

43rd Annual Meetings of

THE CANADIAN ASSOCIATION FOR
PHYSICAL ANTHROPOLOGY



L'ASSOCIATION CANADIENNE
D'ANTHROPOLOGIE PHYSIQUE

28-31 October 2015

Fort Garry Hotel

Winnipeg, Manitoba



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Lower Level off lobby Meeting Room

The Club & Boardroom – located in the South-East corner off the main lobby

Lobby Level Meeting Rooms

Broadway Room - located on the North-East side off the main lobby
Provencher Ballroom - located on the North-West side off the main lobby
Palm Lounge - located on the South side off the main lobby

Mezzanine Level Meeting Rooms

Gateway - located on the South-East side of the mezzanine
La Vérendrye - located on the North-East side of the mezzanine
Taché - Located next to the Gateway Room on the East side

First Floor Meeting Rooms

(Three left turns from the elevator to the Salons)
Salon A - located on the West side
Salon B - located on the East side
Salon C - located on the South side

Seventh Floor Meeting Rooms

Concert Hall - located on the West side
Crystal Ballroom - located on the East side

Fort Garry Conference Centre Meeting Rooms

Assiniboine A & B - located on floor 5 (turn right)
Assiniboine Ballroom - located on floor 5 (turn right)
Grand Ballroom - located on floor 4
Selkirk Annex - located on floor 5 (turn left)
Selkirk Ballroom - located on floor 5 (turn left)

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**Locations of Meeting Rooms
in the Fort Garry Hotel &
Conference Centre**

**Meeting Rooms in Conference
Centre - Take the stairs or
elevator to Floor 1 and cross the
Sky Walk**

Meeting Rooms

Lobby Level

Broadway Room
Broadway Annex
Provencher Ballroom
The Club Room

Mezzanine

Gateway
La Vérendrye
Taché

Floor 1

Salon A
Salon B
Salon C

Floor 7

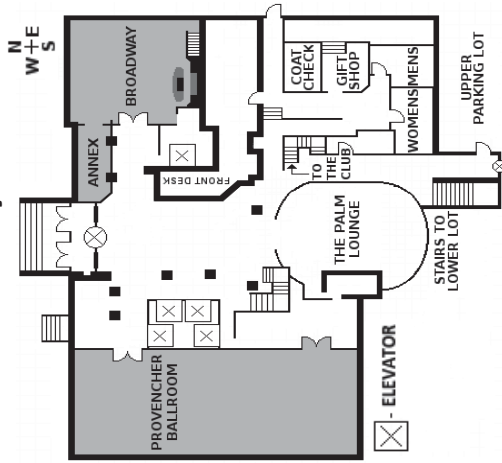
Foyer and Loggia
Concert Ballroom
Crystal Ballroom

**Fort Garry Conference Centre
via Sky Walk on Floor 1**

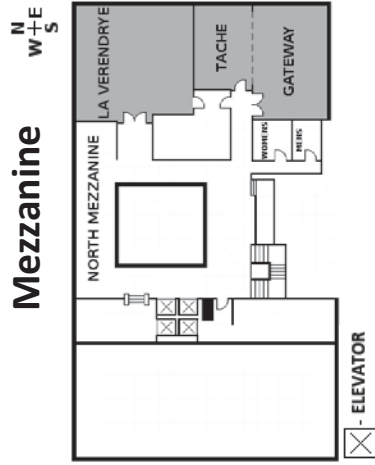
Floor 4 - Loggia
Floor 4 - Grand Ballroom

Floor 5 - Assiniboine Annex A
Floor 5 - Assiniboine Annex B
Floor 5 - Assiniboine Ballroom
Floor 5 - Selkirk Annex
Floor 5 - Selkirk Ballroom

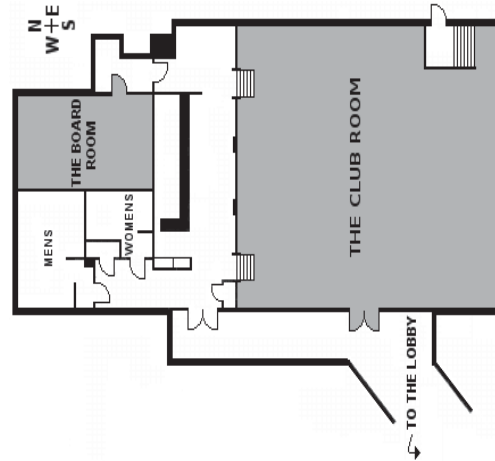
Lobby Level



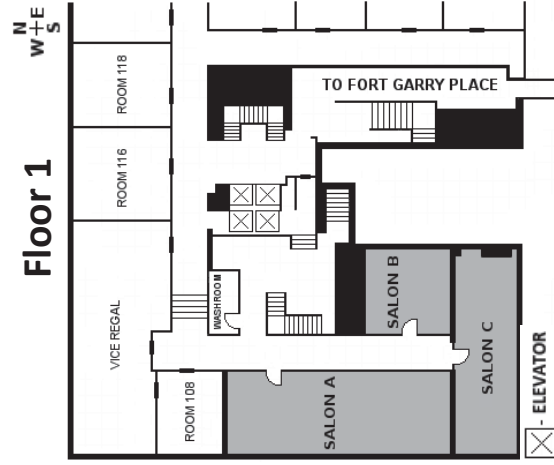
Mezzanine



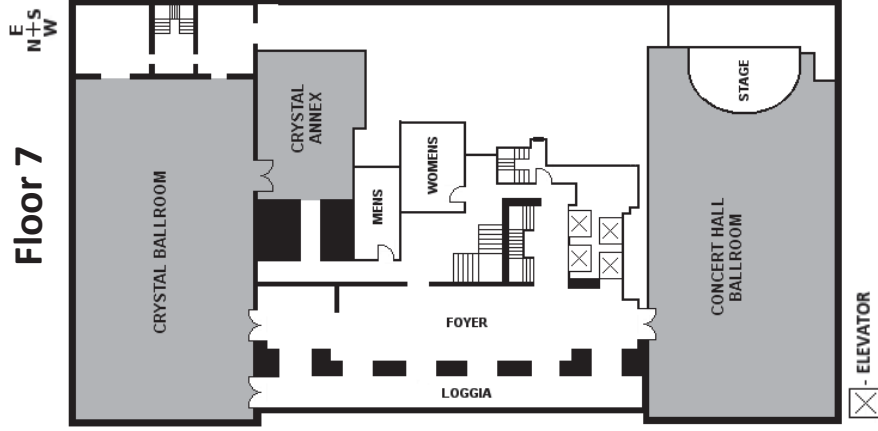
The Club



Floor 1

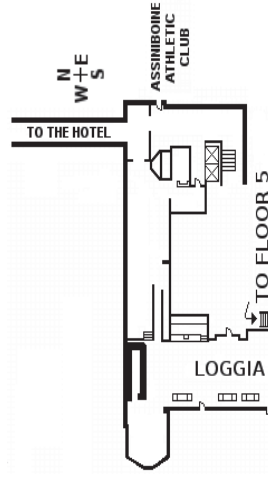


Floor 7

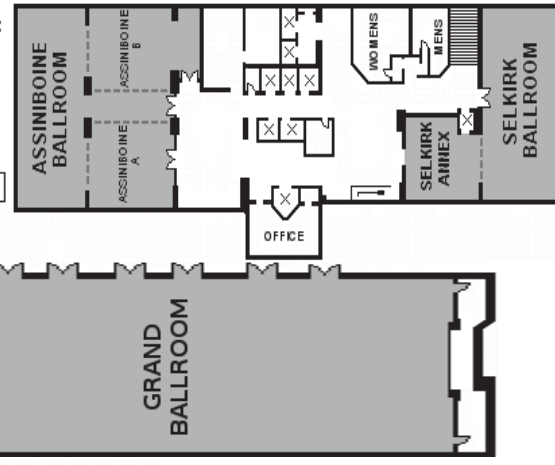


Conference Centre

Floor 4



ELEVATOR N+S W



Floor 5

WED 28th Oct

7pm - 9pm Reception - North Mezzanine (2nd level), Fort Garry
9pm - 11pm Student Pub Night - The Pint

THURS 29th Oct

North Mezzanine (coffee and posters) & LaVerendrye (podium)

7:30:00 AM - 9:00:00 AM Coffee and Registration
8:45:00 AM - 9:00:00 AM Welcome

Symposium: Reproduction and Parental Investment in Human and Non-human Primates

9:00:00 AM - 9:15:00 AM * Walker-Bolton A, and Parga J Operational sex ratio, dominance rank and mating success of group and non-group male ring-tailed lemurs (*Lemur catta*).
9:15:00 AM - 9:30:00 AM Vayro J, Ziegler T, Fedigan L and and Sicotte P Post-conceptive mating as counter strategy to male infanticide in *Colobus vellerosus*
9:30:00 AM - 9:45:00 AM Crotty A, Wikberg E, Vayro J, Fox S, MacDonald L, and Sicotte P Exploring lactation and weaning in colobus monkeys (*Colobus vellerosus*)
9:45:00 AM - 10:00:00 AM Fujita M and Baranski J Human milk antibody as parental investment: A preliminary analysis of secretory immunoglobulin A data from northern Kenya

10:00:00 AM - 10:15:00 AM COFFEE/POSTERS
10:15:00 AM - 10:30:00 AM COFFEE/POSTERS

10:30:00 AM - 10:45:00 AM * Bădescu I, Watts D, and Sellen D Maternal kinship and infant sex influence natal attraction and infant handling in wild chimpanzees at Ngogo, Uganda
10:45:00 AM - 11:00:00 AM Fox S, and Sicotte P Do mothers mediate affiliative interactions between males and infants in wild *Colobus vellerosus*?
11:00:00 AM - 11:15:00 AM Teichroeb J. Evidence of indirect parental investment by males via resource defence in nonhuman primates: variation with paternity certainty

Human Biology and Health

11:15:00 AM - 11:30:00 AM * Bhattacharjee P, Datta Banik S, and Mukhopadhyay B Low height-for-age among Limbu and Mech children and adolescents from two districts of West Bengal, India
11:30:00 AM - 11:45:00 AM Wilson WM, Brown G, Hoehn N, Szabo B, Campanella S, Schmeer KK, and Piperata BA Social capital, maternal mental health, and child health: a cross-sectional survey of mothers and their children in rural Nicaragua
11:45:00 AM - 12:00:00 PM Hallman SA, Gagnon A, Herring DA, and Earn DJD “The Empty Chair”: The 1890 Russian Influenza Pandemic in Ontario

12:00:00 PM - 2:00:00 PM LUNCH
student lunch provided

Student Professional Development Panel Discussion

Publish not perish: A professional development panel

Dr. Tracy Prowse, McMaster University; Dr. Paul Hackett, University of Saskatchewan; Dr. Treena Swanston, University of Saskatchewan

* denotes eligible for student competition

Paleoanthropology

2:00:00 PM	-	2:15:00 PM	Hopwood DE	Escalation as a Motive Force in the Behavioural Evolution of Early Homo and Homo erectus
2:15:00 PM	-	2:30:00 PM	* Klassen P	Finding our roots: premolar root morphology evolution within the Plio-Pleistocene hominin clade
2:30:00 PM	-	2:45:00 PM	Abbas RS and Skinner MM	A Geometric Morphometric Analysis of the Molars of the Piltdown Specimen
2:45:00 PM	-	3:00:00 PM	Silcox MT, Dunn RH, Kumar K, Rana R, Sahni A, Smith T, and Rose KD	What can you do with an ear bone? Phylogenetic and functional inferences from an exceptionally well-preserved Early Eocene primate petrosal (Cambay Shale Formation, India)
3:00:00 PM	-	3:15:00 PM	COFFEE/POSTERS	
3:15:00 PM	-	3:30:00 PM	COFFEE/POSTERS	
3:30:00 PM	-	4:30:00 PM	CIHR RoundTable with Nancy Klos (UofM)	
FRI 30th Oct				
7:30:00 AM	-	8:30:00 AM	North Mezzanine (coffee and posters) & LaVerendrye (podium) Coffee and Registration	
Symposium: Paleoanthropology and Migration				
8:30:00 AM	-	8:45:00 AM	Cote S	High levels of endemism in East African early Miocene catarrhines: does limited migration play a role?
8:45:00 AM	-	9:00:00 AM	Werner JJ	Hafted hunting weapons and the dispersal of early modern humans: use-wear evidence from the Magubike archaeological site, Tanzania.
9:00:00 AM	-	9:15:00 AM	Hopper C, Sealy J, and Dewar G	Tracking migration in South Africa using serial sampling of dentine for stable isotope analysis
9:15:00 AM	-	9:30:00 AM	Willoughby PR	Population expansion and contraction: The role of East Africa before and during Out of Africa 2
9:30:00 AM	-	9:45:00 AM	Roksandic M	The role of the Balkans in early human migrations to Europe
9:45:00 AM	-	10:00:00 AM	Begun D	Ample time for migration on the largest scale.
10:00:00 AM	-	10:15:00 AM	COFFEE/POSTERS	
10:15:00 AM	-	10:30:00 AM	COFFEE/POSTERS	

Sponsored by Pearson Education Canada

Symposium: Bodies in Motion: Forces, Traces, and Contact

10:30:00 AM - 10:45:00 AM	Swanston T, Bewer B, Keenleyside A, Nelson A, Martin RR, Stenton D, Varney T, Coulthard I, Pushie MJ, and Cooper DML	Unravelling the evidence for lead exposure during the Franklin expedition
10:45:00 AM - 11:00:00 AM	Bogaert KL	Conscription and Cross Protection between the First and Second Waves of the 1918 Influenza Pandemic among Soldiers of the Canadian Expeditionary Force (CEF) in Ontario
11:00:00 AM - 11:15:00 AM	Holland A, Clark T, Cybulski J, and Coupland G	Bead burials: Highlights from the shishálh Archaeological Research
11:15:00 AM - 11:30:00 AM	* Mant M, Ives R, de la Cova C, and Brickley M	Femoral neck fractures in post-medieval urban London: Palaeopathology and patterns
11:30:00 AM - 11:45:00 AM	Halmhofer S	Two Cases of Bipartite Coracoids from the Trail Bay Site (DiRw-28), Sechelt, BC
11:45:00 AM - 12:00:00 PM	Sawchuk E	Tracing the origins of East African pastoralism: new dental evidence from Turkana, Northwest Kenya
12:00:00 PM - 1:30:00 PM	LUNCH (student lunch provided)	

Human Osteology & Bioarchaeology

1:30:00 PM - 1:45:00 PM	Gibbon VE, and Buzon MR	Morphometric assessment of the appendicular skeleton from Tombos components in Upper Nubia
1:45:00 PM - 2:00:00 PM	* Beauchamp A	Cortical Thickness as an Indicator of Physiological Stress
2:00:00 PM - 2:15:00 PM	MacKinnon M	Diagnosing Juvenile-Onset Ankylosing Spondylitis: A Palaeopathology Case Study from the Ishkeenickh River Cave Site
2:15:00 PM - 2:30:00 PM	Brickley M, D'Ortenzio L, Ribot I, Raguin E, Schattmann A, Kahlon B, and Bertrand B	Detecting Previous Episodes of Vitamin D Deficiency: The Potential Use of Dental Tissue
2:30:00 PM - 2:45:00 PM	Horocholyn K	Starving skeletons: famine through a bioarchaeological lens
2:45:00 PM - 3:00:00 PM	Sanchez J	The Oft-Forgotten Bone: An Etiological Analysis of Sternal Porosity
3:00:00 PM - 3:15:00 PM	COFFEE/POSTERS	
3:15:00 PM - 3:30:00 PM	COFFEE/POSTERS	
3:30:00 PM - 3:45:00 PM	* Spake L and Cardoso HFV	Is Mortality Bias a Significant Factor when Studying Past Child Health and Growth?

3:45:00 PM - 4:00:00 PM	Giffin K, Swanston T, Coulthard I, Brown M, Murphy R, Cooper D, and Varney T	Lives' Lead: Skeletal Lead Burden Of The Colonial British Royal Navy In English Harbour, Antigua, West Indies
4:00:00 PM - 4:15:00 PM	Harris A, Duggan AT, Marciniak S, Marshall I, Poinar H, and Grimes V	Dating the human occupation of Newfoundland and Labrador: Challenges and progress.
4:15:00 PM - 4:30:00 PM	* Offenbecker AM, Kelley JH, and Katzenberg MA	Examining Violence at Casas Grandes, Mexico using Strontium Isotope Analysis
4:30:00 PM - 5:00:00 PM	POSTERS <i>final viewing</i>	
5:00:00 PM - 6:00:00 PM	BUSINESS MEETING	
6:00:00 PM - 7:00:00 AM	The Club (lower level) opens for banquet/Cash bar	
7:00:00 PM - 12:00:00 AM	Banquet (buffet)	
SAT 31st Oct		
7:30:00 AM - 9:00:00 AM	North Mezzanine (coffee and posters) & LaVerendrye (podium)	
<i>Human Osteology & Bioarchaeology</i>		
9:00:00 AM - 9:15:00 AM	Marciniak S, Duggan AT, Prowse TL, and Poinar HN	It's not the needle, it's the whole haystack! Comparing pathogen DNA detection strategies in archaeological samples
9:15:00 AM - 9:30:00 AM	Merritt CE	Substance over style in adult skeletal age estimation: Why what we do is more important than how we analyze it.
9:30:00 AM - 9:45:00 AM	Schillaci MA and Dewar G	Biological Relationships of the Western Basin Tradition Revealed by Biodistance Analysis
9:45:00 AM - 10:00:00 AM	Willoughby J, Nelson A, and Garvin G	New checklist for the radiological identification of neoplastic disease in mummies – Check!
10:00:00 AM - 10:15:00 AM	COFFEE	
10:15:00 AM - 10:30:00 AM	COFFEE	
10:30:00 AM - 10:45:00 AM	Doyle LE	Quantitative strategies for mitigating multiple testing and low power in analyses of neural canal size: implications for adulthood survival in Holocene foragers of the southern African Cape
10:45:00 AM - 11:00:00 AM	Prowse TL	Geographic Origins and Mobility on a Roman Imperial Estate (2nd – 4th centuries CE) in Southern Italy through Stable Isotope Analysis.
11:00:00 AM - 11:15:00 AM	Kulatilake S, Peiris R, Perera HN, and Perera HJ	3600-Year Old Human Remains from the Mini-athiliya Shell Midden, Sri Lanka
11:15:00 AM - 11:30:00 AM	Lindal J	The role of the human nasal cavity in patterns of craniofacial covariation and integration.

* denotes eligible for student competition

11:30:00 AM - 11:45:00 AM	Chinique de Armas, Buhay, Nikitović, Rodríguez Suárez, Smith, Jorda and Roksandic	Isotopic reconstruction of the breastfeeding and weaning process in the archaeological population of Canímar Abajo, Matanzas, Cuba
11:45:00 AM - 12:00:00 PM	CLOSING REMARKS	

POSTERS

1	Alarie K and Roksandic M	Pre-Columbian Dental Modification Complex at the Site of Canimar Abajo, Matanzas Cuba.
2	Albanese J	The Tholos Tomb and Ossuary at Tzannata, Kefalonia, Greece: Preliminary Findings and Research Potential.
3 *	Avery LC	The Challenges of Determining Social Status and Impact of Misidentification
4	Basset NA	An Osteobiographical Account of the “Red Indian” Individual
5	Gamble JA	A bioarchaeological exploration of sex-specificity in circaseptan rhythms measured from human dental enamel.
6	Choi H-J and Garlie TN	Comparison of body size among male and female African American military personnel between 1988 and 2012.
7	Garlie TN, Mitchell KB, and Choi H-J	Designing user effective products: The role of anthropology and human factors engineering in design, development and testing of clothing and individual equipment to enhance comfort, safety, and performance for military personnel.
8 *	Gilhooly LG, Colquhoun IC, and Trick C	The Effect of Tourists on the Behaviour and Parasite Load of Long-tailed Macaques in Sabah, Malaysia
9	Ginter JK and Ahn SH	Teaching with Technology: Using 3D Imaging to Promote Access, Engagement and Experiential Learning
10	Abonyi S and Hackett P	Revealing circumstances of epidemiologic transition among Métis people: The Case of the Keg River (Alberta) Métis
11	Paul J and Harrington L	Localized hypoplasia of the primary canine in South African foragers
12	Houle-Wierzbicki Z , Raguin E, Ribot I, Auger R, and Treyvaud G	Development of a CT-scan data bank for paleopathological analyses: three cases of a protestant cemetery, St-Matthew, Quebec City (1771-1861)
13	Marinho L and Cardoso H	A retrospective analysis of blunt force skeletal trauma in fall-related deaths Before Paquimé: An exploration of diet during the Viejo period in Casas Grandes, Chihuahua, Mexico
14 *	McConnan Borstad C, Kelley JH, and Katzenberg MA	Breaks by the Baltic: Fracture patterns compared between the rural Drawsko (Poland) and urban Black Friars (Danish) post-medieval populations
15	Stevens L, Scott A, and Betsinger T	

16	Pitirri MK and Begun DR	Cortical bone distribution in the mandibular corpus of great apes with implications for understanding the hominoid fossil record.
17	Thew M	Investigation of Methodologies for Fiberglass Resin Removal from Bone
18	* Timmins S, Seréville-Niel C, and Brickley M	Childhood Cranial Trauma from a late Roman and Merovingian context from Michelet, Lisieux, France
19	Tuttösi P and Berna F	Pattern of bone fluoridation in the Lower Paleolithic deposits of Dmanisi, Republic of Georgia: implication for taphonomic and site formation studies
20	Willmer B and Lazenby R	A Study of Skeletal Trauma and Gender/Sex concerning the 1984 Massacre at Putis, Ayacucho, Peru
21	Willmon RM,, Holland EJ, and Arntfield MA	The Expanding Role of Forensic Anthropologists in Canadian Community-Led Investigations
22	Cardoso HFV, Marinho L, Vanderugten J, Simon EL, Spake L, McCuaig M, and Albanese J	Can we improve the reliability of sex estimations in archaeological populations by using non-population specific metric methods?

BANQUET: Manitoba Deluxe Dinner Buffet

Fresh House Made Organic Sourdough Bread and Rolls

Variety of Sliced European Meats with Pommery and Dijon Mustards

Field Greens, Julienne Carrots, Celery, Radish, & Cherry Tomato with Balsamic Vinaigrette

Butter Leaf Lettuce with Strawberries, Toasted Pumpkin Seeds and Sour Orange Vinaigrette

Grilled Mushroom, Arugula & Tomatoes, Crumbled Goat Cheese, Lemon Basil Olive Oil

Honey Roasted Vegetables with Cumin and Fig Couscous

Carved Turkey with Gravy, Cranberry Sauce Sage and Apple Stuffing

Salmon with Three Citrus Vermouth Sauce

Potato Cheddar Perogies with Sour Cream and Candied Onions

Medley of Seasonal Vegetables

Pasta Primavera

Oven Roasted Potatoes with Rosemary

Sliced Seasonal Fresh Fruit Platter

Devil's Food Chocolate Cake

Vanilla Cheese Cake with Cashew Caramel Sauce

Regular and Decaf Coffee and Tea

Wine at each table plus cash bar

CAPA 2015 Winnipeg

Abstracts

A geometric morphometric analysis of the molars of the Piltdown specimen

Abbas, R.S.¹ and M.M. Skinner^{2,3}

¹Institute of Archaeology, University College London;

²School of Anthropology and Conservation, University of Kent; ³Max-Planck-Institute for Evolutionary Anthropology

Molar crown morphology has been used for alpha taxonomy and has successfully addressed taxonomic questions in extant apes. In this study, quantitative and qualitative analyses compared molar crown morphology in order to examine the taxonomic affiliation of the Piltdown molars. The quantitative analysis involved the geometric morphometric (GM) analysis of the enamel dentine junction (EDJ) shape variation amongst groups of *Homo*, *Gorilla*, *Pan* and *Pongo* in an attempt to identify affinities with the Piltdown molars. A metameric analysis was also conducted exploring variation amongst the Piltdown molars in order to identify the molar position of the Piltdown 2 tooth. Micro CT scans of the mandible were analyzed in order to identify the correlation between the Piltdown 1 molars and the mandible. Results suggest the Piltdown 1 molars and mandible most likely belong to the same orangutan individual as that of Piltdown 2 which in turn is a lower first molar. Additionally, comparisons between GM analyses using different landmark sets involved in this study concluded the possibility to conduct reliable EDJ morphological assessments with-or-for samples consisting of incomplete or worn surfaces. These results confirm previous findings that the EDJ preserves taxonomically significant shape information in worn teeth and that mean differences in EDJ shape consist of differences in horn height and EDJ and CEJ ridge shape.

Revealing circumstances of epidemiologic transition among Métis people: The Case of the Keg River (Alberta) Métis

Abonyi, S.^{1,3} and P. Hackett^{2,3}

¹Department of Community Health and Epidemiology, University of Saskatchewan; ²Department of Geography and Planning, University of Saskatchewan; ³Saskatchewan Population Health and Evaluation Population Unit (SPHERU)

The twentieth century witnessed the emergence of new, chronic, afflictions among Canada's Aboriginal people, including type 2 diabetes and obesity, consistent with Omran's Epidemiologic Transition. Historical research and analysis of archival and more contemporary health outcome data has provided a broad account of the circumstances of population health transitions for

Aboriginal people more generally and for some specific First Nation communities in Canada. Little comparable research exists for Métis peoples specifically, whose historical socio-political and economic circumstances differ from First Nations people. This case study explores disease and mortality among the Métis of Keg River, in Northern Alberta, from the mid-1930s to the mid-1950s. Drawing upon archival and published records and the observations of the local physician who practiced in Keg River throughout the study period, we present a consideration of the timing, type, and magnitude of socio-political and economic circumstances surrounding early shifts in health and well-being that presage the chronic disease transition. Fundamental shifts in employment, diet, and residence patterns seem to have contributed to increased rates of obesity among seniors and adult women, with a corresponding rise in hypertension, diabetes and, for pregnant women, preeclampsia. Children experienced marked weight gain on average, though men appear to have escaped the effects as of the end of the study period. This research suggests that in some Métis communities the transition may have occurred much earlier than generally thought, and over a relatively brief time span. The experience in Keg River points to government policy, economic development in the north, and innovation in transportation as key factors in the epidemiologic transition for this Métis community.

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

Alarie, K.¹ and M. Roksandic²

¹Department of Anthropology, University of Manitoba;

²Department of Anthropology, University of Winnipeg

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. Traditions of dental modifications have not been previously observed in pre-contact indigenous Caribbean populations. An individual recovered from the Pre-Columbian site of Canimar Abajo, Matanzas, Cuba radiocarbon dated to 970-790 cal B.C.E (AA101059) (Roksandic et al., 2015) exhibits dental modification of the upper central incisors, similar to West African styles of dental modification, yet clearly predates the African Diaspora. A further examination of the dentition of 88 individuals from the Canimar Abajo collected, yielded 6 additional cases of pre-contact dental modification. All 7 individuals were found to be female and exhibited the same type of dental modification.

The tholos tomb and ossuary at Tzannata, Kefalonia, Greece: Preliminary findings and research potential

Albanese, J.

Department of Sociology, Anthropology, and Criminology,
University of Windsor

The Borzi Hill near the village of Tzannata is the most archaeologically significant known area from the Mycenaean (Late Helladic) Period on the island of Kefalonia. The habitation and burial sites clustered on and around the hill include a tholos or “beehive” tomb and associated ossuary which were excavated from 1992 to 1994. This tholos tomb is the largest yet found in the Ionian Islands. Although the tomb was looted in antiquity, excavations have yielded a number of notable finds: pottery; seal-stones; gold jewellery, rosettes and a double-axe; extensive animal remains; and the remains of about 150 people. An assessment of the human remains from the tholos tomb and ossuary began in May 2015. Approximately 15% of the collection was sampled to assess its research potential. Preliminary analysis indicates these remains include males and females ranging from under one year of age to older adults; there is evidence of healed trauma; ritual burning, but not cremation, of skeletons; and the placement of specific parts of animals as funerary offerings. Moreover, there seems to be a distinct morphological pattern in some facial characteristics found in several skeletons. The research potential of the site has broader significance given the archaeological, geographical and textual evidence from Homer’s *Odyssey* that the island of Kefalonia may be ancient Ithaca, and the tholos tomb is contemporaneous with the historically known war at Troy.

The challenges of determining social status and impact of misidentification

Avery, L.C.

Department of Anthropology, McMaster University

Social inequalities have long been explored by physical anthropologists and bioarchaeologists to answer a variety of questions, including those related to stature, mortality, diet, and “health.” This has been done under the assumption that those with lower social status had increased risk due to poor living conditions, hazardous and physically demanding occupations, and poor diet, while those with higher social status were at least partially buffered against these stressors. In an attempt to determine social status, archaeologists and anthropologists tend to look at mortuary profiles and funerary evidence. However, while there are set standards to determine sex and age, there are no set standards or

methods for determining social status. Instead, researchers employ a range of methods to create divisions in this past; methods which have not been widely established, tested, or proven. This is further complicated by the fact that using mortuary data to determine social status is problematic at best due to social manipulation, differential preservation, and contextual understandings.

Maternal kinship and infant sex influence natal attraction and infant handling in wild chimpanzees at Ngogo, Uganda

Bădescu, I.¹, Watts, D.P.², and D. Sellen¹

¹Department of Anthropology, University of Toronto;

²Department of Anthropology, Yale University

Primate individuals often inspect, touch, and groom others’ infants (natal attraction), which can lead to holding and carrying of these infants in a manner that resembles maternal care (infant handling). Natal attraction and infant handling can affect fitness by improving infant survival and development, reducing inter-birth intervals of mothers, promoting maternal skills among inexperienced handlers, and favoring the formation of social bonds. We examined the effects of handler age, sex and maternal kinship, as well as infant age and sex, on rates of natal attraction and infant handling in chimpanzees (*Pan troglodytes schweinfurthii*) at Ngogo, Uganda. Infants (N=41) received average rates (occurrences/hour \pm SD) of 0.65 ± 0.58 for natal attraction, and 0.12 ± 0.19 for infant handling, which were higher than expected for wild chimpanzees but similar to other social breeding primates. Rates of behaviors did not seem to vary by the ages of infants (GEE, natal attraction: $p = 0.94$; infant handling: $p = 0.38$) or handlers (natal attraction: $p = 0.07$; infant handling: $p = 0.77$). Females were more attracted to infants than males ($p = 0.04$), but they did not get to handle them more ($p = 0.10$). Infant females received more natal attraction ($p = 0.01$) and infant handling ($p = 0.00$) than males, which suggests that female infants benefit most from these behaviors. Female chimpanzees disperse from their natal group during adolescence, and early social interactions may help young females learn the social skills necessary to establish membership in a new population. Maternal male and female kin showed the most natal attraction ($p=0.00$) and infant handling ($p=0.00$). Handlers may gain inclusive fitness benefits from promoting earlier weaning and contributing to reduced inter-birth intervals of related females, and from enabling related mothers to spend more time feeding or grooming unencumbered by their infants.

An osteobiographical account of the “Red Indian” individual

Basset, N.A.

Department of Anthropology, University of Manitoba

In the 1920s, J.C.B. Grant, an anatomist at the University of Manitoba and subsequently the University of Toronto, made an exchange of human remains with an anatomist at the University of Cape Town. They were curious by the indigenous “races” belonging to the geographical areas in which they lived and thus exchanged a “Red Indian” for a “Bushman”. With ethical concerns in the forefront of anthropology today, an arrangement was made to return these remains to where they originally came from. As part of the documentation of the remains, a complete osteobiography of the individual was undertaken with the intention of repatriation of the individual. Both metric and non-metric analyses were undertaken to estimate this individual’s sex, age at death, ancestry, and overall biological profile. From the analysis, it is not clear if the cranial bones are from the same individual as the post-cranial bones. This poster reviews the historical context for the return of the remains from the University of Cape Town, to the University of Toronto and then the University of Manitoba, and provides an overview of osteobiography of the individual.

Cortical thickness as an indicator of physiological stress

Beauchamp, A.

Department of Anthropology, University of Manitoba

Longitudinal growth assessed in the form of long bone length has long been used as a measure of growth stunting, a tell-tale sign of physiological stress during childhood. Appositional growth is rarely considered as a potential measure of growth and yet it may be a more sensitive indicator than long bone length. A sample of humeri, femora, and 2nd metacarpals from 49 subadults from Medieval to Early Modern urban Danish sites were studied using macroscopic measurements and digital imaging. The use of computer tomography (CT) allowed for the 3D reconstruction of cortical bone cross-sectional area. Using MIMICS medical imaging software, cortical and medullary widths were measured as well as cortical and medullary area at the midshaft of each bone. While both longitudinal and appositional growth increase with age, a ratio of cortical area to medullary area reduces the impact of size in measurements. Observations of cortical thickness values are consistent with other signs of physiological stress. Further study would be necessary to determine the influence of genetic ancestry and secular trends on cortical thickness to support its use to compare genetically and temporally different populations.

Ample time for migration on the largest scale

Begun, D.R.

Department of Anthropology, University of Toronto

In 1871 Charles Darwin recognized the scope and magnitude of faunal migrations, something many researchers of prehistory and paleontology have forgotten. While Darwin thought it somewhat more likely that African apes and humans first evolved in Africa, given the evidence of *Dryopithecus* from France, he noted that there was “ample time for migration on the largest scale” to explain the presence of a hominine, that is, an African ape/human ancestor, in Europe. This observation has been largely ignored in favor, despite the absence of evidence, of the hypothesis of an in situ Africa evolution of the hominines. Between about 12.5 and 6 Ma in both Europe and Asia there is evidence of the hominine (African ape and human) clade while in Africa this clade does not appear until about 7 Ma. In any other mammalian lineage this would be taken as unambiguous evidence of dispersal into Africa from Eurasia. In fact, there is widespread agreement that much of the current African fauna (antelopes, suids, giraffes, perissodactyls, orycteropids, rodents, insectivores, small carnivores and hyenas) dispersed into Africa. Here I examine new evidence of hominines in Eurasia and their absence before 7 Ma in Africa.

Low height-for-age among Limbu and Mech children and adolescents from two districts of West Bengal, India

Bhattacharjee, P.¹, Datta Banik, S.², and B. Mukhopadhyay³

¹Department of Anthropology, Vidyasagar University, Midnapur, India; ²Department of Human Ecology, Cinvestav-Merida, Yucatan, Mexico; ³Biological Anthropology Unit, Indian Statistical Institute, Kolkata, India

Stunting or low height-for-age is a state of chronic undernutrition in children and adolescents. Studies reported that India has the highest number of stunted children in the World. Situation of the children from rural and tribal communities and especially the girls are worse. In this background, objective of the present study was to record prevalence of stunting in 6 to 18 year-old boys and girls from two tribal communities in Darjeeling and Alipurduar districts of West Bengal, India. The study also aimed to compare the rate of stunting among the participants with standard growth reference curves. The sample represented 1523 participants from Limbu (377 boys, 379 girls) and Mech (365 boys, 402 girls) communities. Overall frequency of stunting among 6 to 18 year-old boys (33%) and girls (34.7%) was remarkably high. Rate of stunting was higher in Limbu boys (43.5%) and girls

(44.6%) than their age-peers from Mech community (boys 22.2%, girls 25.4%). There was a tendency of decline in prevalence of stunting with advancement of age in the sample. Height data after normalization shows that all centiles curves of height of the Limbu and Mech boys and girls are consistently below the standard height-for-age curves of the World Health Organization. Limbu and Mech boys and girls appear to be taller with respect to their median (50th percentile) height when compared with the median height of the Indian Council of Medical research data of children from rural India.

Conscription and cross protection between the first and second waves of the 1918 influenza pandemic among soldiers of the Canadian Expeditionary Force (CEF) in Ontario

Bogaert, K.L

Department of Anthropology, McMaster University

This paper analyses morbidity and mortality during the 1918 influenza pandemic among Ontario soldiers in the Canadian Expeditionary Force (CEF). This paper asks: did exposure to influenza during the first wave confer protection against illness and death during the second wave of the pandemic? Pneumonia and influenza (P&I) cases and deaths among Ontario soldiers were transcribed from the 1918 Admission and Discharge books for the CEF. Following the methods of Barry et al. (2008), hospital admission and mortality rates for P&I were compared for new recruits (<1 month service) and seasoned soldiers (> 1 month service) in order to assess the possibility of cross protection during successive waves of the pandemic. The first wave of the 1918 influenza pandemic occurred between March and May of 1918, with the second wave erupting from September to December. Mortality in the second wave was more severe, with a case fatality rate of 4.7%, which was more than double the rate of 2.3% from March-May. Seasoned soldiers experienced 82.5% protection from illness due to P&I illness in the fall, and 84% protection from death. The morbidity data for the soldier population of Ontario, data unavailable for civilians, confirms the presence of a herald wave in Ontario. The findings support the hypothesis that exposure to influenza during the first wave of the pandemic had a protective effect during the second more deadly wave in the fall. Regional heterogeneity characterized the pandemic among soldiers in Ontario. Conscription practices, which were altered in April of 1918 to revoke exemptions for farmers, may have funneled vulnerable recruits into training camps after the first wave of the pandemic, but prior to the second wave.

Detecting previous episodes of vitamin D deficiency: The potential use of dental tissue

Brickley, M.¹, D'Ortenzio, L.¹, Ribot, I.², Raguin, E.², Schattmann, A.¹, Kahlon, B.¹, and B. Bertrand^{3,4}

¹Department of Anthropology, McMaster University;

²Département d'Anthropologie, Université de Montréal;

³Communauté d'Agglomération du Douaisis, Direction de l'Archéologie, Laboratoire d'Analyses et de Recherche, Douai, France; ⁴Unité de Taphonomie Médico-Légale, Université Lille, Lille, France

Recognition and recording of rickets and osteomalacia in archaeological human bone has improved considerably in the last ten years, but the identification of previous episodes of vitamin D deficiency in older children and adults is still limited. Clinically defects in tooth dentin of those with vitamin D deficiency have been identified. The aim of this study is to investigate whether abnormal mineralization in tooth dentin can be observed in archaeological individuals with evidence of past deficiency. Macroscopic, microscopic, radiographic, and SEM analysis of tooth dentin was applied to adult and juvenile human remains from archaeological contexts and two known controls. Most of the archaeological individuals (14/16), who showed skeletal evidence of past deficiency, displayed the formation of interglobular dentin (spaces) and/or misshapen pulp horns within the tooth. Our results suggest a temporary inhibition of dentin growth that leads to modification of calcospherite shape and size, resulting in characteristic interglobular spaces, and uneven, hooked pulp horns. Although further research is needed, we conclude that global mineralization problems of the rachitic individual may cause dentin mineralization to stop or falter, preventing further dentin growth and fusion. This results in morphological alterations that can be observed in individuals with past episodes of vitamin D deficiency. This pilot project demonstrated that dental tissue has the potential to provide important information on individuals who survived periods of deficiency. Further recognition of those who survived specific childhood deficiencies has considerable potential to provide additional information on socioeconomic and cultural factors affecting juveniles in past societies and more information on overall health and welfare of past infants and children.

Can we improve the reliability of sex estimations in archaeological populations by using non-population specific metric methods?

Cardoso, H.F.V.¹, Marinho, L.¹, Vandergugten, J.¹, Simon, E.L.¹, Spake, L.¹, McCuaig, M.¹, and J. Albanese²

¹Department of Archaeology, Simon Fraser University;

²Department of Sociology, Anthropology, and Criminology, University of Windsor

Although metric sex estimation methods are generally assumed to be population specific, Albanese (2003) proposed to control for population variation in overall size and sexual dimorphism by combining femoral with hipbone measurements. In order to test the applicability of this generic approach, a sample of 192 individuals (90 females and 102 males) from eight European human skeletal reference collections was used to validate sex estimation based on measurements proposed by Albanese (2003) in a sample that is very diverse in overall size and in sexual dimorphism. Allocation accuracies were calculated for each model for the whole sample, and each model's performance was compared between the collections to assess consistency. Sexual dimorphism was assessed for each measurement and collection using t-tests. The model using hip bone height, iliac breadth, pubic length, max diameter of the femoral head, and epicondylar breadth (Model 1) consistently yielded the highest allocation accuracies, with an accuracy rate of 92.19% for the whole sample. The two collections with the highest sexual dimorphism generated the best average allocation accuracies, but the collections with the worst allocation accuracies did not necessarily show the lowest sexual dimorphism. The only two models that did not include the femur provided significant differences in allocation accuracy between the different collections. This suggests that femur measurements do help to control for cross population variation in size. These results indicate that models using both femoral and hipbone measurements can be successfully applied in archaeological populations.

Isotopic reconstruction of the breastfeeding and weaning process in the archaeological population of Canímar Abajo, Matanzas, Cuba

Chinique de Armas, Y.^{1,2}, Buhay, W.M.¹, Nikitović, D.^{3,4}, Rodríguez Suárez, R.², Smith, D.⁵, García Jordá, D.^{1,6}, and M. Roksandic¹

¹University of Winnipeg; ²University of Havana, Havana;

³University of Toronto Scarborough; ⁴Department of Anthropology, University of Toronto; ⁵Department of Anthropology, University of Toronto Mississauga; ⁶South Calgary Health Centre, Alberta

Lack of well preserved juvenile skeletal remains in Caribbean archaeological sites prevents analysis of juvenile dietary patterns. The Cuban site of Canímar Abajo, with a large number of well-preserved juvenile and adult skeletal remains, provides a unique opportunity to fill this gap. In this paper, we estimated the ages for the start and end of the weaning process in this population, as well as the food sources used for weaning. Bone collagen of 31 juveniles and 18 adult females were processed for carbon and nitrogen isotope analyses. Results were evaluated and

compared within two Bayesian probability models: the WARN and SIAR models. This approach facilitates a much better accounting of various isotopic uncertainties that traditionally hamper the results of paleodiet reconstructions. Results of both models suggest a major dietary change around two years of age. Breast milk was the most important dietary source for children before two years of age, after which juvenile diet was increasingly supplemented by starch rich foods such as root cultigens, legumes and *Zamia*. By the age of three, the weaning process was completed and juveniles had a diet with depleted nitrogen isotopic values. Although animal protein and maize were part of Canímar Abajo adult diets, these resources were likely not used to feed juveniles.

Comparison of body size among male and female African American military personnel between 1988 and 2012

Choi, H.-J.¹ and T.N. Garlie²

¹Oak Ridge Institute for Science and Education (ORISE); Human Sciences and Engineering Branch (HSEB), U.S. Army, Natick Soldier Research, Development and Engineering Center (NSRDEC); ²Human Sciences and Engineering Branch (HSEB), U.S. Army, Natick Soldier Research, Development and Engineering Center (NSRDEC).

Understanding body size is important for the development and evaluation of workspace and clothing and individual equipment (CIE) design. Nowhere is this more important than within the military, or other first responder populations, where such equipment provides critical lifesaving properties. Thus, the US military has undertaken a multitude of anthropometric surveys since the 1860's that have provided critical body dimensions that aid understanding the health and fitness of military personnel and in the design and development of military products (see for example Gould, 1869; Davenport and Love, 1921; White and Churchill, 1971; and Gordon et al., 1989). In 2006, the Army conducted a pilot study (ANSUR II, pilot) that showed, in general, body size in the military population had changed since the 1988 Army survey (Paquette et al., 2009). These changes have a critical impact on military products and so the Army conducted a full scale anthropometric survey of Active Duty Soldiers, Army Reservists and Army National Guard in order to update the anthropometry of the US military and provide better data for design and development (Gordon et al., 2014). The goal of this paper is to provide a comparative analysis of body size among male and female African American personnel between 1988 and 2012. This paper is a follow-on study that provided a comparative analysis of White male and female military personnel which revealed significant increases in circumferential measurements among individuals, but length measurements remained similar between the two time periods (Choi et al., 2014).

The results of this study showed similar trends to the earlier study where height and length measurements remained similar, but substantial changes in the soft tissue component that influence major circumferential measurements was seen. In addition, a comparison with White male and female military personnel is provided to show a preliminary inter-population comparative analysis.

High levels of endemism in East African early Miocene catarrhines: does limited migration play a role?

Cote, S.

Department of Anthropology and Archaeology, University of Calgary

The early Miocene of Kenya and Uganda has a rich and well-calibrated fossil record that samples over 20 species of catarrhine primates. These fossil localities are of considerable interest for primate evolution because they sample some of the oldest known cercopithecoids as well as the oldest putative hominoids. Catarrhines are patchily distributed at these localities. Many species are found only at one locality, despite close temporal and spatial proximity to other seemingly similar fossil localities. This pattern is not observed in other mammalian taxa, and does not appear to be the result of sampling bias or taphonomic factors. Two non-mutually exclusive hypotheses have been proposed to explain the high degree of endemism in early Miocene East African catarrhines: (1) chronological differences and (2) habitat differences. Preliminary analyses of community structure and faunal composition do not show strong evidence for differentiation of forest types, but recent isotopic analyses do suggest that localities in Uganda may sample more open habitats than previously thought. In addition, new dating results for the Moroto, Bukwa, and Napak localities in Uganda have shifted the known age of these sites by up to 2-3 million years, and strongly suggests that the entire sequence needs to be re-dated. A third viable hypothesis is that these catarrhines show high degrees of endemism due to limited migration potential. Each of these fossil sites is associated with a separate volcanic complex that may act as an isolated forest ecosystem separated from other suitable catarrhine habitat by large distances of non-primate habitat. In addition, the volcanoes themselves may each create strong regimes of habitat disturbance via regular volcanic eruptions. Work in progress to test these three hypotheses includes developing an updated chronostratigraphic framework for the entire region, as well as detailed environmental reconstruction using shared methodologies across all localities.

Exploring lactation and weaning in colobus monkeys (*Colobus vellerosus*)

Crotty, A.¹, Wikberg, E.^{1,2}, Vayro, J.¹, Fox, S.¹, MacDonald, L.¹, and P. Sicotte¹

¹Department of Anthropology and Archaeology, University of Calgary; ²Department of Integrated Biosciences, University of Tokyo

Female mammals are energy and time constrained throughout their reproductive lives. Maternal investment can be measured by the amount of time allocated to each offspring during gestation and lactation (Langer 2008). Folivorous primates have slow life histories, with long gestation and lactation lengths, often spanning multiple seasons. Lactation length varies between and within populations, and this variation is probably due to maternal condition, food availability and group dynamics, or a combination of these factors. We investigated variation in lactation length in an aseasonal breeding wild colobine, living in a seasonal habitat, and explored the impact of infant sex, infanticide risk, and female group composition (a proxy for the level of scramble feeding competition females experience) on this variation. We also investigated the annual distribution of weaning events in relation to the availability of high quality food. Observational data was collected between 2006-2015 at Boabeng-Fiema Monkey Sanctuary, Ghana. We have two types of data: exact lactation lengths (N = 12), and exact weaning dates (N = 38). The latter refers to the timing of weaning events, whereas the former refers to the nursing period duration. Mean lactation length was 56.3 weeks (median = 61.4; range = 39.3-67.4) and was not significantly influenced by infant sex (U = 14.5, z = -.561 p = 0.575), infanticide risk (U = 7, z = -1.708, p = 0.088), or female group composition (Kruskal-Wallis H: 3, = 2.162, p = .339). Weaning events were uniformly distributed throughout the year, indicating that weaning events are not clustered to high food availability (Rayleigh test: Z = 0.0657; p = .884; N = 38). Our study has eliminated some potential variables that may have explained the variation observed in lactation length and weaning events in our species, although it is evident that other underlying factor(s) are causing the variation.

Quantitative strategies for mitigating multiple testing and low power in analyses of neural canal size: Implications for adulthood survival in Holocene foragers of the southern African Cape

Doyle, L.E.

Department of Anthropology, University of Toronto

In 2012, analysis of covariance (ANCOVA) identified a significantly smaller mean size in the mediolateral neural canal (NC-ML) in adult Later Stone Age southern African

foragers who died before age 35 years than in those who survived longer. However, several methodological limitations were identified in this analysis: First, uneven preservation may affect variability in effect sizes among vertebrae, which complicates interpretation and suppresses statistical power. Second, testing each vertebra individually introduces a risk of multiple-testing error. Third, ANCOVA does not estimate the survival benefit that may have been conferred by the conditions that produced larger neural canal sizes. This study re-examines the relationship between age at death and NC size using alternative quantitative strategies to mitigate these constraints. Mediolateral (ML) and anteroposterior (AP) NC diameters at T1, T6, L1, and L5 are z-transformed to correct for sexual dimorphism. Missing values are replaced with multiple imputation and two summary NC variables (PCA-AP, PCA-ML) derived using PCA (N=105; M=56; F=49). Binary logistic regression models are constructed and tests of power and sensitivity are performed on models from both imputed and original datasets. The results demonstrate a significant increase in the probability of having an age-at-death older than 35 years with larger NC-ML, an average of 60% greater odds for each standard deviation increase in diameter across the four vertebrae (e.g. PCA-ML $\beta=0.56$, OR=1.74, 95% CI=1.08—2.82, $p<0.05$). Imputation of missing values and derivation of summary size variables significantly benefits the analysis by moderating variability and magnitude of effect sizes, increasing p values, and enhancing power and sensitivity. Better growth in childhood is positively associated with adulthood survival among this Later Stone Age people, who followed a mobile foraging way of life with little evidence of structural social stratification or inequality.

Do mothers mediate affiliative interactions between males and infants in wild *Colobus vellerosus*?

Fox, S.A. and P. Sicotte
University of Calgary, Department of Anthropology and Archaeology

Primate infants are altricial and spend a long period of time with and on their mother. As a result, primate mothers can strongly influence their infant's early social experience. In most group living primates, adult and sub-adult males are potential social partners for infants. Mothers could be motivated to promote or mediate interactions between infants and males if certain males are more likely to harm their infant (i.e., males who are unlikely to be the sire of their infant and therefore potentially infanticidal), or if particular males are more likely to benefit their infant's fitness (i.e., dominant males might provide a 'safe zone' where infants face reduced social stress or risk of infanticidal attacks). Mothers could facilitate male-infant relationships if spending time around

a male predisposes their infant to interact with this male, especially when infants are more dependent. Infants could also learn from their mother's behaviour that some males are favoured social partners, and then independently interact with these males. To test these ideas, we used data from a *Colobus vellerosus* population where individuals can be recognized. We used 6 months of focal data on 12 males in 4 social groups. For the 12 infants who interacted with males, mothers were in proximity for a mean of $36.47 \pm 32.47\%$ of interactions (measured per infant). Mothers' presence ranged from never to always present, and was negatively correlated with infant age ($r=-0.802$, $p=0.002$). When controlling for infant age, the amount of time that mothers and males spent in proximity was a strong predictor of male-infant affiliation (GLMM: $F(1, 53)$, $p<0.00$). While it is not surprising that mothers mediate interactions of young infants, our findings suggest that mother-male relationships continue to influence male-infant interactions even when infants have gained more independence.

Human milk antibody as parental investment: A preliminary analysis of secretory immunoglobulin A data from northern Kenya

Fujita, M.^{1,2} and J. Baranski²

¹Department of Anthropology, Michigan State University;

²Biomarker Laboratory for Anthropological Research, Michigan State University

Infants are vulnerable to infections because their immune systems are immature. This vulnerability is mitigated by maternal immune factors, transferred through placenta during gestation and breastmilk after birth. Mammary glands secrete antibodies into milk, mainly secretory immunoglobulin A (sIgA), capable of inhibiting infectious pathogen invasion of infant's gut mucosa. Higher levels of sIgA in milk should provide greater protection for infants, yet sIgA levels appear dynamic within and between mothers. From the parental investment perspective, secretion of sIgA into milk is energetically expensive and places a high demand on maternal energy. It is then reasonable to hypothesize that sIgA levels may be conditional upon maternal energy status and offspring sex which may affect the net return on investment. Using data from 64 exclusively breastfeeding Kenyan mothers, the following hypotheses were tested: 1) maternal arm fat area (AFA) will positively predict sIgA, 2) this effect will be moderated by infant sex, and 3) there will be a Trivers-Willard effect, i.e., low AFA mothers will exhibit preference toward daughters and high AFA mothers toward sons. Regression models were applied to examine the effects of maternal AFA, infant sex, and AFA-sex interaction on sIgA. Results support hypotheses 1 and 2 but not 3; maternal AFA positively predicted sIgA, and

infant sex moderated this effect. However, this moderation was such that high AFA mothers favor sons while low AFA mothers exhibit no sex bias. These results indicate that sIgA levels in human milk may be influenced by maternal energy status particularly for sons.

A bioarchaeological exploration of sex-specificity in circaseptan rhythms measured from human dental enamel

Gamble, J.A.

Department of Anthropology, University of Toronto

Sex-based differences in developmental schedules have been observed in a number of physiological systems, with females typically hitting developmental thresholds at a faster rate than males. However, the extent to which this is reflected in differing circaseptan rhythms is poorly understood. There have been inconsistent results from the experimental literature considering sex differences in circaseptan rhythms in both faunal and human examples. Such literature has considered cortisol levels, melatonin, and temperature fluctuation. Furthermore, while circaseptan rhythms derived from daily markers (cross-striations) between long-period markers in human enamel have been found to range from 5 to 14 days, sex-based differences on this level have not been explored. Should sex-based differences be present in cross-striation counts, it will help us to better refine our estimates of such aspects as enamel defect timing (i.e., in relation to a non-specific stress incident during development). This paper will investigate sex-specificity in cross-striation counts using a medieval Danish cemetery sample drawn from two sites. The null hypothesis that there will be no sex-based difference in cross-striation counts will be tested to gain further insight into developmental patterning between males and females.

Designing user effective products: The role of anthropology and human factors engineering in design, development and testing of clothing and individual equipment to enhance comfort, safety, and performance for military personnel

Garlie, T.N.¹, Mitchell, K.B.¹, and H.-J. Choi²

¹Human Sciences and Engineering Branch (HSEB), U.S. Army, Natick Soldier Research, Development, and Engineering Center (NSRDEC); ²Oak Ridge Institute for Science and Education (ORISE), Human Sciences and Engineering Branch (HSEB), U.S. Army, Natick Soldier Research, Development, and Engineering Center (NSRDEC)

The U.S. Army, like most military and first responder services around the world, strive to deliver the best

possible clothing and individual equipment (CIE), including personal protective equipment, to those individuals who have volunteered to serve. As these CIE products are developed, anthropology and human factors are critical elements of the design cycle, to ensure that the end product meets the users' needs and will be accepted. Natick Soldier Research, Development and Engineering Center's (NSRDEC) anthropology and human factors teams conduct applied research to aid CIE developers in delivering the best possible product. The primary role of the NSRDEC anthropology team is to maintain and utilize a representative database of Soldier anthropometry to ensure fit and comfort, because everything the Soldier wears, carries, flies in, drives in, rides in, works in, and sleeps in depends on a clear understanding of user body size and shape. The main role of the NSRDEC human factors team is to assist developers to ensure that products meet the needs of the users and allow personnel to perform their mission safely, efficiently and effectively. Without including these principles in the design process, developers run the risk of creating products that will not be used, will be used improperly, and/or will become an additional burden. The principles and examples outlined can be readily applied to other military or first responder personnel CIE and highlight the importance of involving anthropology and human factors engineering in the design process in order to improve and enhance: fit, comfort, protection, usability, performance, and likelihood of mission success.

Morphometric assessment of the appendicular skeleton from Tombos components in Upper Nubia

Gibbon, V.E.^{1,2} and M.R. Buzon²

¹Department of Anthropology, University of New Brunswick; ²Department of Anthropology, Purdue University

Along the Nile River, ancient Nubians and Egyptians interacted for millennia through diplomacy, trade, and military actions. The Tombos archaeological site is located in northern Sudan (ancient Nubia) at the third cataract of the Nile making it an important ancient site to explore the interaction between Egyptians and Nubians. In this study we assessed population continuity at Tombos through sociopolitical transitions, using morphometric and statistical analyses of the appendicular skeleton of people from the New Kingdom (1400-1070 BC) and Napatan (c. 1070-656 BC) periods. Each bony element on the upper and lower limbs was assessed through its size (i.e., length, breadth, width) and shape (bone's measurements with size removed). Adult skeletons from 67 discrete burials: 26 from the New Kingdom and 41 from the Napatan were studied. From a commingled context a further 370 (313 from New Kingdom and 57 from the Napatan) skeletal

elements were included. Skeletal fragmentation was an issue; thus, for some individual bones (discrete and comingled) it was not possible to obtain all measurements and they were excluded from analyses. The Napatan component (when Nubia ruled Egypt) was consistently larger in size than the earlier New Kingdom component (when Egypt ruled Nubia), with little variation in shape. More variability in both size and shape was observed in males. Some of the variability between the Tombos samples may be the result of gene flow, or rather changes in migration to the area through time and sociopolitics. However, the numerous differences in size with few in shape provide more support for an environmental explanation since size is more susceptible to nutritional stress, disease, and physical activity.

Lives' lead: Skeletal lead burden of the colonial British Royal Navy in English Harbour, Antigua, West Indies

Giffin, K.¹, Swanston, T.², Coulthard, I.³, Brown, M.⁴, Murphy, R.⁵, Cooper, D.⁶, and T. Varney¹

¹Department of Anthropology, Lakehead University;

²Department of Archaeology and Anthropology, University of Saskatchewan; ³Canadian Light Source, Saskatoon;

⁴Department of Anthropology and Archaeology, Brooklyn College, City University of New York; ⁵National Parks, Antigua, West Indies; ⁶Department of Anatomy and Cell Biology, University of Saskatchewan

Lead poisoning is identified as a significant health issue in the writings of 19th century British Royal Navy physicians. Contemporary historian Roger Buckley raised the question of the contribution of exposure to the toxic metal to the demise of the British military in the West Indies. The excavations of two colonial era naval cemeteries on the island of Antigua have presented a good sample of rank and file naval personnel. Cortical long bone samples were analyzed to examine the extent to which naval personnel (c. 1800) were exposed to lead. Initial attempts to test the veracity of the aforementioned historical question focused on 24 individuals from the Royal Naval Hospital cemetery. An additional 10 individuals from on-going excavations at the Galleon Beach burial ground has supported and augmented the interpretations drawn from our initial studies. The bulk bone lead content analyzed via inductively-coupled plasma mass spectrometry (ICP-MS) revealed a wide range of lead exposure among the 34 individuals from the two sites. In general, the level of lead within the bone was found to be poorly associated with both age and ancestry. However, the youngest individuals tested (3 adolescents) did have relatively high lead levels, likely reflective of the higher rate of bone deposition of their growing skeletons. Further analysis with synchrotron radiation x-ray fluorescence imaging (SR-XRF) mapping of the distribution of lead within the bone demonstrated

similar patterns of lead deposition for all individuals, regardless of site of burial, which is strongly supportive of the biogenic nature of the lead. We suggest that the pervasive yet variable nature of the lead levels among individuals is likely more reflective of their unique individual life experiences rather than their shared involvement with the British Royal Navy.

The effect of tourists on the behaviour and parasite load of long-tailed macaques in Sabah, Malaysia

Gilhooly, L.G.^{1,2,3}, Colquhoun, I.C.^{1,2}, and C. Trick^{2,4}

¹Department of Anthropology, University of Western Ontario; ²Centre for Environment and Sustainability, University of Western Ontario; ³Danau Girang Field Centre, Cardiff University; ⁴Department of Microbiology and Immunology, University of Western Ontario

Nature-based tourism (i.e., ecotourism) is becoming increasingly popular throughout the tropics as a way for travelers to 'experience' nature in a meaningful way. An important risk to such endeavors is that it places potentially infectious humans in close proximity to wild primates, increasing the likelihood of cross-species disease transmission. The objective of my PhD research is to explore the impact of tourists on the behaviour, distribution, and parasite load of wild long-tailed macaques at the Sepilok Orangutan Rehabilitation Center in Sabah, Malaysia. The aim is to better understand the implications for human-to-primate pathogen transmission and its potential impact on primate conservation. Sepilok is one of the most popular tourist attractions in Sabah, and works to rehabilitate and reintroduce orangutans that have been injured and/or confiscated throughout Sabah. The center is also home to other naturally occurring primate species, including macaques. The orangutans that have been released into the reserve are fed twice daily on specific feeding platforms. Visitors to the center can observe these feedings from designated viewing platforms, which are occasionally approached by both the orangutans and macaques, allowing for potential disease transmission. My research will thus address how the fluctuations in tourist attendance differentially affect the behaviour and parasite load of the macaques within the reserve. This project will address three main hypotheses based on existing literature and a recent feasibility study: 1) the number of tourists visiting Sepilok will fluctuate throughout the year; 2) macaque parasite load will correlate with tourist numbers; and 3) differences in tourist attendance and behaviour will alter the feeding and ranging patterns of macaques. This poster will outline the background, research questions, study site and methodology, main hypotheses, possible results, potential interpretation of the results, and significance of this proposed research.

Teaching with technology: Using 3D imaging to promote access, engagement and experiential learning

Ginter, J.K.^{1,2} and S.H. Ahn³

¹Faculty of Humanities and Social Sciences, Sheridan College; ²Trent University Archaeological Research Centre (TUARC), Trent University; ³Digital Learning and Innovation, Centre for Teaching and Learning, Sheridan College

In 2011 the Faculty of Humanities and Social Sciences at Sheridan College was loaned a small collection of late medieval-era human skeletons by the State Collection for Anthropology and Palaeoanatomy in Munich (SAPM) for use in teaching biological anthropology. In collaboration with Sheridan's Centre for Teaching and Learning, a project was undertaken to 3D scan some of the skeletal material and to develop a web-based visualization application to animate the skeletal remains. The goal of the project was to create a learning tool that would increase access to the skeletal collection and promote experiential learning for students taking courses in biological anthropology across Sheridan's three campuses. The complete skeleton of one adult female and one juvenile were scanned using a NextEngine 3D scanner and ScanStudio software. In order to effectively capture fine details of the external morphology, post-mortem damage and pathology, multiple high-resolution 2D digital SLR images were taken of each element and projected onto the 3D reconstruction, mapping surface colour information onto the 3D model. Students can use the visualization application to view high quality colour 3D models of the complete skeleton and individual skeletal elements, key anatomical features, and osteometric landmarks. Other 3D applications exist for learning human osteology but these lack the details, imperfections and unique features of archaeologically derived human bone. The application will also enhance our curatorial strategy by digitally documenting the collection, and will provide future undergraduate research opportunities in 3D printing and skeletal reconstruction.

"The Empty Chair": The 1890 Russian Influenza pandemic in Ontario

Hallman, S.A.¹, Gagnon, A.², Herring, D.A.³, and D.J.D. Earn⁴

¹Department of Sociology, Western University;

²Département de démographie, Université de Montréal;

³Department of Anthropology, McMaster University;

⁴Department of Mathematics and Statistics, McMaster University

The last decade of the 19th century was punctuated by the Russian influenza pandemic ("La Grippe"), the first pandemic to occur in a world tightly connected through

rapid railway and transoceanic shipping networks. Originating in Europe, La Grippe circled the globe in 4 months, arriving in northeastern North America in December 1889. Little is known about how the Russian influenza was experienced by Canadians compared to the more thoroughly studied Spanish influenza pandemic of 1918-1920. Using registered death records, the 1891 census, and reports of both the Provincial Board of Health and the Registrar General for Ontario, we provide new insight into a relatively unknown pandemic in York County, Ontario. Analysis of total deaths and mortality rates indicates that influenza epidemics occurred in the winters of 1890 and 1892, but not in the intervening year of 1891. The duration of the epidemics and age-specific mortality proved to be similar to other locations, globally. In contrast to the "W" shaped mortality pattern of the 1918 Spanish influenza with the unexpected increase in young adult mortality, the Russian pandemic in Ontario followed the more typical "U" shaped mortality pattern found in influenza pandemics.

Two cases of bipartite coracoids from the Trail Bay Site (DiRw-28), Sechelt, BC

Halmhofer, S.

In Situ Consulting, Roberts Creek, British Columbia

The coracoid process is a small, hook-like, laterally-pointing projection of bone on the superior anterior portion of the scapula. Together with the acromion, the coracoid works to stabilize the shoulder joint. Fractures of the coracoid are rare, occurring in only about 2% to 5% of all scapular fractures, and are caused by either direct trauma or avulsion. Congenital abnormalities of the coracoid are equally rare and are usually discovered incidentally. While a small handful of medical cases have been reported (Petty 1906, Garcia-Elias and Salo 1985, Eyres et al. 1995, Ogawa et al. 1996, Kim et al. 1998, Asbury and Tennent 2005), archaeological examples in literature are non-existent. Here I report on two cases of bipartite coracoids observed in two women from the Trail Bay Site (DiRw-28) in Sechelt, British Columbia. Analysis of the specimens at the Tems Swiya Museum in Sechelt has determined that the bipartite coracoids are resultant from a failure of fusion, although the cause of the failed fusion is currently unknown. Potential causes for the failed fusion observed in burials 2011.003 and 2011.005 are presented here as a differential diagnosis.

Dating the human occupation of Newfoundland and Labrador: Challenges and progress

Harris, A.¹, Duggan, A.T.², Marciniak, S.², Marshall, I.³, Poinar, H.², and V. Grimes¹

¹Department of Archaeology, Memorial University of Newfoundland; ²Department of Anthropology, McMaster University; ³Institute of Social and Economic Research, Memorial University of Newfoundland

Stable isotope and genetic analyses of the skeletal remains of over 120 individuals from the Maritime Archaic and Recent Indian cultural traditions are poised to offer new insights into the long precontact history of Newfoundland and Labrador, but the utility of this research hinges on our ability to tether these remains to an accurate chronology. Very few of these individuals have been directly radiocarbon dated due to the challenge presented by the marine radiocarbon reservoir effect (MRE). Archaeological faunal remains, site distribution, artifact assemblages, and now, bone collagen stable isotope values give every indication that marine resources played a central role in the subsistence practices of each of Newfoundland's precontact cultural traditions. As the MRE was thought to render all radiocarbon dates from the bones of these humans with marine diets unreliable, charcoal samples from archaeological features associated with human remains have been the preferred material for radiocarbon dating in Newfoundland. Unfortunately, many of the human skeletons were recovered from disturbed or uncertain archaeological contexts and require direct dates on bone collagen to situate them in time. The marine radiocarbon reservoir effect can now be quantified through the incorporation of the local marine reservoir correction (δR) and by reconstructing past human diets using stable isotope analyses of human and faunal bone collagen. Using parameters that are both temporally and regionally specific to the population under study, a dietary mixing model can be applied to estimate the contribution of marine-derived dietary carbon. Here we demonstrate the efficacy of this approach, highlight the relevant challenges, and present a refined chronology for the human occupation of Newfoundland and Labrador.

Bead burials: Highlights from the shíshálh Archaeological Research Project

Holland, A.¹, Clark, T.², Cybulski, J.², and G. Coupland³

¹Department of Anthropology, McMaster University; ²Canadian Museum of History, Gatineau, QC; ³Department of Anthropology, University of Toronto

Previous excavations (2011, 2010) on the Northwest Coast of North America identified two bead-rich burials dating to the Charles period (5500-3500BP) at a site known as "the

burial ground". Three additional burials were recovered in the 2012 field season, consisting of a double burial that also contained thousands of beads and an infant burial. Burials from this time period on the Northwest Coast are relatively rare, and the contents and preservation of the burials make them comparatively unique. This paper will discuss the burials in relation to their placement within the landscape and the specific site context in order to explore geographical interactions on the ancient Northwest Coast. The bioarchaeological findings are used to understand individual and group movements of shíshálh ancestors as part of the larger shíshálh Archaeological Research Project.

Tracking migration in South Africa using serial sampling of dentine for stable isotope analysis

Hopper, C.¹, Sealy, J.², and G. Dewar¹

¹Department of Anthropology, University of Toronto;

²Department of Archaeology, University of Cape Town

Due to teeth's incremental growth and lack of remodelling, they can provide a wealth of information about an individual's diet, geographic origin, and migratory patterns. In order to examine these topics within the scope of hunter-gatherer/animal interaction, analysis of springbok (*Antidorcus marsupialis*) dental remains recovered from a shell midden located on the Namaqualand coastal plain in South Africa was completed. The site SK400, dated to the Little Ice Age (AD 1500 to AD 1800), contains a substantial number of springbok (MNI=123) deposited during a single anthropogenic mass harvesting event. The faunal remains present a demographic profile consisting of adults and six month old juveniles from both sexes. Although paleoenvironmental proxies indicate that the Little Ice Age was a wet/cold period, the demographic pattern and seasonality indicators are consistent with the springbok being trapped/hunted during an extremely arid summer while on a "drought trek" in search of water.

In this paper, the stable light isotopic composition of springbok mandibular permanent first molar enamel ($\delta^{13}C$ and $\delta^{18}O$) and dentine ($\delta^{13}C$ and $\delta^{15}N$) for nine individuals was prepared and analysed. In order to gain a refined understanding of landscape use by these animals and in turn the humans trapping them, an isotopic serial sampling method was employed. Dentine was collected from the highest cusp at the occlusal surface to the most apical portion of the root, ensuring that at least 10 samples were collected from each tooth. This method was chosen over a whole tooth averaged sampling method in order to facilitate the construction of a sequential isotopic profile for the seasonality of the springbok. In this way, serial sampling of dentine along each tooth provided high-resolution environmental signatures and dietary trends

through time for individuals within the group. This research contributes to a growing body of research on migration and land use patterns by southern African hunter-gatherer populations. By using the Little Ice Age as a proxy for Pleistocene glacial/interstadial periods, we can use this data to model mobility and migration patterns during a period of environmental flux, modern human behaviours that ultimately allowed people to migrate out of Africa.

Escalation as a motive force in the behavioural evolution of early *Homo* and *Homo erectus*

Hopwood, D.E.

Department of Anthropology, Vancouver Island University

Large bodied carnivorans placed significant selective pressure on early *Homo* and *Homo erectus* populations as they entered the carnivoran guild. How hominins reacted to these pressures had direct implications for the evolution of behaviour. The Hypothesis of Escalation is employed as an interpretive framework to determine if changes in hominin behaviour are a result of escalated, competitive interactions with carnivorans. The hypothesis predicts that if escalation is a cause of evolutionary change there should be long-term trends associated with improving a prey's ability to acquire, defend or prevent enemies, i.e., predators or dangerous competitors, from procuring resources (Vermeij, 1994, 2004). If escalation was a primary factor in the behavioural evolution of early *Homo* and *Homo erectus* there should be long-term improvement in the hominin behavioural repertoire increasing their competitive efficiency. This should be expressed through behavioural variables, such as a more sophisticated tool kit, hominin sites found in more competitive locales and evidence of access to more complete prey carcasses. A multifocal approach, integrating information from carcass acquisition, raw material transportation distance and stone tool use, was utilised to provide a robust understanding of the changing behavioural abilities of early *Homo* and *Homo erectus* between ~2.0 – 0.6 Ma. Changes in the richness of the extinct carnivoran guild were also examined. Hominins demonstrate long-term increases in competitive ability related to alterations in the large carnivoran guild. This is associated with an increase in tool kit complexity, improved cognition, and a capacity to directly compete with other members of the carnivoran guild for carcasses access. Although larger extrinsic factors such as climatic variability may be the ultimate trigger of behavioural change it was the immediacy of competition with large carnivorans that was the proximate determinant.

Starving skeletons: Famine through a bioarchaeological lens

Horocholyn, K.

McMaster University

Famine is a disaster that affects societies world-wide, with no restriction on geography and time in its appearance. The application of the term famine is not consistent across disciplines and ultimately may reflect an arbitrary political approach rather than one rooted in technical elements. Bioarchaeological investigations frequently define famine as an occurrence of mass starvation which can be seen through patterns of nutritional stress on the body. The term is often used without any culturally-specific context or further explanation as to what it encompasses for past populations. This perspective tends to homogenize the experiences of individuals within communities, and focuses on a narrow prescription of how famine manifests as a result of only biological and ecological conditions. This paper will highlight the components involved in famines, focusing on the Great Irish Famine of 1845-1849 and the recent 2010-2011 famine in Somalia. The comparative analysis of both events will highlight the overlapping conditions that precipitated a state of emergency categorized as famine. To gain a better understanding of catastrophes in the past, bioarchaeologists could investigate the consequences of food shortages on vulnerable segments of the population, and further contextualize these events with socio-political perspectives. The approach proposed will expand research topics beyond inferring the occurrence of famine through skeletal nutritional stress markers by adapting a socially holistic perspective.

Development of a CT-scan data bank for paleopathological analyses: Three cases from a Protestant cemetery, St-Matthew, Québec City (1771-1861)

Houle-Wierzbicki, Z.¹, Raguin, E.¹, Ribot, I.¹, Auger, R.², and G. Treyvaud³

¹Département d'anthropologie, Université de Montréal;

²Département des Sciences historiques, Université de Laval; ³Institut National de recherche scientifique (INRS), Centre Eau Terre Environnement

As part of a paleopathological research project, human skeletons from the Protestant cemetery of St-Matthew (1771-1861 A.D.) have been CT-scanned at the Institut National de Recherche Scientifique, Québec City (Scanographie – Eau Terre Environnement Laboratory). To overcome key issues in Québécois bioarchaeology (reburials and loss of information on past health), the main objectives were: 1) to create a repository of CT-scans from

the skeletons that were the most well-preserved and the most representative (age, sex, pathology); and 2) to combine this data set with previous macroscopical observations in order to improve paleopathological interpretations. Using a Siemens CT-scanner (SOMATOM model), 55 skeletons (more than 50% of them are young adults) have been entirely CT-scanned. The images in sagittal, coronal, and transversal views were then analysed with OsiriX software, searching for abnormalities according to a well-defined protocol for describing both type and distribution of lesions. Finally, they were compared with previous macroscopical observations and then discussed in the light of the possible diagnoses proposed for some cases. Three skeletons that are the most interesting are presented here, to illustrate the necessity to combine macroscopical observations with CT-scan data. The development of this data bank enables us to further explore the etiology of lesions. It provides additional data and interpretations on various diseases (e.g. rickets, scurvy, trauma, tumors, dysplasia) that possibly affected the urban Euro-Québécois population in the early to mid 19th century.

Finding our roots: premolar root morphology evolution within the Plio-Pleistocene hominin clade

Klassen, P.
Institute of Archaeology and Department of Anthropology,
University College London

Premolar root morphology is often mentioned within descriptions of new specimens and included in diagnostic traits of species. The development of roots is strongly controlled by genetics and any morphological changes indicate a possible outside influence. Previous studies have shown distinct trends within premolar root morphology between hominin taxa. This study intends to create an evolutionary pathway of the premolar root morphology within the Plio-Pleistocene hominin clade. Analysis of hominin premolars is through the use of microCT scans to examine the external root and internal canal morphologies. Categorizations of both elements are used to trace the evolutionary transition leading to modern *Homo sapiens*. The results confirm previous patterns but include a larger sample with more species than previous studies. There are two patterns observed: a reduction of premolar root and canal number, as well as an increase in number of each, uniquely, in the robust australopithecines. The reduction of root and canal number is due to a lack of interradicular process activity within the developing teeth. The increase in roots and canals of the robust australopithecines is from an increase in this activity. The observed patterns indicate that within the hominin clade the root development is strictly controlled.

3600-year old human remains from the Mini-athiliya shell midden, Sri Lanka

Kulatilake, S.¹, Peiris, R.², Perera, H.N.³, and H.J. Perera⁴
¹Department of Sociology and Anthropology, Mount Royal University; ²Division of Anatomy, Department of Basic Sciences, University of Peradeniya, Sri Lanka; ³Postgraduate Institute of Archaeology, Colombo, Sri Lanka; ⁴Sri Lanka Department of Archaeology, Colombo, Sri Lanka

We report the recovery of ancient human remains from a salvage archaeology operation conducted at a shell midden site in the coastal village of Mini-athiliya, in southern Sri Lanka. This site has been radiocarbon dated to ca.3600 BP. Large quantities of shells, stone tool debris and charred animal bones were associated with the human skeletal remains located within the midden. The burials had been greatly disturbed by recent shell mining activities at this site, and much of the material was mixed and fragmented. From the commingled midden debris we identified five individuals. A complete undisturbed burial was also previously reported. Therefore a total of six individuals were recovered from Mini-athiliya. The estimated age at death for these individuals ranged from 5 – 45 years. Due to the paucity of diagnostic elements, among the six individuals, only two adult individuals were sexed. Heavy attrition and the absence of caries in the adult dentition indicate a highly abrasive, yet cariostatic diet among these relatively robust mid-Holocene aquatic foragers of Sri Lanka.

The role of the human nasal cavity in patterns of craniofacial covariation and integration

Lindal, J.
Department of Anthropology, University of Manitoba

Climate is a major selective influence on craniofacial form in general, and nasal cavity morphology in particular. However, due to the constraints of developmental and functional integration, naturally selected changes in one cranial structure necessitate changes in connected structures in order to maintain structural and functional cohesion. The relationships between climate and both skull shape and nasal cavity dimensions have been explored, but the integrative role of the nasal morphological variability within the skull as a whole has not. This thesis presents two hypotheses in order to explore this role: 1) patterns of integration between the cranial base and face that have been observed in 2D can be reproduced using 3D geometric morphometric techniques; and 2) the nasal cavity exhibits a higher level of covariation with the lateral cranial base than with other parts of the skull, since differences in nasal morphology

and basicranial breadth have both been linked to climatic variables. The results of this thesis support the former hypothesis, but not the latter; covariation observed between the nasal cavity and other cranial modules may suggest that these relationships are characterized by a unique integrative relationship.

Diagnosing juvenile-onset ankylosing spondylitis: A palaeopathology case study from the Ishkeenickh River Cave Site

MacKinnon, M.

Canadian Museum of History, Gatineau, QC

In the summer of 1967, a relatively complete skeleton of a juvenile, dating from approximately 2000 years ago, was excavated from the Ishkeenickh River Cave Site (now the Ksi Hlginx River). This individual, aged approximately 10 to 12 years at the time of death, displays osteological features consistent with juvenile-onset ankylosing spondylitis (JAS). This case study represents a unique opportunity to observe the bony changes that occur with JAS, since the majority of published research on this disease is from modern contexts. Clinical studies report that JAS often presents first in peripheral joints and may not appear in the spine for several years. This study suggests, however, that along with indicators in peripheral joints, severe changes in the spine can be fully developed by the time a child reaches 10-12 years of age. Finally, this skeleton exemplifies that osteological features of JAS may resemble those of adult-onset ankylosing spondylitis but may not present in the same order.

Femoral neck fractures in post-medieval urban London: Palaeopathology and patterns

Mant, M.¹, Ives, R.², de la Cova, C.³, and M. Brickley¹

¹Department of Anthropology, McMaster University; ²AOC Archaeology Group, Twickenham, UK; ³Department of Anthropology, University of South Carolina

Hip fractures, occurring in the femoral neck and trochanteric region, have high incidence rates in the modern Western world and are associated with high morbidity and mortality and considerable expenditure. In modern populations these fractures have been documented as increasing exponentially with age, being associated with a specific demographic group (older adults) and are frequently linked to an underlying pathology (e.g., osteoporosis or vitamin D deficiency). The rising prevalence with age may mean that hip fractures were rare occurrences in some past populations, with higher mortality in young to middle adulthood than found

in developed countries today. Yet, in population samples that do demonstrate demographic longevity, there is potential to recognize age-related pathological conditions. This research involved the observation of 1597 adult (18+ years) skeletons from eight urban post-medieval sites from England dating from the 18th and 19th centuries. This adult sample included 834 males and 652 females as well as 11 of undetermined sex. Of this sample, 15 (0.94%) had fractures in the femoral neck or inter-trochanteric area: nine males, four females, and two individuals of undetermined sex. There was an age-related trend with more individuals aged 50+ years with fractures than in other age categories. Underlying osteoporosis was potentially a complicating factor in five individuals. Fractures occurring close to the time of death and healed fractures were observed, indicating that the risk of mortality following this trauma was not consistent across the sample. This paper will survey the possible causes of the fractures and consider the significance of the results for the wider understanding of both biological and social impacts of the fractures in this skeletal sample.

It's not the needle, it's the whole haystack! Comparing pathogen DNA detection strategies in archaeological samples

Marciniak, S.^{1,2}, Duggan, A.T.^{1,2}, Prowse, T.L.², and H.N. Poinar^{1,2,3}

¹McMaster Ancient DNA Centre, McMaster University;

²Department of Anthropology, McMaster University;

³Michael G. DeGroote Institute for Infectious Disease Research, McMaster University

The complexity of ancient DNA extracts requires a comprehensive strategy to detect the minute pathogen components contained within archaeological specimens. A common challenge is that multiple lines of evidence (e.g., skeletal, archaeological, historical) are unable to provide a consensus or indication of a presumptive disease associated with a burial assemblage. Here we evaluate the use of two high-throughput sequencing strategies aimed at prioritizing candidate pathogens in such a scenario. A variety of samples (e.g., teeth, mummified tissue, bones) were selected from diverse spatiotemporal contexts (e.g., ancient Rome, medieval Europe, North America). Shotgun sequencing of the metagenome (all organisms) was performed to approximate the abundance of environmental, non-pathogenic and pathogenic microorganisms. The second strategy used an in-solution baits set designed to detect 1,152 human pathogenic species via targeted enrichment. Comparisons of the resultant microbial profiles demonstrated both sequencing strategies are capable of species-level characterization of ancient DNA extracts. The shotgun metagenomic output represented a conservative approach, where pathogenic

species risk being undetectable within the large datasets (representing less than 0.001-0.5% of alignable reads to respective genomes). Conversely, the capture technique was successful in detecting such low abundance pathogens (representing 2-20% of alignable reads to respective genomes). The capture strategy enabled the identification of candidate pathogens, whereas the shotgun approach functioned only as a screening tool. Ultimately, parallel pathogen capture is one of the most efficient approaches to characterize the scope of synergistic disease interactions across diverse archaeological contexts.

A retrospective analysis of blunt force skeletal trauma in fall-related deaths

Marinho, L. and H. Cardoso

Department of Archaeology and Centre for Forensic Research, Simon Fraser University

Falls are a common occurrence in medicolegal investigations, yielding complex patterns of skeletal blunt force trauma. A fatal fall from height can result from an accident, suicide, or homicide, and ascertaining the manner of death can be challenging in certain cases. A retrospective analysis of 100 selected cases of falls that underwent autopsy at the National Institute of Legal Medicine and Forensic Sciences, Portugal, between 2009 and 2014, was carried out. In total, 42 individuals committed suicide by jumping from heights and 58 fell accidentally. For analytical purposes, both intentional and unintentional falls were classified as occurring from the individual's own height, from low (≤ 4 m), mid (4-20 m) or high (> 20 m) height. Falls down a set of stairs were classified separately. Out of the 58 accidental falls, 17 (29%) occurred from own's height, 16 (28%) from low and 16 (28%) from mid height, only one (2%) from high height, and 8 (14%) cases were falls down stairs. Of the 42 suicidal cases, only one individual (2%) jumped from a low height, 21 (50%) jumped from mid height, and 20 (48%) jumped from high height. Falls from mid height provided the largest number of comparative cases between suicides and accidents. In this category, the average number of body regions ($n=3$) with skeletal trauma was the same for both jumpers and accidental fallers. Additionally, both had the ribs as the most frequently fractured bones, followed by the neurocranium. Distinctively, while the frequency of fractures to the lower limbs was 33.3% in jumpers, in accidental falls this region was only injured in 12.5% of the cases. Further research in fall-related trauma as the one presented here has the potential to unravel skeletal fracture patterns and trends useful for the distinction of the manner of death of fall-related deaths.

Before Paquimé: An exploration of diet during the Viejo period in Casas Grandes, Chihuahua, Mexico

McConnan Borstad, C., Kelley, J.H., and M.A. Katzenberg

Department of Anthropology and Archaeology, University of Calgary

The Viejo period (AD 900-1200) in Casas Grandes was characterized by small pithouse communities that practiced subsistence agriculture supplemented by hunting and gathering. As compared to the later Medio period (AD 1200-1450), when multi-story buildings dominated and sites like Paquimé built ball courts and ceremonial mounds, the Viejo period has traditionally attracted much less interest. Until more recently, it has also remained relatively unexplored archaeologically. This has created an opportunity to explore dietary practices in the Casas Grandes region prior to the Medio period. Presented here are the results from the stable carbon and nitrogen isotope analysis of 20 Viejo period individuals, including new data from 13 individuals from the Convento site, near Paquimé. Previously published data from four other sites in west-central Chihuahua are also included for comparative purposes. Diet appears to have been based largely upon C4 plants and fauna throughout the Casas Grandes region, with some differences apparent between the Convento site to the north and the west-central Chihuahua sites. While the stable carbon isotope values remain similar, the mean stable nitrogen isotope value at the Convento site is significantly lower. This suggests a differing reliance on animal protein in the diet between the two areas, possibly related to the biotic zones that each site is located in. The distribution of the stable nitrogen isotope values at each site also suggests that underlying environmental characteristics may be the cause of these differences. These results not only help to interpret dietary practices during the Viejo, but also provide a larger context within which to interpret the later Medio period values.

Substance over style in adult skeletal age estimation: Why what we do is more important than how we analyze it

Merritt, C.E.

Centre for Anatomy and Human Identification, University of Dundee

When assessing age at death from adult skeletal remains, biological anthropologists are in general agreement on the most reliable methods: the Suchey-Brooks pubic symphysis, the Lovejoy et al. auricular surface, and the İşcan et al. fourth rib methods. However, there is considerable debate surrounding the process for interpreting and analyzing the results of these methods.

How is age determined if multiple methods are used? Should the entire range of an age phase be used? When using a point age, should it be the mean, median (where available), or should the researcher rely on their experience to select an age on the upper or lower end of the range? If the latter, how can “experience” be weighted and results reproduced? For statistical analyses, should we use pairwise comparison statistics such as student t-tests or ANOVAs, multivariate analyses such as MANOVAs, PCAs, or GLMs, or Bayesian statistics such as transition analysis or probit models? In this talk, I will present the results of my research in adult skeletal age estimation as interpreted through the three above mentioned age estimation methods, first applied separately and then applied as multiple-method analysis. I will then present the same results analyzed using MANOVA, GLM, and transition analysis. While the numbers vary slightly depending on the model, the overall findings are the same and are statistically significant in each case. Researchers using established age estimation methods rigorously and consistently can be confident in their results.

Examining violence at Casas Grandes, Mexico using strontium isotope analysis

Offenbecker, A.M., Kelley, J.H., and M.A. Katzenberg
Department of Anthropology and Archaeology, University of Calgary

Casas Grandes, also known as Paquimé, is considered to be one of the largest and most complex sites north of Mesoamerica. During the Medio period (ca. 1200 – 1450 AD), Casas Grandes was the core of a regional system that was connected through a variety of social, ritual, economic, and political relationships. There is also evidence of emerging social hierarchy and inequality that coincides with an increase in violence when compared to the earlier Viejo period (ca. 900 – 1200 AD). Although the large skeletal assemblage recovered from the site exhibits trauma patterns and mortuary treatment indicative of both interpersonal and ritual violence, little is known about the individuals involved. As such, the primary objective of this study is to determine whether violence was directed toward members of the local community or outsiders, such as immigrants or captives. We accomplish this by using strontium isotope analysis to examine the relationship between geographic origins and various osteological and mortuary variables. Our preliminary results indicate that $87\text{Sr}/86\text{Sr}$ values are significantly correlated with mortuary treatment, particularly in ritual contexts. We discuss these results in the context of emerging complexity and inequality at the site and also highlight the strontium results from several distinctive burials, including potential human sacrifices, cannibalised remains, and various interments from an elite burial tomb.

Localized hypoplasia of the primary canine in South African foragers

Paul, J. and L. Harrington
Department of Anthropology, University of Alberta

This study explores localized hypoplasia of the primary canine (LHPC) among Later Stone Age foragers from southern Africa. LHPC presents as an enamel defect on the deciduous canine, ranging from a small ‘pin-prick’ to a larger plane-form expression. Most scholars attribute LHPC to physiological stress, specifically nutritional deficiencies in early life. However, the etiology of LHPC is still not well understood and its interpretation is best approached by comparing its frequency across populations with various cultural and environmental contexts. This paper contributes to the literature on LHPC by examining its frequency in an assemblage of 59 juvenile southern African foragers. The presence of LHPC among Later Stone Age juveniles is of interest given that this population displays few of the classic indicators of physiological stress. Defects were counted and described qualitatively, with particular attention paid to bilateral asymmetry, the position of the defect on the tooth, and the relative size of the defect. LHPC was observed macroscopically in the dentition of 13 individuals in the sample, with only 4 individuals displaying bilateral expression. Using LHPC data, we explore the limited body of research both on the etiology of LHPC, as well as childhood health and diet in Later Stone Age southern Africa.

Cortical bone distribution in the mandibular corpus of great apes with implications for understanding the hominoid fossil record

Pitirri, M.K. and D.R. Begun
Department of Anthropology, University of Toronto

Mandibular cortical bone is known to respond to stresses and strains placed on the mandible during mastication. Since mandibular fragments are among the most commonly preserved specimens in the hominoid fossil record, it is surprising that relatively few studies have focused on this anatomical aspect. Here, cortical bone distribution in the great ape mandibular corpus is quantified and compared using six landmarks and 60 semilandmarks at two locations along the right side of the mandible, in between M3-M2 and M2-M1. 152 adult specimens of *Pan paniscus*, *Pan troglodytes*, *Gorilla gorilla* and *Pongo pygmaeus*, as well as four Miocene ape specimens (*Sivapithecus*, *Dryopithecus fontani* and *Rudapithecus hungaricus*) were included in this study. Data were collected from orthoslices of CTscans for the extant specimens and higher resolution scans for the fossil specimens in Amira. Semilandmarks were ‘slid’ via

minimum bending energy, after which, the resulting landmarks were subjected to generalized Procrustes analysis and PCA was conducted on the resulting shape coordinates. All statistics were conducted using the Morpho package in R. Preliminary assessment of the M3-M2 analysis indicates separation of extant taxa along PC1 and PC3, reflecting differences in cortical bone distribution throughout the entire anatomical section, as well as differences in overall shape of the corpus. Preliminary assessment of the M2-M1 analysis also shows separation of extant taxa along PC1 and PC3, reflecting inferior and buccal differences in cortical bone placement, as well as corpus height. Results of this analysis are discussed in terms of taxonomic and functional significance.

Geographic origins and mobility on a Roman Imperial estate (2nd – 4th centuries CE) in Southern Italy through stable isotope analysis

Prowse, T.L.

Department of Anthropology, McMaster University

Archaeological evidence from the region of Apulia in southern Italy indicates a decrease in settlement size and density after the end of the Iron Age (ca. 5th c. BCE). Historical evidence from the early Roman Republic (ca. 4th – 3rd centuries BCE) reports significant political and social upheaval in the region associated with a series of battles between the expanding Roman Republic, indigenous Italian groups, Greece, and Carthage. One outcome of these conflicts was that groups conquered by Rome were taken as slaves and their lands confiscated. There is evidence for a resurgence of settlements in the region by the 1st century CE, including the presence of Imperial estates, which were properties owned by the emperor and run by local administrators. The site of Vagnari is one of these estates and archaeological excavations at the site have revealed a large site (3.5 hectares) with extensive residential and industrial areas, along with a necropolis dating between the 2nd and 4th centuries CE. This raises the question of whether the people who lived and worked on this estate were local to the area, or if they moved to the region (or were brought there) by the managers(s) of the estate. To answer this question, enamel samples from 54 1st molars were analyzed for $\delta^{18}\text{O}$ to explore geographic origins and mobility in this skeletal sample. Results of this analysis indicate that only a small percentage (5/54, or 9.3%) of the sample display $\delta^{18}\text{O}$ values indicative of non-local origins. This suggests that the source of this Imperial workforce was likely from local subjugated populations. This study also examines the relationship between the $\delta^{18}\text{O}$ values of the non-locals and the quality and quantity of grave goods found in their burials to explore evidence for differential burial treatment of people not born locally.

The role of the Balkans in early human migrations to Europe

Roksandic, M.

Department of Anthropology, University of Winnipeg

At the gates to the continent, the Balkan Peninsula represents the most logical route of migration into Europe. Paleontological evidence supports successive movement of animals from Africa / Southwest Asia (SWA) into Europe in the Early and Middle Pleistocene. This notion of successive movement has recently been explored by Denell et al. (2011) and Bermudez del Castro and Martinon-Torres (2013) using a demographic “sinks and sources” model. The authors postulate a demographic source population in SWA, which would have repopulated Europe in successive migrations, intermixing to an extent with humans that were present in southwestern European refugia at the time. The Balkans, lacking any geographic barriers to SWA, represents its logical continuation. For all their importance in allowing the movement of animals and people into Europe, the Balkans should not be conceptualized exclusively as a transit zone. Together with the Iberian and Apennine Peninsulas the Balkans played the role of a refugium for temperate deciduous forests and associated biota. Unlike the more western peninsulas, this region maintained open contact with the rest of the inhabited world. The lack of geographic isolation of the Balkans and their position between the continents links this area to SWA to form what I would like to refer to as the “eastern Mediterranean” geographic entity, a region at the crossroads of the continents that should be conceptualized as the fertilization zone between different populations and their technological traditions. Building on the scant – but growing – fossil human record contextualized by more abundant archaeological data, we examine the evidence for this larger Eastern Mediterranean Communications Area in the Middle and Upper Pleistocene record.

The oft-forgotten bone: An etiological analysis of sternal porosity

Sanchez, J.

Department of Anthropology, University of Manitoba

The sternum has rarely been the sole unit of analysis in paleopathological studies. As a result, the extent to which the sternum can aid in disease diagnosis in past populations is not fully known. The present study assesses the relationship between manubrial porosity on the posterior surface of the manubrium, respiratory disease (specifically pulmonary tuberculosis), and confounding factors such as age, sex, and biomechanics. 154 individuals from the Luis Lopes Skeletal Collection were assessed for

manubrial porosity. Manubrial porosity (score of 2 and higher) was present in 39% (60/154) of individuals. When divided into two broad cause of death categories, pulmonary and non-pulmonary disease, sternal porosity was present in 40.5% (17/42) and 37% (40/108) of individuals, respectively. Individuals in the pulmonary disease category were further divided into tuberculosis and non-tuberculosis categories. Result from the Odds Ratio show that the individuals in the non-tuberculosis category are two times more likely to have manubrial porosity than those in the tuberculosis category, but not at a statistically significant level (OR: 2.2, 95% CI: 0.59 – 8.40). Odds ratio results do show a statistically significant relationship between adolescents (age category) and manubrial porosity when compared to children, young adults, and older adults (OR: 7.7, 95% CI: 1.16 – 51.17; OR: 3.6, 95% CI: 0.99 – 13.16; OR: 4.09, 95% CI: 1.31- 12.70 respectively). The results of this study show that the sternum cannot aid in the skeletal diagnosis of pulmonary tuberculosis, but two possible etiologies of manubrial porosity are proposed. The first proposed etiology is that manubrial porosity is an expression of normal variation in sternal morphology; the second, manubrial porosity may act as a non-specific indicator of disease.

Tracing the origins of East African pastoralism: New dental evidence from Turkana, Northwest Kenya

Sawchuk, E.

Department of Anthropology, University of Toronto

Recent excavations (2012-2014) of human remains from west of Lake Turkana provide new information about the biological attributes and social practices of groups living there during the transition to food production. This new skeletal collection (n=45) comes from three mid-Holocene “pillar sites,” a subset of megalithic sites around the lake with linear arrangements of basalt and sandstone pillars associated with platforms, stone circles, cairns, and, in some instances, dense accumulations of burials. Dating suggests construction and use 5270 to 4825 cal BP, with activity at key sites during the short span of 4868 to 4825 cal BP. Newly discovered evidence for domesticated fauna now suggests the pillar builders may represent some of the earliest herders in eastern Africa. Research on the pillar sites sheds new light on the question of how pastoralism spread to this part of the world. Cattle, sheep, and goats likely entered the Turkana Basin from the north, where pastoral societies flourished in the ‘Green Sahara’ until environmental conditions destabilized at the end of the African Humid Period. Whether they were accompanied by migrant herders or were locally adopted by the fisher-foragers around Lake Turkana remains in dispute. Although early scholarship favoured the migration hypothesis, absence of any strong archaeological

connections to the north has been used to argue for local origins. This paper presents preliminary biodistance results comparing the dental morphology of the new skeletal sample (n=24 dentitions) to earlier foragers (n=40), contemporaneous herders (n=53), and later pastoralists (n=91) from eastern Africa. Investigating biological continuity across the boundary to food production has great potential to resolve long-standing questions about the movement of people and animals that led to the rise of East Africa’s pastoral tradition.

Biological relationships of the Western Basin Tradition revealed by biodistance analysis

Schillaci, M.A. and G. Dewar

Department of Anthropology, University of Toronto
Scarborough

We present the results from our research examining the biological relationships of the Western Basin Tradition (WBT) of the Late Woodland Period of southwestern Ontario (ca. AD 500-1400). Specifically, we examined whether the WBT exhibited a closer biological relationship with historic Iroquoian or Algonquian-speaking groups. More generally, we were also interested in examining the biological relationships among prehistoric cultural groupings in Ontario, and whether those groups showed affiliation with either historic Iroquoian or Algonquian-speaking groups. For our study, data for 9 commonly used cranial metric variables were compiled for a total of 366 individuals comprising 22 cultural groupings. We generated pairwise biological distances among cultural groupings based on the R-matrix derived from the craniometric data. The resulting distance matrix was described graphically using conventional cluster analysis and ordination, in addition to a generalized nearest-neighbor network analysis. The results of our analysis indicated that the WBT grouping exhibited its closest relationship with the Historic Huron/Wendat of Ontario, and its next closest relationship with Late Woodland Juntunen population from Michigan. On average, the WBT grouping exhibited a much closer relationship with known historic Iroquoian-speaking groups (i.e., Huron/Wendat, Neutral/Wenro, Five Nations), than with known Algonquian-speaking groups (i.e., Cheyenne, Chippewa, Blackfoot). The Ontario Archaic population from the Hind site exhibited a very close relationship with the Archaic population from New York, and with the Algonquian Chippewa sample. Interestingly, the Ontario Middle Woodland sample exhibited its closest relationship with the Archaic population from New York, but did not exhibit a close relationship with the Ontario Archaic sample. Our results invite several possible inferences regarding linguistic affiliation and population history of the prehistoric cultures of southern Ontario.

What can you do with an ear bone? Phylogenetic and functional inferences from an exceptionally well-preserved Early Eocene primate petrosal (Cambay Shale Formation, India)

Silcox, M.T.¹, Dunn, R.H.², Kumar, K.³, Rana, R.⁴, Sahni, A.⁵, Smith, T.⁶, and K.D. Rose⁷

¹Department of Anthropology, University of Toronto;

²Department of Anatomy, Des Moines University; ³Wadia Institute of Himalayan Geology; ⁴Garhwal University;

⁵Panjab University; ⁶Directorate Earth & History of Life, Institut Royal des Science Naturelles de Belgique; ⁷Center for Functional Anatomy and Evolution, Johns Hopkins University

The Vastan Lignite mine (Gujarat, India) has yielded a collection of exquisitely preserved primate gnathic and postcranial specimens from the Early Eocene (~54.5 mya) Cambay Shale Formation, including representatives of both of the common Eocene euprimate superfamilies (*Adapoidea*, *Omomyoidea*). The first primate cranial specimen identified from this site is an isolated left petrosal that preserves a partial stapes in anatomical position. The specimen is identified as pertaining to the adapoid *Marcgodinotius indicus* based on an adapoid-like pathway for the branches of the internal carotid artery, and body mass estimates derived from measurements of the semicircular canals. Although representing only a small part of the cranium, the specimen is quite informative both phylogenetically and functionally. From a phylogenetic perspective, it may be significant that the promontorial artery was not contained in a bony tube, a feature more similar to living strepsirhines than haplorhines. Functionally, the specimen preserves a nearly complete cast of the inner ear, allowing for inferences about locomotor behaviour from the semicircular canals and hearing performance from the cochlea and oval window area. The early age and fine quality of preservation of this specimen make it relevant to reconstructing auditory morphology near the base of the primate tree.

Is mortality bias a significant factor when studying past child health and growth?

Spake, L. and H.F.V. Cardoso

Department of Archaeology and Centre for Forensic Research, Simon Fraser University

Archaeologists have long recognized that skeletal samples are comprised of the non-survivors. These individuals have succumbed to stressors, and may not accurately reflect the growth, nutritional, or health status of the survivors. This issue cannot be directly investigated, as it would require knowledge of the health status of both survivors

and non-survivors from the same past population. However, more recent populations can be used to ask what differences may have existed between survivors and non-survivors, as well as to estimate whether these differences are large enough to impact interpretations of past health. A sample of 323 autopsy records of juvenile deaths occurring between 2002 and 2010 (birth-18 years) from Cleveland, Ohio, was used to investigate this question. The sample consists of 160 accidental deaths (55 females and 107 males) used as proxies for the survivors, and 163 natural deaths (76 females and 85 males) used as proxies for the non-survivors. Z-scores were calculated for height using NCHS-1977, in order to quantify individual deviation from the mean for age. The distributions of Z-scores were then compared between the manner-of-death groups. The differences in height for age were smallest in the youngest age group (birth to 3 years at death), and increased with age (up to 10 cm). These findings suggest that there is indeed a difference in growth between survivors and non-survivors, which increases with age, potentially affecting the interpretation of growth patterns based on non-survivors. The effects of mortality bias, however, are likely to be minimized by other sources of error, such as age estimation, which also increase with age.

Breaks by the Baltic: Fracture patterns compared between the rural Drawsko (Poland) and urban Black Friars (Danish) post-medieval populations

Stevens, L.¹, Scott, A.¹, and T. Betsinger²

¹Department of Anthropology, University of Manitoba;

²Department of Anthropology, SUNY Oneonta

The study of trauma is an important element of bioarchaeological analysis that helps inform our understanding of activity and adaptation in distinct sociocultural environments. The main objective of this research was to explore evidence of trauma, specifically skeletal fractures, between two post-medieval populations and how this data may inform our understanding of this distinct historical period. This study compared 117 adult individuals from the 17th-18th centuries rural Drawsko (Poland) population and the 16th-17th centuries urban Black Friars (Denmark) population. It was hypothesized that the urban Black Friars population would present greater fracture trauma than the contemporaneous Drawsko population. The results of this study confirmed this hypothesis with 11% of the urban Danish population showing evidence of fractures compared to only 7% of the rural Polish population. When comparing these trends between sexes, in the urban population females were more affected than males whereas in the rural population the opposite was true, although not statistically significant. Female fractures were primarily associated with the upper

extremities, whereas male fractures were distributed throughout multiple skeletal elements. All fractures examined were healed except for two examples in the urban population. While the majority of these fractures could be associated with accidental trauma (i.e., Colles' fracture), both the urban and rural populations demonstrated evidence of violent trauma (i.e., sharp and blunt force). This preliminary analysis demonstrates a distinct trend between these urban and rural populations that inform our understanding of activity and lifestyle prominent in Europe during this period.

Unravelling the evidence for lead exposure during the Franklin expedition

Swanston, T.¹, Bewer, B.², Keenleyside, A.³, Nelson, A.⁴, Martin, R.R.⁵, Stenton, D.⁶, Varney, T.⁷, Coulthard, I.², Pushie, M.J.⁸, and D.M.L. Cooper⁸

¹Department of Archaeology and Anthropology, University of Saskatchewan; ²Canadian Light Source, Saskatoon, SK;

³Department of Anthropology, Trent University;

⁴Department of Anthropology, Western University;

⁵Department of Chemistry, Western University;

⁶Department of Culture and Heritage, Government of Nunavut; ⁷Department of Anthropology, Lakehead University; ⁸Department of Anatomy, University of Saskatchewan

Sir John Franklin was given the task of mapping the route of the Northwest Passage with two ships and a crew of 128 men. They spent the first winter at Beechey Island, where three crewmen died and were buried. In September 1846, the ships became stranded in ice off the northwest coast of King William Island, where they remained until April 1848. At that time, the crew, now reduced to 105, deserted the ships and headed south along the western shore. Sadly, not one individual survived. Previous analyses of bone and hair samples from expedition remains indicate that crewmembers had high lead (Pb) levels and may have been suffering from Pb poisoning at the time of death, but questions remain regarding the source, duration of exposure, and the degree to which the crewmembers were incapacitated. Since people interact with their environments in a variety of ways, including the biogenic uptake of trace elements such as Pb, we have the opportunity to look at the spatial patterns of trace element distribution with high resolution synchrotron imaging and match these patterns with bone remodeling events to determine the prevalence and timing of the uptake. Other elements such as strontium (Sr) occur naturally in the environment, but interestingly, this element is also found in newly mineralizing bone. Our objective was to image bone samples from individuals buried on Beechey Island to determine the Pb and Sr spatial patterns and compare these results with the

patterns identified in the samples recovered from King William Island. The results support recent conclusions that they were chronically exposed to Pb prior to the expedition, but the comparisons of the Sr uptake patterns with the Pb patterns also suggests that lead exposure was variable for the individual crewmembers.

Evidence of indirect parental investment by males via resource defence in nonhuman primates: Variation with paternity certainty

Teichroeb, J.A.

Department of Anthropology, University of Toronto Scarborough

In primates, direct, affiliative parental investment by males is relatively rare, mainly occurring in species with pair-bonding, altricial young, or high reproductive rates. However, indirect paternal investment may occur without males physically interacting with infants and can consist of: 1) range defense to ensure resources are available for females and offspring (resource defence polygyny), or; 2) infant defense against conspecific males and predators. As demonstrated by other animal groups, males could use indirect parental investment as a way to attract females. These behaviours benefit female fitness and where females can disperse and choose the males they associate with, behaviours falling under indirect parental investment may be important selective criteria. Conversely, males could invest less in these behaviours if females do not transfer between groups and male ability to associate with females does not depend on attracting them. Here, I examined the occurrence of male resource defence in the nonhuman primates and determined whether it co-occurs with female dispersal and paternity certainty (uni-male versus multi-male groupings). Evidence of resource defense polygyny is still rare in the primates but more examples have recently been found. Resource defense by a single male is associated with female dispersal, thus males appear to invest in defending food for females and offspring when their assurance of paternity is high and they attract females with their resource holding potential. Resource defence by groups of males occurs, both with and without female dispersal. Defense in male-philopatric species appears more organized and to suffer less from collective action problems, while successful defence in female-philopatric species may depend on the number of defending males. In both types of species, male resources defence benefits males via increased female reproductive rates even with low paternity certainty for individual males.

Investigation of methodologies for fiberglass resin removal from bone

Thew, M.

Department of Anthropology, Political Science and Economics, MacEwan University

This project explores the use of solvents for removing fiberglass from bone. A human skeleton housed at the University of MacEwan was improperly conserved using fiberglass resin and removal of this resin is required before the remains can be used as part of the anthropological teaching collection. No published literature was found on methods of resin removal from bone and as such this project was undertaken using pig bone as a proxy for human material. Three chemical removal agents, acetone, ethyl acetate, and dichloromethane, were tested using two application methods, soaking and surface brushing. All three reagents were successful at removing resin when the bones were soaked with dichloromethane acting the fastest and requiring the least amount of manual resin manipulation. This reagent was then selected for a small scale test using the right arm bones of the human osteological remains which were coated with older resin than had been applied to the pig bone. The dichloromethane was successful at removing the resin from the human bone. Acetone was then applied to the remains to remove paint staining. The results of these tests have provided a successful method to remove fiberglass from bone and will allow for the improperly conserved human remains to be incorporated into the teaching collection.

Childhood cranial trauma from a late Roman and Merovingian context from Michelet, Lisieux, France

Timmins, S.¹, Seréville-Niel, C.², and M. Brickley¹

¹Department of Anthropology, McMaster University;

²Michel Centre Bouard - Craham, Université de Caen

Trauma and violence has long been of interest to bioarchaeologists, yet analyses focus largely on adult prevalence rates and as such, examples of childhood trauma remain underreported, and poorly understood. The Michelet necropolis in Lisieux, France is comprised of a large number of well-preserved juvenile remains dating from the late Roman to Merovingian period, offering a unique opportunity to better understand childhood trauma in the past. The aims of this study were threefold; 1) to determine the type and mechanism of trauma evidenced in children from the 4th - 8th centuries AD, 2) explore potential behaviours or circumstances surrounding the trauma and 3) to better understand childhood during the late Roman and Merovingian period. The remains of 109 juveniles from the Michelet necropolis

were macroscopically examined for the presence of cranial and post-cranial trauma with careful attention paid to differentiating postmortem damage from perimortem and antemortem trauma. Location, characteristic features of the lesion, and type of trauma was recorded for each individual exhibiting trauma. No cases of post-cranial trauma were identified, but three cases of perimortem and one case of antemortem cranial trauma were evident. Cranial trauma affected 4.1% of children with observable cranial remains. The children affected were young (2-7 years old), making it unlikely that they would have participated in militaristic activities. Based on the location, morphology and mechanism of injury identified, it is likely that the perimortem injuries sustained by three children were not accidental. The presence of a number of cranial injuries from this site demonstrates that children were not always exempt from violence resulting in death. The consideration and inclusion of childhood trauma in bioarchaeological analyses allows for a more detailed and in-depth understanding of violence and childhood in the past.

Pattern of bone fluoridation in the Lower Paleolithic deposits of Dmanisi, Republic of Georgia: Implications for taphonomic and site formation studies

Tuttösí, P. and F. Berna

Department of Archaeology, Simon Fraser University

The archaeological site of Dmanisi, Republic of Georgia, has produced some of the most important hominin and faunal skeletal remains dating back to nearly 1.8 million years ago. Here we present a chemical and mineralogical characterization performed in order to understand the geochemical mechanism(s) that lead to the exceptional state of bone preservation at this site. Bone specimens collected from different excavation areas were sampled from the exterior, interior, and in cross section and analyzed by Fourier transform infrared spectroscopy (FTIR). The bone's organic components (collagen and other proteins) are degraded below the detection limit of this technique, while the bone's mineral component (carbonate hydroxyl apatite) appears to be transformed differently in different paleo-depositional settings (i.e., pipes, gullies, buried soil horizons). Specifically FTIR identified each sample as consisting of hydroxyapatite, fluorapatite, or being partially fluoridated. We observed different patterns of bone fluoridation in relation to specific depositional environments. The bones found dispersed in paleosol horizon show little to no fluoridation, bone found in pipe fills are fluoridated primarily in an outer rim, and the bones found in gully fills are diffusely fluoridated. We thus hypothesize that the different bone fluoridation patterns reflect the different water regimes experienced by bone fragments in specific depositional

environments. In particular we propose that the bones deposited in gullies have been immersed in a much greater quantity of flowing water with respect to the bone deposited in the subterranean pipes, or those on the paleosol surface and subsurface. The relevance of the presented results for taphonomic studies, stratigraphic correlation, and isotopic and molecular studies are discussed.

Post-conceptive mating as counter strategy to male infanticide in *Colobus vellerosus*

Vayro, J.¹, Ziegler, T.², Fedigan, L.¹, and P. Sicotte¹

¹Department of Anthropology and Archaeology, University of Calgary; ²National Primate Research Center, ICTR Core Laboratory, University of Wisconsin, Madison

Male infanticide typically occurs when a new male kills infants after taking over a dominant reproductive position in a group. Because females invest heavily during gestation and lactation, the costs of infanticide are high. Thus, there is strong selective pressure for females to develop counter-strategies to infanticide, one of which is paternity confusion through post-conceptive mating. This study investigates female mating patterns relative to (un)stable male group-membership in wild colobines, in which male infanticide has been documented. If female behaviours aim at confusing paternity through post-conceptive mating, we expect females in groups with unstable male membership to mate when pregnant. Using 10-minute continuous focal and ad libitum sampling, we collected 12 months of behavioural data from four groups of *C. vellerosus* at BFMS. We measured ovarian hormones from faecal samples and created hormone profiles for 18 females. All females experienced unstable male-membership for some portion of the study period subsequent to male incursion or rank change (range 2-12 mths). In unstable periods, females mated post-conceptively significantly more than females in stable periods ($U=3.5$, $p=.031$). The mean rate was 0.86 copulations/100 contact hrs (range 0-1.88, $n=8$ pregnant females in unstable periods), and 0.43 solicitations/100 contact hrs (range 0-1.25, $n=8$ pregnant females in unstable periods). During stable periods, females mated post-conceptively at a mean rate of 0.11 copulations/100 contact hrs (range 0-0.43, $n=4$ pregnant females in stable periods) and solicited mating at a rate of 0.22 solicitations/100 contact hrs (range 0-0.86, $n=4$ pregnant females in stable periods). All females in groups undergoing unstable periods solicited and mated with multiple males post-conceptively. These results support the paternity confusion hypothesis. When male group-membership is unstable and infanticide risk high, females mate more often and with more males, than do those in stable groups.

Operational sex ratio, dominance rank and mating success of group and non-group male ring-tailed lemurs (*Lemur catta*)

Walker-Bolton, A.¹ and J.A. Parga²

¹Department of Anthropology, University of Toronto;

²Department of Anthropology, California State University, Los Angeles

Sexual selection theory states that male mating success depends on intrinsic male qualities, but mating success can also be impacted by extrinsic factors. Male mating success is known to be impacted by the operational sex ratio (OSR) in several diverse species. We examined the relationship between OSR, dominance rank, and male mating success in four groups of ring-tailed lemur (*Lemur catta*) at Berenty Reserve Madagascar based on data collected in three mating seasons. We found significant relationships between the OSR during mating (calculated based on whether males were present and engaged in competition for the estrous female) and thrust duration (Whitney $U = 0.0001$, $n_0 = 4 < n_1 = 11$, $P < 0.001$ two-tailed), as well as OSR and female rank ($R=-0.603$, $N=17$, $P=0.010$). Incidence of ejaculation was shown to correlate with thrust duration ($R=0.704$, $N=15$ mating bouts, $P=0.003$). Alpha males copulated (thrust) for longer durations than lower ranking group males (Mann-Whitney $U = 0.0001$, $n_0 = 5 > n_1 = 4$, $P < 0.016$ two-tailed). When non-alphas of the estrous female's group were considered, extra group males were more likely to ejaculate than group males ($R=0.828$, $N=11$, $P=0.002$). These findings show that variation in the OSR during a female's estrous period impacts male reproductive success as higher levels of male-male competition inhibit ejaculation and raise questions about the value of group membership for non-alpha males.

Hafted hunting weapons and the dispersal of early modern humans: Use-wear evidence from the Magubike archaeological site, Tanzania

Werner, J.J.

Department of Anthropology, University of Alberta

The migration of early modern humans across Africa was likely facilitated to a large degree by the appearance of hafted hunting weaponry during the Middle Stone Age. These tools would have permitted entry into new biomes and allowed for the procurement of a range of different animal resources. Evidence of this technology is often exemplified in Middle Stone Age assemblages by unretouched triangular flakes, sometimes called Levallois points. Nevertheless, the function of these artifacts is often assumed, despite their potential significance. This is due to a number of constraints, most related to the

difficulties of performing use-wear analysis on Middle Stone Age artifacts, many of which may be heavily damaged, or manufactured from materials unsuitable for conventional use-wear techniques. However, use-wear methods that rely on plotting edge damage distribution at an assemblage level have been shown to be effective at identifying tool-function for difficult to analyze classes of artifacts. Recently, this technique was applied to points from the Middle Stone Age at Pinnacle Point, South Africa, the results of which implied a scraping rather than projectile function. The methods of that study are replicated here using Middle Stone Age points from the Magubike archaeological site in southern Tanzania. Initial findings demonstrate exaggerated tip-damage, suggesting a possible drilling, piercing or hunting function.

A study of skeletal trauma and gender/sex concerning the 1984 massacre at Putis, Ayacucho, Peru

Willmer, B. and R. Lazenby

Department of Anthropology, University of Northern British Columbia

This study explores whether skeletal trauma inflicted during a massacre is related to victims' gender or sex, and if so, why. The Peruvian Forensic Anthropology Team (EPAF) created forensic analysis reports on the remains of 92 victims recovered from the mass grave at Putis, Ayacucho, Peru in 2008. Eighteen of these reports (7 male, 11 female) were examined for incidences of perimortem trauma according to skeletal location (cranial, thorax, abdomen, upper and lower limbs). Fisher's Exact test was used to compare the total number of injuries by sex for each anatomical area. A significant difference ($p = 0.017$) was found differentiating trauma to the head versus torso. Most of the men's perimortem skeletal trauma was inflicted to the cranial (head and neck) area, while most of the women's trauma was located in the thorax and abdomen areas. Literature detailing physical trauma in other conflicts, particularly genocides, show similar sex/gender-related patterns of trauma, and suggest that perpetrators of mass killing attack female sexuality.

The expanding role of forensic anthropologists in Canadian community-led investigations

Willmon, R.M.^{1,2}, Holland, E.J.³, and M.A. Arntfield⁴

¹Department of Anthropology, Western University;

²Laboratoire d'Anthropologie Biologique "Paul Broca," École Pratique des Hautes Études; ³Department of

Anthropology, Brandon University; ⁴Department of English and Writing Studies, Western University

The purpose of this poster is to consider the ways in which the role of the forensic anthropologist in Canada is expanding to contribute to open access, community-led investigations such as the "Drag The Red" initiative to recover the missing and murdered in Manitoba and the "Cold Case Society" at Western University, an interdisciplinary think tank whose methods were also employed in the internationally syndicated educational documentary-drama series, *To Catch A Killer*. The involvement of forensic anthropologists in criminal investigations has historically been initiated at the discretion of either the local police or in some cases the regional coroner or medical examiner when skeletal remains have been found or need to be located. In recent years, however, some groups have proactively initiated the investigation, re-investigation, or audit and evaluation of unsolved crimes, employing methods that have included searching for human remains and workshopping historical crimes through the lens of modern forensic adequacy standards. These initiatives have benefitted from the contribution of forensic anthropological theory and methods. This includes: engaging forensic anthropologists to train volunteer searchers in proper search and recovery techniques; providing consistent instruction on the proper protocols to be used when skeletal remains have been located; and the review and analysis of historical homicide data, including original case notes, crime scene photographs, autopsy reports, and contemporary attendance at and surveys of historical crime scenes. We incorporate anthropological, criminological and police perspectives in discussing the implications of anthropological engagement in open access, community-led investigations on conventional methods of criminal investigation involving human remains, as well as on the training and professional development of forensic anthropologists.

New checklist for the radiological identification of neoplastic disease in mummies – Check!

Willoughby, J.¹, Nelson, A.¹, and G. Garvin²

¹Department of Anthropology, University of Western Ontario; ²Medical Imaging, St. Joseph's Health Care London, London, ON

While most existing case studies of ancient cancer are focused on skeletal remains, mummified remains have the potential to preserve soft tissue tumors, thus affording a broader understanding of cancer in the ancient world. Computed tomography (CT) provides a non-invasive method for the comprehensive analysis of mummified remains that may reveal evidence of neoplastic disease not otherwise observable. For this type of imaging analysis, it is necessary to incorporate clinical methods in radiological oncological diagnosis to ensure accurate

differential diagnosis. However, taphonomy and the effects of mummification must also be considered in soft tissue analysis. Clinical standards must be adapted to cope with post-mortem processes such as desiccation, removal of internal organs, and faunal activity, which alter the presentation of soft tissues and their appearance in CT images. This paper presents a new checklist for the identification of neoplastic disease in mummified remains, discusses the process of developing this checklist, and advocates for the use of checklists in the paleopathological analysis of radiographs. Checklists are used in clinical radiology to ensure thorough examination, and that no critical anomalies are overlooked. The new checklist was developed based on existing clinical examples with the assistance of a radiologist who has experience working with mummies. As part of a larger project surveying the presence of cancer in ancient human remains, the presented checklist will contribute to paleopathological methodology. It will be important for identifying potential cases of cancer as well as for ensuring accurate differential diagnosis in radiological analysis and standardizing diagnostic methods in mummified human remains.

Population expansion and contraction: The role of East Africa before and during Out of Africa 2

Willoughby, P.R.

Department of Anthropology, University of Alberta

Since the mid 1980s, it has been clear that our own species, *Homo sapiens*, evolved in Africa sometime around 200,000 years ago. This was towards the end of the Acheulean and the start of the Middle Stone Age (MSA). Descendants of these MSA people subsequently dispersed out of the continent starting around 50,000 years ago, interbred with indigenous people in Eurasia, and ultimately settled the globe. But what was happening in sub-Saharan Africa at the time? In many regions, glacial periods saw increasing dry and cold conditions and local extinction of plants, animals, and possibly hominins as well. But, somewhat surprisingly, palaeoanthropological evidence collected over the past decade by members of IRAP, the Iringa Region Archaeological Project, and others, shows that the Southern Highlands of Iringa, Tanzania may have been more or less continuously occupied over the past 200,000+ years. This region seems to be little affected by glacial expansions and retreats. This presentation presents a review of the palaeoenvironmental, palaeontological and archaeological data supporting the argument for continuous occupation of the Iringa highlands over the course of the late Pleistocene and beyond. This region might have been a refugium during cold, dry, glacial phases. As such, it may have had a central role in the survival of the most recent

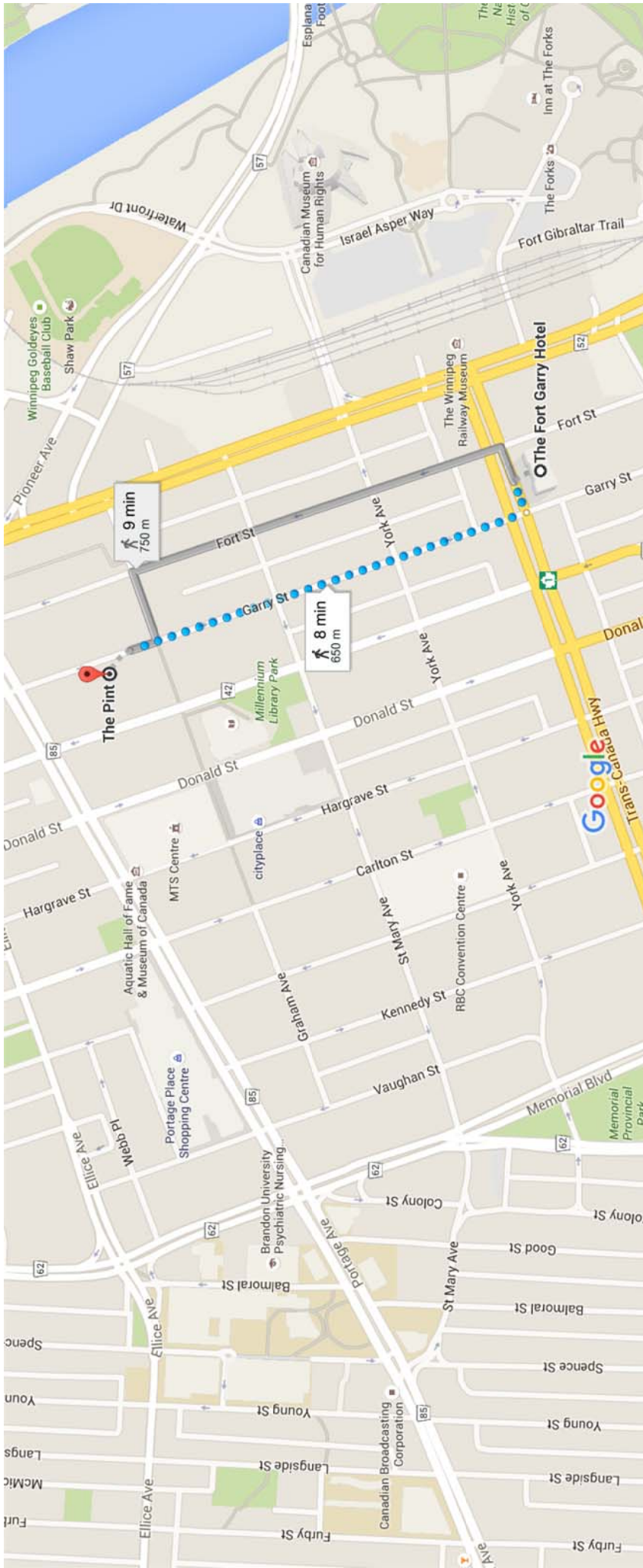
common ancestral human population and in their dispersal out of the continent.

Social capital, maternal mental health, and child health: A cross-sectional survey of mothers and their children in rural Nicaragua

Wilson W.M.¹, Brown, G.¹, Hoehn, N.¹, Szabo, B.², Campanella, S.², Schmeer, K.K.³, and B.A. Piperata³

¹Department of Anthropology and Archaeology, University of Calgary; ²Rollins School of Public Health, Emory University; ³Department of Anthropology, Ohio State University

While a number of hypotheses have been proposed to explain the expansion of the neo-cortex in human evolution, sociality appears to have been the primary catalyst for this development. More specifically, recent work suggests that the rapid encephalization of *Homo* spp. was driven by the need to cooperate, a finding consistent with work in neurology and experimental psychology that indicates we are, indeed, wired to connect. Given the apparent evolutionary importance of social networks, it is not surprising that a large body of research finds that an individual's social capital is positively associated with both their mental and physical health outcomes. The purpose of this presentation is to add to this body of research by exploring the relationship between social capital and health outcomes among rural Nicaraguan women and their children. In particular, we evaluate the hypothesis that a mother's social capital is positively associated with her mental health, self-reported health, and the nutritional status her children. We evaluate this hypothesis using data collected in rural Nicaragua for 250 mother-child dyads. Independent variables considered include social capital (social support network scores and subjective social status). Dependent variables include maternal mental health, self-reported health, and child nutritional status. Preliminary analyses reveal that a mother's social capital is positively associated with her mental health and the nutritional status of her child, but not with her self-reported health. These findings encourage further research concerning how social ecology influences maternal and child well-being.



Map data ©2015 Google

100 m



via Garry St

8 min

650 m



via Fort St

9 min

750 m