over 20 complete skeletons. Animal carcasses were obtained through collaboration with the Nova Scotia Department of Natural Resources. The remains were de-fleshed using a uniquely developed and effective five-step maceration process which applied natural, mechanical and chemical maceration techniques. The outcome of this project resulted in well-preserved and complete faunal dry bones for curation and comparative analyses that are readily available to anthropologists and pathologists to aid in the identification process.
This project has resulted in a curated reference collection that has greatly facilitated the process of skeletal analysis. Identifying an unknown bone as non-human by physically matching it to that of known animal bones is a necessary confirmatory step in the anthropology identification process.

A new metric technique for assessing ancestry from the femur

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Torsion through the femoral head and neck has been identified as a feature that presents differently between populations and can be applied to ancestry assessments (Stewart, 1962). Current techniques for investigating femoral torsion are morphological or involve calculating torsion through a series of measurements (Bass, 2005; Byers, 2008). There is no single measurement that quantifies torsion, nor examines torsion independent of femoral curvature for ancestry assessments. The purpose of this research was to investigate an angle measurement of femoral torsion, as utilized in pathological studies, for ancestry assessments. The angle measurement was investigated with 35 European-Canadian femora from the Grant Skeletal collection and 35 First Nation femora from the Kleinburg Ossuary collection with permission from the Huron-Wendat Council. The angle measurement was taken directly on the femur, as well as on 3D images of the femora. With the increased use of 3D images for research and in

archiving, metric techniques must be tested to determine if they can be accurately applied to digital data. The digital equivalent of the angle measurement was obtained using the 3ds Max 2015 software package. The results of this research identified a 5% higher accuracy in correctly classified femora using 3D images (85.71%) compared to the angle taken on the bone itself (80%). This difference supports the prospect of greater versatility with 3D images. The positive results of this research verify the use of femoral torsion as an independent feature for assessing ancestry and the prospects of employing digital data equivalents of techniques.

3D images and their use in metric analyses of ancestry from the femur

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The use of 3D images in conducting research has increased with technological availability, however metric-based research purely on 3D images is limited. 3D images allow researchers to manipulate skeletal elements in ways not possible with actual bones, such as the use of measurements and tools that slice the 3D images. Manipulations and measurements that would be difficult or impossible to apply to actual bone, can be developed specifically for 3D images through the use of specialized software. The greater malleability of 3D images has the potential to develop alternative methods for obtaining measurements, while reducing the subjectivity of landmark selection for measurements.

The purpose of this research was to establish the comparative value of digital measurements to manual data. To verify the effectiveness of digital data, this research investigated a series of measurements from established protocols on the femur. These same measurements were then obtained from 3D images of the femora created with photogrammetry and a structure light scanner. The digital measurements were gathered through the 3ds Max 2015 software package in a manner that could be replicated with other software packages with measuring functions. With positive results indicating no differences between the manual and digital datasets, each dataset was employed to perform an ancestry assessment on the femora of a European-Canadian and a First Nations population. The manual to digital comparison of datasets established the equivalence of digital metric data for analyses. The positive results of this research demonstrate the accurate versatility and potential for conducting research from 3D images.

Evolutionary relationships of long-tailed macaques (*Macaca fascicularis fascicularis*) from Singapore revealed by detailed phylogenetic analyses of mitochondrial DNA sequences

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Long-tailed macaques, *M. fascicularis*, have a wide geographic distribution across mainland and insular Southeast Asia. We performed phylogenetic analyses of *M. fascicularis* mitochondrial 12S/tRNA-val/16S sequences to test the hypothesis that macaques from Singapore form a monophyletic clade relative to those from the southern Malay Peninsula. We used previously archived sequences in GenBank and new sequences from Singapore (n=16) and Bali, Indonesia (n=2) in a Bayesian phylogenetic framework to co-infer evolutionary histories and divergence dates, and with maximum parsimony (MP) and maximum likelihood (ML) analyses to infer phylogenetic relationships. Our results provide only marginal support for this hypothesis. Sequences originating from the southern Malay Peninsula and Singapore formed a statistically well-supported monophyletic clade in the ML, MP, and Bayesian analyses with a mean inferred divergence date of about 0.242 years ago. Singapore macaques formed a poorly supported monophyletic subclade within the peninsular clade in the ML analysis, but clustered strongly in the MP and Bayesian analyses. A median-joining network of haplotypes mirrored the results from the phylogenetic analyses, with the exception of Singapore, which did not form an exclusive hapolotype grouping. Our study was limited by the availability of sequences from important regions of this species geographic range. Future research should build on available data by including the 12S/tRNA-val/16S sequences from *M. fascicularis* populations east of Wallace's Line, Java, the Philippines, Myanmar, Bangladesh, and the small islands of the Indonesian and Malaysian archipelago.

A preliminary analysis of osteocalcin extraction and implications for the archaeological study of stress

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During prolonged periods of stress the human body undergoes a chemical transformation that affects the normal metabolism of the skeleton, effectively leading to hard tissue changes. Underlying this mechanism of skeletal disruption however, is a specific change in protein secretion that may be used to explore the stress mechanism beyond gross macroscopic observation. Osteocalcin, produced by the osteoblast cells, is the second most abundant protein in the body, which during times of stress may be reduced as the osteoblast cells are negatively affected by the release of glucocorticoids. For this study, bone samples from the femur and clavicle were collected from 20 individuals from the Black Friars (13^{th}-17^{th} centuries) Danish sample to test an extraction protocol for osteocalcin. Using microBCA to enumerate total protein content and an enzyme-linked immunosorbent assay to quantify osteocalcin in the extracts (ELISA), our results demonstrate that osteocalcin is present in these archaeological samples and at levels that we would expect based on clinical evidence. Further, the amount of osteocalcin extracted in both the femur and clavicle samples were compared with macroscopic indicators of stress to evaluate the relationship between osteocalcin levels and the presence or absence of skeletal stress. In the femur samples, results showed no significant differences when comparing osteocalcin amounts between individuals with and without stress indicators present; however in the clavicle samples, there were significant differences in the amount of osteocalcin present in those with and without stress indicators present. While this study is limited by a small sample

size, these preliminary patterns have important implications for how stress is identified, quantified, and interpreted in archaeological samples.

Micronutrient-rich complementary foods: Enhancing ancient hominin solutions in contemporary human contexts

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Recently, nutritionists and anthropologists have clarified details of likely deficits in actual nutrient intake between many contemporary infants and the inferred diets of ancestral human infants prior to the adoption of agriculture. Factors likely contributing to these gaps include profound and widespread alterations in human birthing and postnatal care practices. Premature cord clamping, bottle-feeding, infant formulas and infant food preparation are accompanied by loss or reduction in breastfeeding, pre-mastication and feeding of micronutrient-rich eggs, meats, fish, berries and nuts in the second half of infancy, and the direct contributions of older children to their own diets (through food gathering, preparation, or both). The contemporary problems caused by these changes include widespread micronutrient deficiencies, increased child mortality, morbidity, and developmental deficits and reduced health, embodied human capital formation and economic gains. With renewed global interest in food fortification for low and middle income countries (LMICs), evolutionary anthropological modelling of how ancient humans accessed and delivered micronutrient dense foods to older infants as part of a broader "evolved care package" may prove a useful strategy for designing innovations to solve problems of micronutrient deficiencies in complementary foods, and human diets in general. However, key social environmental mediating factors include nutrition insecurity, weak networks of psycho-social support and hostile daily environmental conditions associated with economic poverty. There is potentially considerable value in developing new political economic indicators of whether governments respond to and adopt global recommendations, and at the levels required; whether industry partners comply with guidelines and legislation, and whether micronutrient rich food product distribution chains reach vulnerable families and malnourished women and children. Applied, biocultural and critical evolutionary anthropology offers ways to integrate multiple perspectives and generate positive change on delivering micronutrient-rich complementary foods.

Canada's two death investigation systems in review

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The coroner and medical examiner systems seek to determine the cause and manner of death. The coroner typically communicates the investigation process and timelines with those experiencing grief, and answers questions the grief stricken may have, while simultaneously gathering facts and information necessary for the investigation. This investigation can include a

Coroner's Inquest, or a Child Death Review, with a focus on advancing public safety. In the medical examiner's system it may involve a Fatality Review Board as there are no inquests. Investigations can draw on other specialists such as physical anthropologists, forensic anthropologists, pathologists, forensic pathologists, toxicologists, police services, and others. There is a great deal of controversy around the two death investigation systems, as both have strengths and weaknesses, and they have come under scrutiny in recent years. An overview of both systems will be provided, where they originated, how they are similar and different across Canada, and examine the current criticisms. Drawing on some personal examples some interesting challenges faced by coroners will be presented. I will then conclude by looking briefly at the current situation in New Zealand, the United Kingdom, and the United States, as they are similar to those in Canada, and have recently been undergoing change.

The assessment of osteoarthritis in mummies: Promise and challenges

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This poster outlines an ongoing project examining patterns of osteoarthritis in ancient Egyptian mummies using the IMPACT radiological database housed at the University of Western Ontario. This project builds upon previous research in the non-destructive study of human mummies and demonstrates some of the ways in which the IMPACT database can be used for paleopathological research. Its main purpose is to determine the feasibility of incorporating soft tissue features into the study of osteoarthritis in ancient Egyptian mummies through the use of CT scanning. In doing so, we will evaluate whether or not degenerative changes in the soft tissue can be identified in desiccated remains and also provide suggestions for ways in which to improve this process. One particular area of interest to this project is scan resolution and its effect on our ability to distinguish the anatomical features of the joints in severely desiccated remains, as well as to identify radiological signs of degenerative disease. This project will shed light on the impact of factors such as resolution and body positioning on our ability to accurately perform retrospective diagnoses. It will also highlight some possibilities for future paleopathological research on larger sample groups of human mummies through the use of the IMPACT database.

Female life-history characteristics in ursine colobus monkeys (*Colobus vellerosus*)

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For primates that lack external signs of oestrus, like many colobine monkeys, documenting life-history characteristics can be of considerable value because they provide information about traits that directly affect survival, as well as the timing or rate of reproduction. Documenting the mating behaviour of the females relative to their endocrine and ovulatory cycles is also useful as male infanticide is often prevalent in these species. The timing of mating events has been argued as a potential counter-strategy to infanticide. One such strategy may be mating during pregnancy

(pseudo-oestrus). We collected 12 months of data at Boabeng-Fiema Monkey Sanctuary (May 2012-2013) on four groups of *colobus vellerosus* using 10-minute continuous focal and *ad libitum* sampling. We measured mating behaviour and ovarian hormones in 18 *colobus vellerosus* females (prepubescent n=2, cycling n=2, lactating n=12, pregnant n=7, and post-reproductive n=1). The goal of this paper is to present some preliminary life-history characteristics in this species. We collected fecal samples (n=2800) every 2-3 days from all study females and extracted oestrogen (E2) and progesterone (P) metabolites in the field using solid-phase extraction cartridges. We analyzed 1586 samples for E2 using radio-immuno assays, and P using enzyme-immuno assays at the Wisconsin National Primate Research Center, to create a hormone profile for each female. Mean ovarian cycle length was 24 days +/-1 (n=2 cycles). Mean gestation length was 23 weeks (range=21-25 weeks, n=2 pregnancies). For females whose infants survived to weaning, the mean inter-birth interval was 74 weeks (range=36-104 weeks, n=8), whereas inter-birth interval averaged only 48 weeks (range=31-64 weeks, n=3) in females whose infants experienced infanticide. Four females solicited mating and mated while pregnant, all during periods of change in male group membership. When male group-membership is unstable, and infanticide risk high, pseudo-oestrus may be a counter-strategy to infanticide. This study was designed to contribute to a growing body of work that uses behavioural and endocrine data to describe primate life-history variables and mating systems. Detailed study of a single species can provide crucial insight into its life-history and mating systems, and the subtle effects of specific behaviours on social relationships between males and females.

Sel'ungur – Middle Pleistocene hominins from Central Asia?

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Sel'ungur cave is located in the Sokh river valley of the Fergana depression (Kyrgyzstan), near the present day town of Khaidarkan, and was excavated in the 1980s by U. Islamov.
The dating of the about 8m thick sequence is not completely clear, but the large mammal fauna, the microfauna and a single U/Th date all indicate a Middle, likely Late Middle Pleistocene age. The lithic industry is dominated by short and massive flakes and contains choppers, simple sidescrapers, notches and denticulates, and is similar to the pebble and flake industries of the Early Middle Palaeolithic in Central Asia, supporting this age.
Six supposedly human teeth, and a juvenile humerus shaft were found in the third cultural horizon in 1988. In this study we reanalyze the hominin material, using a large fossil and recent comparative sample. We show that while the dental material, contrary to previous interpretations, is likely not hominin, the child humerus represents the earliest human remains from Central Asia. It shows archaic features such as extremely high cortical thickness, while the triangular cross section and mediolateral flattening of the distal half of the shaft are reminiscent of the morphology seen in Neanderthals.

Are colour and preservation of submerged bone useful indicators of taphonomic history?

Young J.

Canadian Museum of History

In the summer of 2003, the fragmentary post cranial skeletal remains of a young male washed up on the banks of the Ottawa River. Site observations noted dark brown colouration of the elements with aspects of the cortical bone eroding to reveal the inner trabecular structure. Initial inspection suggested the bones may be very old, even archaeological perhaps, washed into the river from an unknown cemetery or exposed from an inundated burial site. However, once extraction of the remains from the water began remnants of modern clothing were found intertwined with some of the osseous elements indicating forensic significance. The modern nature of the remains may have been ultimately discounted if determination of temporal context was based solely on the initial macroscopic examination of the skeletal elements. A question as to whether the colour and preservation of submerged bone could be used to distinguish previously buried, exposed, or fresh remains emerged. To provide insight, a pilot observational study was initiated. This paper will outline and discuss the nature of the research conducted, the results of the 40 month investigation, and how the findings relate to the case that initiated the inquiry.

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10. Brydone Jack Observatory - 5 Bailey Dr.
11. Building #7 - 6 Garland Ct.
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13. Campus House - 11 Garland Ct.
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18. Computer Science Information Technology Centre - 550 Windsor St. - A/B/C
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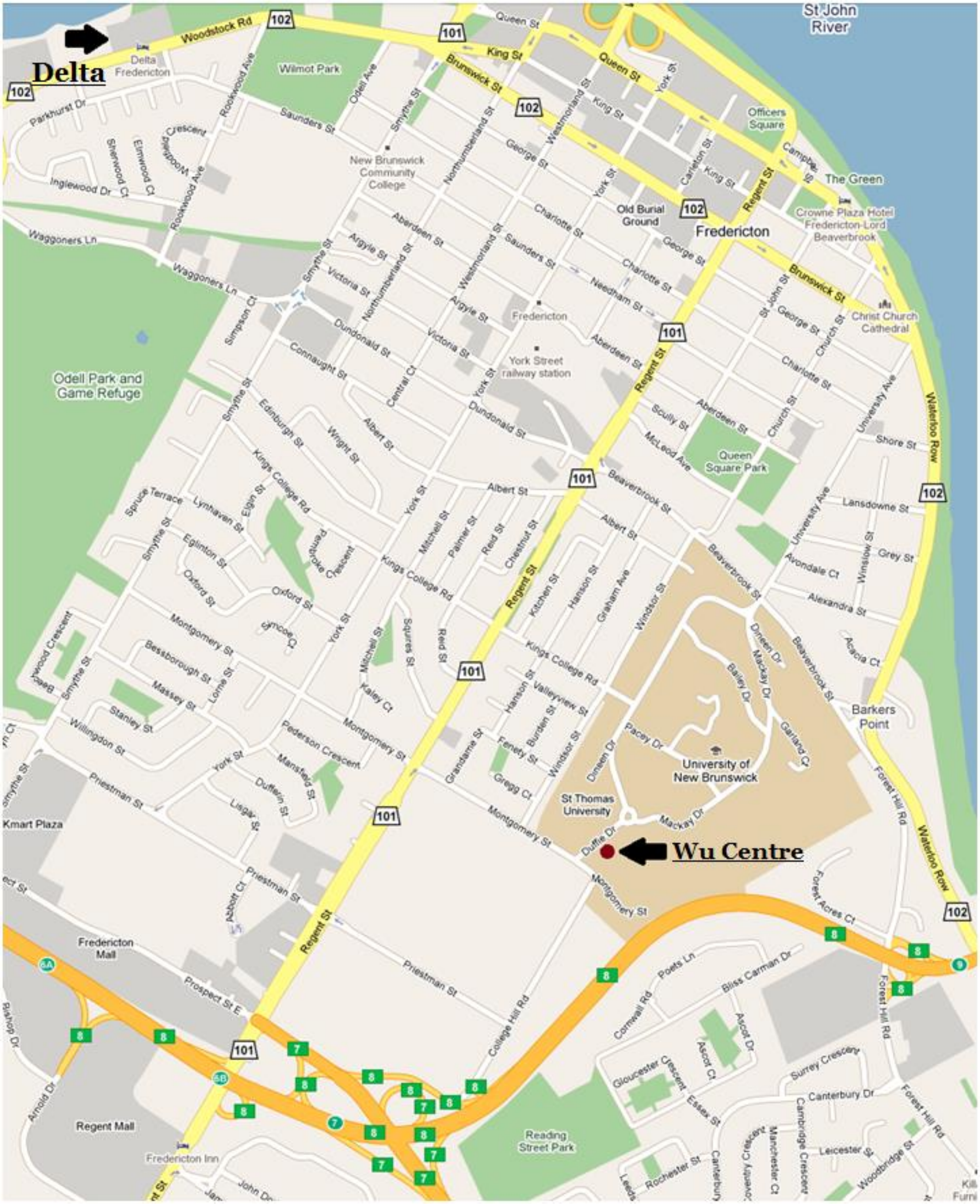
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