SIMON FRASER UNIVERSITY
THINKING OF THE WORLD

Program for the Thirty-Seventh Annual Meeting of the Canadian Association for Physical Anthropology

Programme pour la 37eme Conférence Annuelle de L'Association Canadienne D'Anthropologie Physique

28th-31st October, 2009

To be held at

Simon Fraser University at Harbour Centre
515 West Hastings, Vancouver, BC, Canada

Organizing Committee
Mark Collard (Chair)
Derek Congram
Marina Elliott
Pablo Nepomnaschy
Michael Reid
Mark Skinner
Dongya Yang

The organizing committee
for the 37th annual meeting of the

Canadian Association for Physical Anthropology

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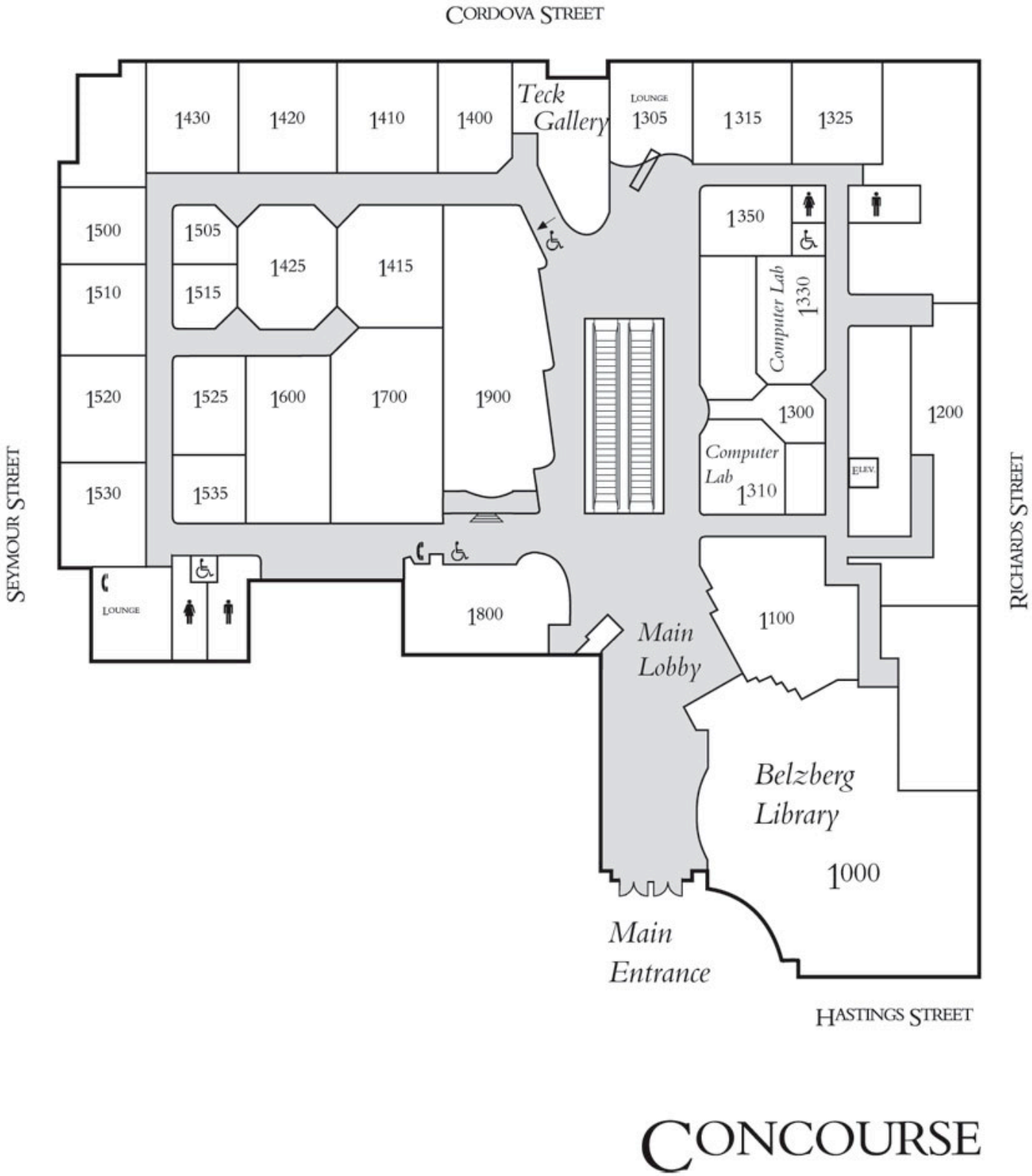
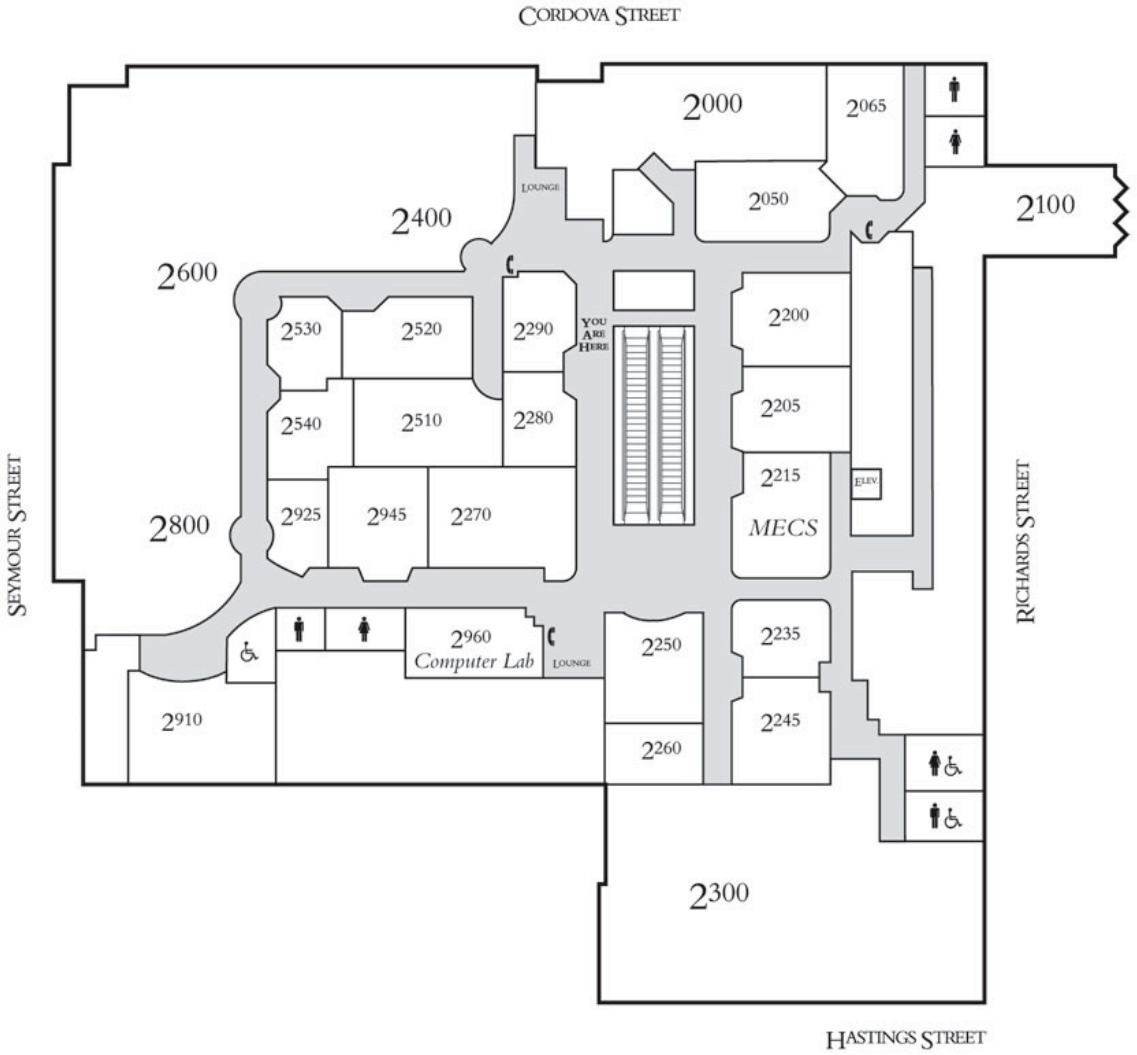
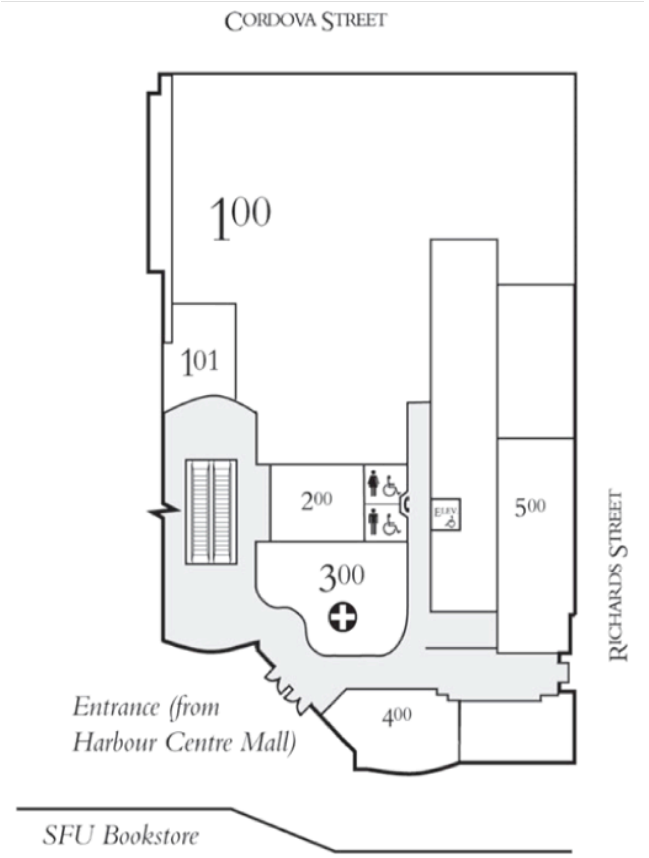




UPPER CONCOURSE



LOWER CONCOURSE

The Conference at a Glance

Wed, Oct 28	17:00-21:00	Welcome Reception (Segal Centre, Concourse Level, Rooms 1400-1410)
Thu, Oct 29	09:00-12:00	Forensics talks (Fletcher Challenge Theatre, Concourse Level, Room 1900) Bioarchaeology posters (Segal Centre)
	13:00-16:00	Bioarchaeology: Methods and Primate Behaviour & Ecology talks (Fletcher Challenge Theatre) Combined Topics posters (Segal Centre)
Fri, Oct 30	09:00-12:00	Human Biology & Ecology talks (Fletcher Challenge Theatre) Bioarchaeology posters (Segal Centre)
	13:00-16:00	Bioarchaeology: Issues & Regional Studies talks (Fletcher Challenge Theatre) Combined Topics posters (Segal Centre)
	16:00-17:00	CAPA business meeting (Fletcher Challenge Theatre)
	17:00-18:00	Keynote address by Dr. Bernie Crespi (Fletcher Challenge Theatre)
	19:00-22:00	Banquet (The Hermitage Restaurant, 115–1025 Robson Street)
Sat, Oct 31	09:00-12:00	09:00-12:00 Palaeoanthropology talks (Fletcher Challenge Theatre)

Keynote Address:

Friday, October 30th
17:00-18:00

Fletcher Challenge Theatre
Simon Fraser University at Harbour Centre

Dr. Bernie Crespi

Professor of Evolutionary Biology, Department of Biological Sciences
Simon Fraser University

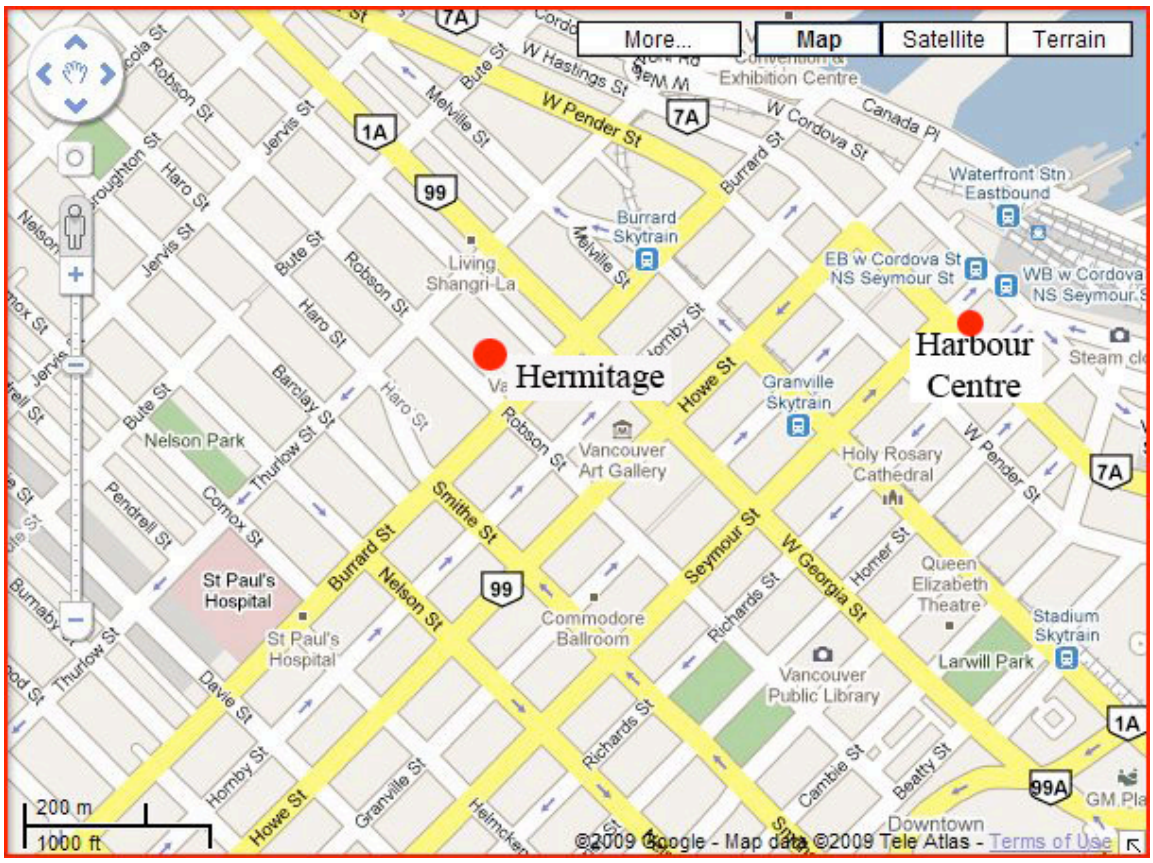
Genomic archaeology of the social brain: autism, psychosis, and the origin of modern humans

Understanding the evolution of humans remains one of the most challenging goals of modern science. I use a combination of data from comparative primatology, archaeology, psychiatry, psychology, neuroscience and genetics, in an evolutionary framework, to develop and evaluate hypotheses regarding the evolution of the human brain and psyche, and its disorders manifested in psychiatric disease. Autistic-spectrum conditions and psychotic-affective spectrum conditions (mainly schizophrenia, bipolar disorder, and major depression) represent two major suites of disorders of human cognition, affect, and behaviour that involve altered development and function of the highly-derived human social brain. I describe evidence that a large suite of anatomical, physiological and neurodevelopmental traits, and their genomic underpinnings, exhibit diametrically opposite forms in autistic-spectrum versus psychotic-affective spectrum conditions. Most generally, social cognition is underdeveloped in autistic-spectrum conditions and hyper-developed on the psychotic-affective spectrum. These data can be interpreted in the context of human evolution, in that autism involves reductions in human-derived social-brain functions, whereas schizophrenia and bipolar disorder involve the social brain run amok specifically with regard to key, uniquely-human features, including language, social emotionality, goal directedness and causal thinking. These hypotheses provide a novel conceptual system for understanding the classification, causes and forms of human mental illness, with direct, specific implications for pharmacological and psychological treatment. Future progress in understanding human evolution will derive in large part from integration across disciplines from primatology through genomics, with hypotheses for patterns and causes of change on the human lineage grounded by data from archaeology, phylogenetics and evolutionary genetics.

The Banquet:

Friday, October 30th
19:00-22:00

The Hermitage Restaurant
115–1025 Robson Street



Please Note: Seating at the Hermitage is limited.
If you did not purchase a ticket in advance, but wish to join us at this excellent restaurant, please ask at the registration desk about late availability.

Detailed schedule

Wednesday evening, October 28th

17:00-21:00 - Welcome reception – Segal Centre

Thursday morning, October 29th

09:00-12:00 Forensics talks

Location: Fletcher Challenge Canada Theatre
Chair: Mark Skinner

09:00-09:15 Lazenby: Forensic Anthropology in the Rural Remote.

09:15-09:30 Clegg: Identification of Canada's Unknown Soldiers and Airmen.

09:30-09:45 Skinner: Forensic Anthropology at Simon Fraser University: Is it working?

09:45-10:00 Katzenberg: Forensic Anthropology Casework in southern Alberta.

10:00-10:15 Waterhouse: A review of fire related deaths in the Edmonton Area.

10:15-10:30 Coffee

10:30- 10:45 Peckmann: The present and future of forensic anthropology in Nova Scotia.

10:45-11:00 Spence: The Practice of Forensic Anthropology in Southwestern Ontario.

11:00-11:15 Stratton: The Professional Education of Forensic Anthropology Students.

11:15-11:30 Congram & Mundorff: Accreditation of Canadian Forensic Archaeologists and Anthropologists.

11:30-11:45 Watamaniuk & Rogers: Thoracic Vertebral Morphology and Determining a Biological Profile.

11:45-12:00 Discussion

09:00-12:00 Bioarchaeology posters

Location: Segal Centre
Chair: Marina Elliott

01. Bleuze & Molto
02. Cooper et al.
03. Correia et al.
04. Ferguson
05. Gloux
06. Nelson et al.
07. Nikitovic & Sikanjic
08. Scharlotta
09. Symchych
10. Harrington
11. Ginter et al.
12. Yang et al.
13. Steinmetz
14. Toth
15. Pitre et al.

12:00-13:00 Lunch

Thursday afternoon, October 29th

13:00-16:00 Bioarchaeology: Methods and Primate Behaviour & Ecology talks:

Location: Fletcher Challenge Canada Theatre
Chairs: Dongya Yang and Michael Reid

13:00-13:15 Bos & Forrest: Metagenomics and ancient human disease.

13:15-13:30 Calce: A Revised Method to Estimate Age Using the Acetabulum.

13:30-13:45 Morris et al.: Human and Nonhuman Secondary Osteon Area for Bone Fragment Identification.

13:45-14:00 Robertson: The use of HR-pQCT for imaging & analysis of archaeological human bone.

14:00-14:15 Webb et al.: Analysis of endogenous cortisol in archaeological human hair.

14:15-14:30 Coffee

14:30-14:45 Colquhoun: Morphological Comparisons of the Black Lemur Taxa (*Eulemur macaco*).

14:45-15:00 Gabriel & Gould: Fecal testosterone and intragroupagonism in ring-tailed lemurs (*Lemur catta*).

15:00-15:15 Gould et al.: Condensed Tannin Intake in Spiny-Forest-Dwelling ring-tailed lemurs (*Lemur catta*).

15:15-15:30 Teichroeb & Sicotte: Vigilance and group size in ursine colobus monkeys (*Colobus vellerosus*).

15:30-15:45 Wikberg et al.: Male dispersal patterns in ursine colobus (*Colobus vellerosus*).

15:45-16:00 Discussion

13:00-16:00 Combined Topics posters

Location: Segal Centre
Chair: Derek Congram

16. Armstrong
17. Tripp et al.
18. Hublin et al.
19. Elliott & Collard
20. Marceau
21. Merrett
22. Zhang et al.
23. Kron
24. McGrath et al.
25. Angus
26. Holmes et al.
27. Collard et al.

Friday morning, October 30th

09:00-12:00 Human Biology and Ecology talks

Location: Fletcher Challenge Canada Theatre
Chair: Pablo Nepomnaschy

09:00-09:15 Sellen: Putting public nutrition recommendations in evolutionary perspective.

09:15-09:30 Parra et al.: Seasonal changes in vitamin D status in healthy young adults.

09:30-09:45 Fujita: Maternal Reproductive Strategy in Vitamin A Deficiency Endemic N. Kenya.

09:45-10:00 Galloway et al.: Patterns of growth among preschool-aged Canadian Inuit children.

10:00-10:15 Highet: Differential Mortality Among Roman Catholics and Non-Catholics.

10:15-10:30 Coffee

10:30- 10:45 McKerracher et al.: The impact of population history and risk on human weaning behaviour.

10:45-11:00 Moffat et al.: Vitamin D Network and maternal-child health of New Canadians.

11:00-11:15 Nepomnaschy: Cross–talk between the stress and reproductive axes in eumenorrheic women.

11:15-11:30 Amarra: Filipino Mothers' Parental Attitudes Affect Preschoolers' Nutritional Well-being.

11:30-11:45 Wilson & Barr: A possible genetic contribution to linear growth faltering.

11:45-12:00 Discussion

09:00-12:00 Bioarchaeology posters

Location: Segal Centre
Chair: Marina Elliott

01. Bleuze & Molto
02. Cooper et al.
03. Correia et al.
04. Ferguson
05. Gloux
06. Nelson et al.
07. Nikitovic & Sikanjic
08. Scharlotta
09. Symchych
10. Harrington
11. Ginter et al.
12. Yang et al.
13. Steinmetz
14. Toth
15. Pitre et al.

12:00-13:00 Lunch

Friday afternoon, 30th October

13:00-16:00 Bioarchaeology Issues and Regional Studies talks

Location: Fletcher Challenge Canada Theatre
Chair: Dongya Yang

13:00-13:15 Beauchesne et al: Metacarpal Radiogrammetry in an Imperial Roman Skeletal Assemblage.

13:15-13:30 Bissonnette & Keenleyside: A Mortuary Analysis of Status at Apollonia Pontica.

13:30-13:45 Dewar: Two South African burial clusters may be signalling unexpected social flux.

13:45-14:00 Kurki: Contraction of the bony pelvis: An indicator of health in past populations?

14:00-14:15 Pfeiffer: Pubic symphysis stress injury in a small-bodied forager.

14:15-14:30 Coffee

14:30-14:45 Jaagumagi: Vertebral Compression Fractures in a Late Horizon Inca Population.

14:45-15:00 Olsen et al.: Life and Death at a Medieval German Poorhouse: Evidence from Stable Isotopes.

15:00-15:15 Wade: Variability of Brain Treatment in Egyptian Mummification.

15:15-15:30 White et al.: Isotopic Evidence for Western Basin Childhood Diet in Southwestern Ontario.

15:30-15:45 Young & Ryan: Reinterpretation of a Sadlermiut 'Doll' Found in a Burial Context.

15:45-16:00 Discussion

13:00-16:00 Combined Topics posters

Location: Segal Centre
Chair: Derek Congram

16. Armstrong
17. Tripp et al.
18. Hublin et al.
19. Elliott & Collard
20. Marceau
21. Merrett
22. Zhang et al.
23. Kron
24. McGrath et al.
25. Angus
26. Holmes et al.
27. Collard et al.

16:00-17:00 CAPA Business Meeting

Location: Fletcher Challenge Canada Theatre

17:00-18:00 Keynote Address by Dr. Bernie Crespi

Location: Fletcher Challenge Canada Theatre

19:00-22:00 Banquet

Location: The Hermitage

Saturday, October 31st

09:00-13:00 Palaeoanthropology

Location: Fletcher Challenge Canada Theatre
Chair: Mark Collard

09:00-09:15 Silcox et al.: First endocasts of *Microsyopsannectens* and brain evolution in primitive primates.

09:15-09:30 Robert: Influence of locomotion on the hominoid humeral distal joint.

09:30-09:45 Begun: Darwin, dryopithecins and dispersals: European and African ape origins.

09:45-10:00 Rolian et al.: Did human fingers and toes co-evolve?

10:00-10:15 Drapeau & Bobe: Paleoanthropological work in the Mursi Formation, Ethiopia.

10:15-10:30 Coffee

10:30- 10:45 Skinner: Examination of the EDJ morphology of the large *Paranthropus* molar from Gondolin, SA.

10:45-11:00 Roksandic et al.: Upper Pleistocene hominin from Sicevo (Serbia) and its larger implications.

11:00-11:15 Cross & Collard: On the estimation of surface area in fossil hominins.

11:15-11:30 Hutchinson & Yokley: The Taxonomic Utility of Femoral Shape.

11:30-11:45 Richards & Verna: Tracking Neanderthal mobility using strontium isotope analysis.

11:45-12:00 Discussion

Abstracts for talks and posters

Filipino Mothers' Parental Satisfaction, Attitudes Toward Child-rearing and Nutrition Affect Preschoolers' Nutritional Well-being.

Amarra, Maria Sophia. Department of Archaeology, University of Calgary.

Human Biology & Ecology talks. 11:15-11:30, Friday, 30th Oct.

Maternal attitudes influence parental behaviour and quality of care, which in turn affects the nutritional well-being of children. This study examined measures of parental satisfaction and attitudes toward child-rearing and nutrition of low-income Filipino mothers, and determined the relationship of these factors to preschool children's nutrient intake and nutritional status. It was hypothesized that mothers who had more positive child-rearing and nutrition attitudes and greater satisfaction in various parental measures would have well-nourished children compared to those with less positive attitudes and less satisfaction. Ninety-five dyads consisting of a mother and her preschool child were studied. Children's food intakes and nutritional status were determined using 3-day 24-hr recalls and anthropometric weight-for-age, respectively. Maternal child-rearing and nutrition attitudes were assessed using a Likert-type scale developed specifically for Filipino women. Parental satisfaction was examined using a questionnaire. Results indicated that mothers with low positive child-rearing and nutrition attitude scores (below the 25th percentile) were more likely to have moderately underweight children, while mothers with high positive scores (above the 75th percentile) were more likely to have normal weight children. Mothers of moderately underweight children had significantly higher scores in the scale Rejection of Mother Role. Maternal satisfaction with the child's personal qualities was significantly associated with higher energy intake in children. Two factors accounted significantly for the variation in preschoolers' weight: mothers' attitudes toward child nutrition (Factor 1) and a group of parental satisfaction measures (Factor 2) – feeling happy about becoming pregnant, planning the pregnancy, and desiring the child' sex.

Breastfeeding and Vitamin D Supplementation Practices among New Canadian & Canadian-born Mothers – Evidence from Statistics Canada.

Angus, S. McMaster University.

Combined Topics Posters. 13:00-16:00, Thursday, 29 Oct and 13:00-16:00, Friday, 30 Oct.

The World Health Organization (2009) recommends exclusive breastfeeding for infants for the first six months of life, however, breastfeeding, like other aspects of perinatal care, is influenced by cultural and social practices. Recent immigrant mothers present a potentially vulnerable population as they face a variety of challenges associated with resettlement, for example, financial insecurity, social isolation, and language barriers. This poster presents the findings of a comparative statistical analysis of immigrant and Canadian-born mothers and infants from Statistics Canada surveys. Additionally, this research investigates infant vitamin D supplementation practices – a co-requisite of exclusive breastfeeding recommended by Health Canada (2004). Results: Breastfeeding initiation and exclusive breastfeeding (minimum 4 months) is more widely practiced among immigrant mothers than Canadian-born mothers. Prevalence (approx. 50% of mothers surveyed) of infant vitamin D supplementation is comparable among immigrant mothers and Canadian-born mothers alike. Prevalence of both infant vitamin D supplementation and exclusive breastfeeding increased among all mothers between 2003 and 2007. Discussion: Policy and health messaging implications for breastfeeding and supplementation practices are explored. Furthermore, we discuss the use of national surveys in human biology research – limitations, challenges, and specifically, immigrant representation.

Cochlear labyrinth volume in non-primate euarchontoglirans versus primates.
Armstrong, S.[1], Silcox, M.T.[1], and Bloch, J.I.[2 1] Department of Anthropology, University of Winnipeg; [2] Florida Museum of Natural History, University of Florida.
Combined Topics Posters. 13:00-16:00, Thursday, 29 Oct and 13:00-16:00, Friday, 30 Oct.

A recent study examined the relationship between cochlear labyrinth volume, body mass and hearing abilities in primates using high resolution computed tomography data, providing evidence that some aspects of the hearing abilities of fossil specimens may be predicted based on cochlear labyrinth volume. That study did not examine cochlear labyrinth volume in nonprimates, however, making it unclear whether the range of variation represented by primates is typical of other mammalian orders. A study was undertaken to examine the relationship between cochlear labyrinth volume and body mass in 3 other euarchontogliran orders (Scandentia, Dermoptera, and Rodentia). In addition, two fossil specimens from the Late Paleocene (Clarkforkian) of Wyoming were examined: *Labidole murkayi* (USNM 530208), thought to be a euarchontogliran nonprimate, and *Carpolestes simpsoni* (USNM 482354), a stem primate. In comparison to these closely related nonprimates and to *Carpolestes*, modern primates have significantly higher cochlear labyrinth volumes relative to body mass, which may be related to a downward shift in the range of audible frequencies over the course of primate evolution. An increase in cochlear labyrinth volume may have contributed to the relative increase in brain size in primates, in accordance with Jerison's principle of proper mass.

Metacarpal Radiogrammetry in an Imperial Roman Skeletal Assemblage: A Developmental Perspective.
Beauchesne, Patrick, Agarwal, Sabrina, and Luca Bondioli.
Bioarchaeology: Issues and Regional Studies talks. 13:00-13:15, Friday, 30th Oct.

This talk explores patterns of age and sex-related cortical bone loss from a skeletal assemblage excavated from the Imperial Roman port city of Velia (1st and 2nd century AD). The ancient city of Velia was founded as a Greek colony and is situated on the west coast of Italy, south of Salerno, in the Campania region. In the Imperial period Velia functioned as an important trading centre and port. The null hypothesis of this research was that patterns of bone loss in this large Roman sample, divided nearly evenly between males and females (n = 90), would mirror modern patterns of age and sex-related change. Results partially followed our null hypothesis, with cortical index increasing into middle-adulthood and then declining with old age for both sexes, although this was not statistically significant in males. It was also noted that in the youngest age group females had a higher cortical index than young males. Intriguingly, while these and other sex differences in cortical remodelling were observed, none were statistically significant, even in the oldest age category, refuting the null hypothesis. A life course approach is used to explain these observations. Specifically, developmental pathways are offered as one explanatory factor in these deviations from modern populations, including considerations of culturally specific activity and reproductive history. Future avenues of research are also outlined.

Darwin, dryopithecins and dispersals: European and African ape origins.
Begun, David R. Department of Anthropology, University of Toronto.
Palaeoanthropology talks. 09:30-09:45, Saturday, 31st Oct.

It is often recalled that Darwin predicted that the ancestors of African ape and humans would be found in Africa, as that is the only continent in which all extant genera can still be found. Yet Darwin also knew about *Dryopithecus*, and he actually suggested that it might have migrated to Africa to found the African ape and human clade. Here I review new evidence from recent excavations at Rudabánya, Hungary, as well as new discoveries from Spain and Turkey that shed light on the issue of African ape and human origins. Relatively complete craniodental remains from Europe provide much new data concerning hominid relations and show a clear affinity with the hominines. This is in contrast to the record of hominoids from Africa. In addition, hominine fossils from Europe are more than 2 million years older than any putative hominine from Africa. Cladistic and paleobiogeographic analysis presented here strongly supports the second hypothesis articulated by Darwin, that the ancestors of African apes and humans are related in some way to *Dryopithecus*, and that this taxon or a descendent dispersed from Europe into Africa in the late Miocene.

A Mortuary Analysis of Status at Apollonia Pontica: Archaeological and Osteological Considerations.
Bissonnette, Michelle and Anne Keenleyside. Trent University.
Bioarchaeology: Issues and Regional Studies talks. 13:15-13:30, Friday, 30th Oct.

This study aims to assess social status at the Greek colonial site of Apollonia Pontica through an investigation of funerary remains excavated from the associated Kalfata necropolis. Located near modern-day Sozopol, Bulgaria, these interments date from the second half of the fifth to the beginning of the second centuries B.C.E. To date, excavations here have uncovered a great deal of osteological and archaeological material. This study considers both sources of data, using skeletal stress markers, graves and grave goods as indicators of status. A sample of 95 adult burials was analyzed through the use of multivariate statistics and interpreted with the aid of contemporary ancient literary sources. These analyses found little distinction amongst the Kalfata burials which can be attributable to status differences. Conclusions suggest that either the population of Apollonia Pontica was characterized by only moderate class distinctions, or that the Kalfata necropolis was reserved for use by a single, homogenous status group. It is also possible that social status is not being clearly expressed here through the use of material mortuary display. Further research will be required to refine these preliminary findings.

Adult Physique at Kellis 2, Dakhleh Oasis, Egypt.
Bleuze, Michele M. and J.E. Molto. The University of Western Ontario, Department of Anthropology.
Bioarchaeology Posters. 09:00-12:00, Thursday, 29 Oct. and 09:00-12:00, Friday, 30th Oct.

Several studies have shown that the human body generally conforms to the ecogeographical expectations of Bergmann's and Allen's rules. However, recent evidence suggests that these expectations are challenged for populations not experiencing climatic extremes. Populations adapted to desert environments may also confound ecogeographical predictions in body size, shape and proportionality since desert climatic regimes can fluctuate dramatically throughout the day, especially during winter. In this study, we test the 'fit' of the physique of a large sample of Kellis 2 males and females from the Dakhleh Oasis in the Western Desert of Egypt against ecogeographical predictions. Body shape was assessed by the femur head diameter to maximum femur length ratio, and brachial and crural indices were calculated to examine limb proportionality. Results show that intra-limb proportions were typical of groups inhabiting warm environments. However, the crural index of the Kellis 2 sample was significantly higher than that for an Old Kingdom Egyptian sample, suggesting that other, possibly socio-economic factors, are responsible for this incongruency. As the Kellis 2 body shape was more consistent with high-latitude populations, we posit that this may reflect a specific adaptation to the desert thermal extremes. Thus, our Egyptian sample does not completely conform to the warm-adapted physique that has generally characterized other Egyptian groups. This study demonstrates the potential sensitivity of infracranial osteometric data to test hypotheses about ecogeographical patterning in past populations.

Metagenomics and ancient human disease: efficient targeted retrieval of ancient pathogen DNA for high-throughput sequencing applications.
Bos, K.I. and S.A. Forrest. McMaster University.
Bioarchaeology Methods talks. 13:00-13:15, Thursday, 29th Oct.

The introduction of high throughput sequencing technologies to palaeogenomic applications has revolutionized the molecular evaluation of ancient tissues. To date, the benefits of these technological advancements are most clearly demonstrated in samples for which endogenous DNA templates are high in number and exogenous contamination is low. Difficulties arise, however, when the molecules of interest are expected to exist in significantly lower proportions than those from other sources. This has special relevance to the study of infectious disease in ancient tissues, where host DNA templates are expected to significantly outnumber those of infectious agents, and hence be preferentially targeted in the sequencing reaction. The primer-based DNA capture approach introduced by Briggs et al, 2009 presents a novel method for the targeted retrieval of ancient DNA for high throughput applications. Here we present a new

computational method for primer selection that may increase the robusticity, and hence the reliability of this method for targeted ancient DNA retrieval by increasing the overall quality of the primers generated for the DNA capture step. This will contribute to a more efficient retrieval of highly informative low copy molecules that would otherwise be difficult to access via current high-throughput sequencing methods. The McMaster Ancient DNA Centre is developing methods for metagenomic sequencing of human pathogens using the Medieval Black Death of Europe as our model. Our current work involves the molecular analysis of 193 bones and 47 teeth from the Royal Mint collection of London, UK. Methods and results to date will be presented and discussed.

A Revised Method to Estimate Age Using the Acetabulum in Bioarchaeological Investigations.
Calce, Stephanie. University of Toronto.
Bioarchaeology Methods Talks. 13:15-13:30, Thursday, 29th Oct.

The purpose of this research is to evaluate Rissech et al.'s (2006) method of estimating adult skeletal age using the acetabulum and to demonstrate the benefits of simplifying the technique for use in a bioarchaeological context. This is the first step in a two-stage process involving the recognition of potential problems with the Rissech et al. method and the development of effective solutions. The second and future stage of the research will include devising and testing specific age ranges to accompany the modifications. Rissech and colleagues' existing scoring method was analyzed using multiple stepwise regression; three variables were found to account for most of the variation associated with age and were tested on males and females to determine if the simplified method does in fact increase precision, while maintaining the potential to accurately reflect age changes. The revised non-destructive method to estimate broad categories of age [Young Adult (17-39 years), Middle Adult (40-64 years), and Old Adult (65+ years)] was developed on two 20th century anatomy series, the University of Toronto Grant Skeletal Collection (males) and the William M. Bass Donated Skeletal Collection (females). The method was tested blind on two contemporary North American skeletal populations ranging in age from 19 to 101 years, who died between 1984 and 2006 – the William M. Bass Donated Skeletal Collection (n=85) and the University of New Mexico Documented Collection (n=164). Non-significant sex-specific differences were found. The inaccuracy of the modified method is 8 years. The direction of bias indicates this acetabulum technique tends to underestimate age. Three statistically significant characteristics are highly correlated with age ($p<0.05$), and together are capable of estimating age-at-death with 82% accuracy, both sexes combined. Results of intraobserver error testing were extremely low (4.4%) indicating that very little error exists when estimating the degree of development of features. Consistency in scoring, reduction in data collection time, and exclusion of a reference population are significant advantages to using this technique and, as a result, is more flexible and useful in bioarchaeological studies than the original technique proposed by Rissech et al. (2006). Investigators should be aware that delicate features of the acetabulum are more difficult to distinguish on greasy bone and specimens may appear younger in these cases.

Identification of Canada's Unknown Soldiers and Airmen.
Clegg, Laurel . Directorate of History and Heritage, Department of National Defence.
Forensics Talks. 09:15-09:30, Thursday, 29th Oct.

In the First and Second World War, Canada contributed more than 1 700 000 service personnel, of which, approximately 112 000 died. Of these fatal casualties, 27 500 have no known grave. Of those with no known grave, nearly 17 000 are potentially 'recoverable' in Belgium, Canada, France, the United States, Germany, Eastern Europe, Japan, Myanmar, Malaysia and elsewhere in the Pacific. My role as Casualty Identification Coordinator at the Department of National Defence is to manage the identification and interment of those individuals who are accidentally discovered every year. My current caseload includes the identification of 11 soldiers from the First World War, three from the Second World War, while monitoring another eight cases with 26 Canadians; all of whom may or may not be recovered in the next five years. Canada, being a signatory to the Commonwealth War Graves Commission, cannot repatriate the remains of its war dead (First, Second and Korea), nor can it exhume those who have already been buried. These restrictions, together with those conditions unique to Commonwealth War Dead, can greatly complicate even those cases which,

anthropologically, are very straightforward. Several cases will be discussed which highlight the different approaches taken to identify each soldier.

Are behavioral differences among wild chimpanzee communities genetic or cultural? An assessment using tool-use data and phylogenetic methods

Collard, Mark [1], Lycett, Stephen J.[2] and William C. McGrew[3]. [1]Laboratory of Human Evolutionary Studies, Department of Archaeology, Simon Fraser University. [2]Department of Anthropology, University of Kent, Canterbury. [3]Leverhulme Centre for Human Evolutionary Studies, Department of Biological Anthropology, University of Cambridge.
Combined Topics Posters. 13:00-16:00, Thursday, 29th Oct. and 13:00-16:00, Friday, 30th Oct.

Over the last 30 years it has become clear that there are many behavioral differences among wild communities of *Pan troglodytes*. Some researchers argue these differences are a consequence of the behaviors being socially learned and thus may be considered cultural. Others contend that the available evidence is too weak to discount the possibility that the behaviors are genetically determined. Previous phylogenetic analyses of chimpanzee behavior have not supported the genetic hypothesis. However, the results of these studies are potentially problematic because communities from central Africa were missing from the sample. Here, we present the results of a study designed to address this shortcoming. We carried out cladistic analyses of data pertaining to 19 tool use behaviors in 10 *P. troglodytes* communities plus an outgroup. Genetic data indicate that chimpanzee communities in West Africa are well differentiated from those in eastern and central Africa, while the latter are not reciprocally monophyletic. Thus, we predicted that if the genetic hypothesis is correct, the tool use data should mirror the genetic data in terms of structure. The three measures of phylogenetic structure we employed (the Retention Index, the bootstrap, and the Permutation Tail Probability Test) did not support the genetic hypothesis. They were all lower when all 10 communities were included than when the three western African communities are excluded. Hence, our study refutes the genetic hypothesis and provides further evidence that patterns of behavior in chimpanzees are the product of social learning and therefore meet the main necessary condition for culture.

Morphological Comparisons of the Black Lemur Taxa (*Eulemur macaco*): Is *E.m. flavifrons* significantly larger than *E.m. macaco*?

Colquhoun, Ian C. Department of Anthropology, University of Western Ontario.
Primate Behaviour & Ecology Talks. 14:30-14:45, Thursday, 29th Oct.

Body size is a key variable in the ecology of primate, and other, species. In a major review of lemur ecogeographic size variation published almost two decades ago, it was proposed that, on the basis of comparative osteometrics, Sclater's lemur (*E.m. flavifrons*, Gray, 1867) was "significantly larger" than its sister taxon, the black lemur (*E.m. macaco*, Linnaeus, 1766). However, this characterization was only a qualitative assessment of basic summary statistics of skull length data – no tests for statistically significant differences in those osteometric data were performed. Testing for statistical significance was subsequently conducted by Colquhoun and Schwitzer. While maximum cranial length and mean cranial length in the available published data were greater for *E.m. flavifrons*, the ranges of skull length values overlapped considerably and there was not a statistically significant difference between the sizes of the two black lemur taxa. In 2008, I had the opportunity to examine and measure a specimen in the University of Edinburgh's Museum of Zoology, reported nearly 60 years ago to be a male "*Lemur nigerrimus*" (Sclater, 1880 = *Eulemur macaco flavifrons*). Previous comparative analyses of black lemur osteometrics have not included this specimen. In this paper, I re-examine the question *of E.m. flavifrons* being "significantly larger" than *E.m. macaco* in light of bringing the Edinburgh "*Lemur nigerrimus*" specimen into an analysis of the scant comparative data. However, concern over the taxonomic identity of the Edinburgh specimen may override its inclusion in this debate over black lemur comparative morphology.

A call for Accreditation of Forensic Archaeologists and Anthropologists in Canada.
Congram, D. and A. Mundorff. Department of Archaeology, Simon Fraser University.
Forensics Talks. 11:15-11:30. Thursday, 29th Oct.

The National Academy of Sciences report on forensic sciences in the United States (2009) reported a need for standardization, stating that the quality of forensic science suffered due to an absence of adequate training, mandatory accreditation programs, failure to adhere to performance standards and a lack of effective oversight, all of which poses a serious threat to the credibility of the practice and, we would add, to practitioners. A US Department of Justice training manual on forensic archaeology warns that defense teams are starting to dispute the substantive findings in forensic reports and that the defense teams are going to start utilizing the 'battle of the experts' concept regarding forensic evidence to start attacking the substantive aspects of these types of reports. This presentation advocates a forensic archaeology and anthropology accreditation system in Canada. Though each context may warrant a unique approach, failure to employ standard methods to ensure competent practice will negatively impact the investigation and the reputation of the disciplines, endangering future involvement by fellow practitioners. Currently two Canadians are certified with the American system, the American Board of Forensic Anthropologists (ABFA). The International Association of Identification is developing an alternative accreditation to the ABFA. In Latin America, a committee is being formed to establish accreditation there. The British certification system has recently been disbanded. This presentation will discuss reasons for forming an accreditation system, briefly examine other systems and propose several approaches for a Canadian system.

Non-destructive 3D histology of cortical bone: possibilities, limitations and application in anthropology.
Cooper, D.M.L.[1], Erickson, B.[1], Peele, A. [2], Hannah, K. [2], Thomas, C.D.L. [3], and J.G. Clement[3]. [1]University of Saskatchewan; [2] La Trobe University, Australia; [3]University of Melbourne, Australia
Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

Quantitative and qualitative histological analysis of cortical bone microstructure has seen use in physical anthropology for applications spanning from age estimation to paleopathology. Histology – literally the study of tissue – is a field nearly synonymous with 2D thin sections. That said, progressive developments in high resolution x-ray imaging are enabling 3D visualization to reach ever smaller structures. Micro-computed tomography, employing conventional x-ray sources, has become the gold standard for 3D analysis of trabecular bone and is now capable of detecting the structure of vascular (osteonal) porosity in cortical bone. Synchrotron Radiation (SR) micro-CT holds even greater promise for bringing additional microstructural details of cortical bone into focus, enabling new levels of 3D analysis. In this preliminary study we imaged human mid-femoral cortical bone specimens derived from a 20 year old male (Melbourne Femur Collection) at the Advanced Photon Source synchrotron (Chicago, USA) using the 2BM beam line. Scan times were 1 hour and images were acquired with 1.4 micron nominal resolution. Our objectives included visualization of microstructural features not 'visible' in conventional micro-CT including osteonal borders (cementing lines) and cellular spaces (lacunae). The results revealed that osteocyte lacunae can be consistently visualized. Osteon borders proved harder to detect and were generally only definitively observed for 'immature' or actively forming osteons which are relatively hypomineralized. In conclusion, imaging technology is at the cusp of being able to achieve 3D visualization approaching the level of conventional histology. The potential anthropological applications are diverse including age estimation, paleopathology and analyses of functional adaptation.

So You Think You Can Curate? Microbial Biodeterioration of Bone in Museum and Research Collections.
Correia, Pamela Mayne[1], Pitre, Mindy C.[1], Mankowski, Peter J.[2], Klassen, Jonathan[2] and Randy S. Currah[2]
[1]Department of Anthropology, University of Alberta; [2]Department of Biological Sciences, University of Alberta.
Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

Microbial biodeterioration was identified in a curated archaeological collection previously considered well preserved based on histological studies carried out over a decade ago. The potential causal organisms, *Amycolatopsis* sp. and

Penicillium chrysogenum were isolated and identified via cultures and DNA amplification. The severity of the destruction caused by these organisms throughout the curation process and the resulting consequences for analyses (chemical, physical) were the impetus for the current project. The research presented here is in its initial stages and final results are expected by the new year. Deer metapodials were inoculated with 1) *Amycolatopsis* sp., 2) *Penicillium chrysogenum*, and 3) both organisms and incubated for 9 weeks. These samples were placed into a variety of commonly accepted storage situations (e.g., plastic, paper, cloth bags) and curated for four months. The histological preservation index of thin sections taken before and after curation will be compared to determine the best storage procedures to minimize microbial biodeterioration of bone. The lack of direction in the conservation literature has flagged this issue as an extremely important one to pursue. Microbial decay has been discussed in the archaeological literature for years; however, when compared to the conservation literature, there is little acknowledgement of this process. As it is essential to provide not only the most culturally sensitive storage for human remains, it is also the curator's responsibility to provide the safest environment for these materials.

On the estimation of surface area in fossil hominins.

Cross, Alan and Mark Collard. Laboratory of Human Evolutionary Studies, Department of Archaeology, Simon Fraser University.

Palaeoanthropology Talks. 11:00-11:15, Saturday, 31st Oct.

Estimates of surface area have played an important role in the development of current understanding of thermoregulation in the fossil hominins. To date, researchers have relied on two methods to generate such estimates and to validate estimates derived from scale models: DuBois and DuBois' (1916) method and Ruff's (1991) method. There is reason to believe these methods are accurate when applied to modern humans, but it is not clear how accurate they are when applied to earlier hominins. The reason for this is that neither method is capable of taking into account body proportion differences, and yet it is clear that there are marked differences in body proportions among the early hominins. With this in mind, we carried out a study in which we compared surface areas generated with DuBois and DuBois' (1916) and Ruff's (1991) methods to surface areas generated with a method that takes body proportion differences into account. In our first analysis we applied the three methods of estimating surface area to data from a sample of living humans in order to provide a baseline for comparison. In the second analysis we applied the three methods to data derived from a sample of modern human skeletons and some key fossil hominin specimens. Together, these analyses suggest that DuBois and DuBois' (1916) method and Ruff's (1991) method are markedly inaccurate when applied to certain fossil hominin specimens. This suggests that they should no longer be used in research on fossil hominin thermoregulation.

Two burial clusters from the West Coast of South Africa, may be signalling unexpected social flux during the Late Holocene.

Dewar, Genevieve. University of Toronto at Scarborough.

Bioarchaeology Issues and Regional Studies Talks. 13:30-13:45, Friday, 30th Oct.

Throughout the Holocene, people living along the West Coast of South Africa buried their dead as single internments within coastal dunes or shell middens. A recently discovered burial cluster (n=6) within a coastal shell midden called Diaz Street Midden (DSM), in conjunction with the nearby Faraoskop Rockshelter (n=14 burials) lead to this study and the hypothesis that the appearance of reused burial sites is signalling a change in social behaviour from a mobile hunter-gatherer pattern to a more sedentary and territorial pattern, potentially defending these territories. Previous research in the region has identified evidence for intensification of resources, however it has been assumed that people still maintained an egalitarian lifestyle. Predicted results include region specific stable isotope signatures and evidence for inter personal violence. Radiocarbon dates indicate that the burial grounds were used contemporaneously during the Late Holocene. Stable Isotope analysis reveals that the individuals from the coastal shell midden DSM exhibit enriched carbon (δ 13C values range from -11.8 to -13.0‰) and nitrogen (δ 15N values range from +14.9 to +16.8 ‰) values indicating a coastal diet. The results from the Faraoskop Rock shelter individuals only 30 km from the shoreline show

carbon isotope values (δ 13C values range from -16.5 to -18.4‰) that are consistent with a terrestrial based diet. Gross morphological analysis of the in situ burials at DSM identified a bone point lodged in the throat region of Burial One making her the sixth individual from this region and time frame to exhibit evidence for inter personal violence.

Paleoanthropological work in the Mursi Formation, Lower Omo Valley, Ethiopia.
Drapeau, M.S.M.[1] and Bobe, R.[21]Département d'anthropologie, Université de Montréal; [2]Department of Anthropology, University of Georgia.
Palaeoanthropology Talks. 10:00-10:15, Saturday, 31st Oct.

The Mursi Formation is the oldest formation of the Omo group and is dated to more than 4 Ma. Its southern-most tip, the Yellow Sands, was surveyed occasionally between 1967 and 1973. From these four field seasons, less than 300 specimens were collected. However, the sedimentary sequence of the formation is exposed on a much greater area (approximately 35 km by 4) than what was explored about 40 years ago. Because of its age, this formation is of particular interest. The period prior to 4 Ma is an important milestone in hominin evolution since it is when the Australopithecus genus arose. It is the only taxon with well-documented bipedal locomotion and is believed to be the most likely ancestor to the genus Homo. Despite the importance of that time period, very few localities of that age are identified. Habitat description for the hominin bearing localities range from open to forested, but it remains unknown whether hominins of that period occupied all these habitats. In order to gather a better understanding of the period prior to 4 Ma, exploration of the Mursi Formation was renewed in the summer of 2009. One locality was identified that included Elephantidae, Suidae, Bovidae, Hippopotamidae, Crocodilia (including Euthecodon), Testudines, small and big fish, and fossil wood. Although the 2009 sample is very small and does not allow for accurate habitat reconstruction, the large fish remains found imply that there was necessarily a large body of water at proximity. Further work is planned in the area.

FORDISC and ancestry determination –further findings.
Elliott, Marina and Mark Collard. Laboratory of Human Evolutionary Studies, Department of Archaeology, Simon Fraser University.
Combined Topics Posters. 13:00-16:00, Thursday, 29th Oct. and 13:00-16:00, Friday, 30th Oct.

FORDISC is a computer program frequently used to determine the ancestry of human skeletons. However, the program's accuracy is currently debated. This paper summarizes the results of a study that explored three contested issues: 1) the impact of the presence/absence of the source population in FORDISC's reference sample, 2) the effect of specifying/leaving unspecified the test specimen's sex, and 3) the influence of variable number. It also presents the results of analyses that addressed a fourth issue related to the statistical criteria FORDISC uses to support a determination. The results indicate that FORDISC's utility is limited. In order for FORDISC to provide an accurate determination of ancestry using Howells dataset, the source population must be present in the reference sample, the sex of the specimen must be known and values for >10 variables must be available. Even when these conditions are met, the current acceptance criteria do not adequately separate correct and incorrect attributions. However, using criteria that prevent false attributions result in very low success rates. At this level, less than one percent of the test sample determinations could be accepted with confidence.

The Scientific Study of Mummies.
Ferguson, Lisa. University of Sheffield.
Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

Mummification of human bodies has occurred for millennia, by both natural and artificial means. Ancient humans whose bodies have been preserved in this way have fascinated the living ever since mummies were first discovered. Mummies are not merely objects of curiosity and fascination, however. They have the potential to reveal much information, not least of which involves the health and disease of the population under investigation. To what extent does analysis of the

soft tissue palaeopathology of mummified remains expand our knowledge beyond the information available from skeletal remains and biomolecular analysis? This presentation will discuss recent advances and research into the scientific study of mummified human remains. The study of soft tissue palaeopathology enables us to understand the evolution and behaviour of disease in the past, and can contribute to developing treatment and prevention strategies in modern populations. Future areas of research are identified.

Current vs. Future Reproduction: Maternal Reproductive Strategy in Vitamin A Deficiency Endemic Northern Kenya.
Fujita, Masako. Dept of Anthropology, Michigan State University.
Human Biology and Ecology Talks. 09:30-09:45, Friday, 30th Oct.

Vitamin A deficiency (VAD) impairs human immune system. Newborns have meagre vitamin A (VA) stores, and are dependent on breast milk for physiological needs and for building liver stores crucial for health after weaning. It has been documented that VA concentrations in breast milk decline across the first year postpartum in women from both developed and developing nations, but the reason for the decline has not been investigated and assumed to be a sign of concurrently depleting maternal hepatic stores. Why the decline is pervasive despite potential adversity on child health merits investigation. Aims: We investigate the relationship between breast milk and maternal hepatic VA based on life-history models using cross-sectional data from northern Kenya. Methods: In 2006, paired breast milk and blood samples were collected from 241 mothers for determining milk retinol concentrations and hepatic retinol stores via the relative-dose response test. The milk-liver retinol relationship was examined by 1) postpartum time (early vs. late), 2) parity status (high vs. low) and 3) breastfeeding status (exclusive vs. partial breastfeeding), using linear regression models. Results: The correlation between milk and liver VA was modified by parity (p=0.053) and breastfeeding pattern (p=0.083). Conclusions: Our observation negates the blanket assumption that breast milk VA concentrations are in positive correlation with maternal hepatic stores. The relationship may be more dynamic and unintuitive in manners consistent with life-history prediction of milk-liver tradeoffs. An evolutionary biological perspective on mother-offspring VA transfer may provide an example of human life-history tradeoffs and contribute to improved public health strategy against VAD.

Patterns of growth among preschool-aged Canadian Inuit children: results from the Nunavut Inuit Child Health Survey.
Galloway T[1], Young T.K[1], and GM. Egeland[2]. [1]Dalla Lana School of Public Health, University of Toronto; [2]Centre for Indigenous People's Nutrition and Environment.
Human Biology and Ecology Talks. 09:45-10:00, Friday, 30th Oct.

In the past, human biology has been concerned with the particular growth patterns of circumpolar populations insofar as they represent physiologic and metabolic adaptations to cold stress. More recently, human biologists working in the Arctic have documented the emergence of obesity and metabolic disease in adults in parallel with acculturation to Western lifestyle. While there has been an effort to document the changing growth pattern of Inuit children and youth, little data exists for preschool-age children living in the circumpolar regions. The present study reports findings from the 2007-8 Inuit Child Health Survey, conducted in Nunavut Territory, Canada. Height and weight measures for 376 children ages 3-5 years were compared with the 2000 CDC growth reference and examined in the context of past and present data on Inuit child growth. For all age groups, stature tracks the CDC reference, confirming that the previously reported secular trend in height has continued in this population. Overweight (BMIC>95) prevalence (50.8%) is higher than previously reported in Canadian children and may be occurring at an earlier age. Together, these findings lend support to the Canadian Paediatric Society's position on the use of the 2000 CDC growth reference in contemporary Inuit populations. In addition, the present study finds significantly more boys (57.1%) than girls (45.2%) in the overweight category. This gender difference runs counter to that reported in adults, leading to concern that contemporary growth patterns may lead to significant increase in obesity-related illness for young Inuit men.

Variation in fecal testosterone and intragroupagonism in relation to reproductive state, dominance rank, and age in wild adult female ringtailed lemurs (*Lemur catta*).

Gabriel, Denise N. and Lisa Gould. University of Victoria.

Primate Behaviour & Ecology Talks. 14:45-15:00, Thursday, 29th Oct.

Circulating androgen levels have modulatory effects on primate social behaviour, particularly during periods of social instability. Testosterone (T) influences both dominance status and agonism in a variety of primate species; however, investigations of these relationships have been largely limited to males. For females, T is closely associated with reproductive state and thus holds important implications for female behaviour throughout the birthing season. We examined mean fecal T (fT) levels and intra-group agonism in wild adult female ring-tailed lemurs from two groups at Beza Mahafaly Reserve, Madagascar, to investigate the behavioural and physiological state correlates of T secretion in reproductive females. Fecal samples and focal animal data were collected across four reproductive periods—early gestation, late gestation, early lactation, and mid lactation and compared with respect to reproductive state, rank, and age. T secretion varied with reproductive state such that the lowest and highest fT levels were exhibited during early lactation and late gestation, respectively. Reproductive state influenced agonistic interactions between females, with the highest rates of agonism displayed in early gestation. Low-ranking females had higher fT during early lactation; however, fT did not vary with rank across the remaining reproductive periods. There was no interaction between rank and agonism. Age affected T secretion, as the two oldest females exhibited the highest fT levels, but no relationship was observed between age and agonism. The data indicate an intricate relationship between T and social behaviour in females, which is dependent upon the physiological state of the individual.

Meat or Maize? A stable isotope study of Western Basin Tradition subsistence.

Ginter, Jaime K.[1,2], Dewar, Genevieve[3], and Christine White[4]. [1]School of Community and Liberal Studies, Sheridan Institute of Technology & Advanced Learning; [2]TUARC, Trent University; [3]Department of Anthropology, University of Toronto at Scarborough; [4]Department of Anthropology, University of Western Ontario.

Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

Archaeological monitoring of construction efforts in the Great Western Park in Windsor, Ontario led to the discovery of an isolated cemetery containing the remains of eight individuals. The individuals were tentatively assigned to the Western Basin Tradition based on the style of interment, site location and the absence of associated artifacts. Western Basin Tradition subsistence is thought to have focused significantly on the exploitation of locally available seasonal resources, with cultivated foods, specifically maize, only making a minor contribution. Contemporary Iroquoian groups, in comparison, had a much stronger focus on the cultivation of domestic crops, namely maize. A stable isotope analysis was undertaken to access direct dietary information to assist in the identification of the cultural affiliation of these individuals. The results of this study challenge the Western Basin subsistence model and suggest that the settlement and subsistence behaviours of Younge-Springwells Phase Western Basin Tradition populations was more complex than previously appreciated. The ^{13}C values for the Great Western Park individuals suggest a more significant reliance on C4 food sources, most likely maize, than anticipated. The high δ15N values also differ from conventional interpretations of Western Basin subsistence, suggesting that the Great Western Park individuals obtained their dietary protein from high trophic level fish. The significant reliance on maize and high trophic level fish challenges the existing understanding of Western Basin Tradition subsistence and calls for further study of contemporary Western Basin Tradition skeletal collections.

Integrating DNA analyses to Bioarchaeology or Physical Anthropology studies: The potential benefits in approaching unknown populations as the Noua Culture.

Gloux, Sabrina. ArchaeoTek.

Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

Although physical anthropology methods and knowledge are well developed and advanced, and the degree of expertise of the physical anthropologist is well established when it comes to bone identifications and studies, a great deal of information is still missing if limited to gross morphology analyses. First applied in forensic contexts, DNA is a growing and promising field for physical anthropology thus for bioarchaeology. When applied to physical anthropology, DNA analyses provide the information we were missing with gross morphology and microscopic analyses such as family relationships, group contacts, and migrating patterns and so on. It can also help in improving some identification methods as in ancestry studies. The purpose of this paper is to present the potential benefits of DNA analyses in approaching unknown populations such as a Noua Culture cemetery from Middle Bronze Age Transylvania (Romania) comprising around 300 individuals. These populations are still unknown since no studies have been conducted. The aim of this research project is to conduct exhaustive bioarcheaological analyses as well as DNA analyses. This will be done in order to compare the osteological data to the archaeological data and to better interpret and understand the life and dynamics of these populations.

Seasonal changes in vitamin D status in healthy young adults of different ancestry in the greater Toronto area.

Gozdzik, A.[1], Barta, J.L.[1], Wu, H.[2], Cole, D.[3], Vieth, R.[4], Weir, A.[5], Whiting, S.[2] and E. Parra[1]. [1]Department of Anthropology, University of Toronto; [2]College of Pharmacy and Nutrition, University of Saskatchewan; [3]Department of Laboratory Medicine and Pathobiology, University of Toronto; [4]Pathology and Laboratory Medicine, Mount Sinai Hospital; [5]Department of Mathematics and Computational Sciences, University of Toronto.

Human Biology & Ecology Talks. 09:15-09:30, Friday, 30th Oct.

Vitamin D plays a critical role in human health, affecting bone metabolism and many cellular and immunological processes, and low levels have been associated with a variety of chronic, autoimmune and infectious diseases. Recent research indicates that concentrations of the main indicator of vitamin D status, serum 25-hydroxyvitamin D [25(OH)], should be in excess of 75 nmol/L. Previous studies have reported that many otherwise healthy adults have low vitamin D concentrations, particularly during the wintertime. The main goal of this study was to examine the seasonal variation in vitamin D status of young Canadian adults of diverse ancestry living in Toronto area. 237 subjects participated in the study. Dietary intake, anthropometric measurements, skin pigmentation, ultraviolet radiation (UVR) exposure and serum 25(OH)D levels were measured in early fall and winter. Mean fall serum 25(OH)D concentration was 49.7 nmol/l for the full sample. However, concentrations were lower for those of East Asian and South Asian ancestry than those of European ancestry (44.6, 33.9 and 71.7 nmol/l, respectively). Mean winter serum 25(OH)D concentration was 35.4 nmol/l. Again, mean concentrations were lower in those of East Asian and South Asian ancestry compared to those of European ancestry (28.1, 26.5 and 51.6 nmol/l, respectively). The low 25(OH)D levels observed during the winter, and also during the fall pose a public health concern. Our data indicate that vitamin D intake is insufficient to maintain adequate levels of vitamin D throughout the year, particularly in individuals of non-European ancestry.

Condensed Tannin Intake in Spiny-Forest-Dwelling ring-tailed lemurs (*Lemur catta*) at Berenty Reserve, Southern Madagascar, during Reproductive Periods.

Gould, L.[1], Constabel , P.[2], and R. Mellway[2] . [1]Department of Anthropology; [2]Centre for Forest Biology, Department of Biology, University of Victoria.

Primate Behaviour & Ecology Talks. 15:00-15:15, Thursday, 29th Oct.

Primates vary in their choice or avoidance of plant foods high in condensed tannins (CT). Our study focused on CT intake in two groups of wild *Lemur catta* residing in spiny forest habitat in southern Madagascar during two reproductive periods. We examined whether *Lemur catta* in this habitat avoided plant foods high in CT, and whether reproductive

females ingested lower concentrations of CT compared with males, since CT consumption compromises protein absorption. Feeding data and plant food samples were collected during reproductive periods in 2006 (early/mid-lactation) and 2007 (early gestation). Food samples were assayed for CT content, and average CT intake was determined for all focal animals. No significant difference was found in CT content of the most commonly consumed foods compared with other foods in each season or between seasons. No sex differences were found in CT consumption in either reproductive period. These ring-tailed lemurs did not avoid plant foods high in CT, and three strategies – ingesting small amounts of CT regularly, high amounts only over short periods, and geophagy – may assist these lemurs in coping with CT content in their highly seasonal diet. *Lemur catta* may also be somewhat physiologically adapted to cope with CT concentrations in their plant foods.

Developmental patterns in postcranial robusticity: Skeletal indicators of mobility and subsistence behaviour among juvenile prehistoric hunter-gatherers.

Harrington, Lesley. University of Toronto.

Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

The lifeways of twentieth-century Khoesan-speaking peoples of southern Africa are known from the research produced by the Harvard Kalahari Project, including the roles of men, women, and to some extent, children, in securing and producing food through hunting and gathering. Archaeological remains of Later Stone Age Khoesan ancestors from the more southerly Cape coastal region provide evidence of the shared physical and cultural characteristics of these populations, who subsisted in very different landscapes. Developmental patterns in postcranial robusticity, as analysed through the age-related changes in biomechanical properties of the lower and upper limb bones of juvenile Later Stone Age hunter-gatherers (n=82), illustrate the skeletal markers for increasing mobility and sex-specific physical activities that emerge during adolescence. These skeletal characteristics are interpreted in the context of skeletal and archaeological evidence of subsistence activities among Later Stone Age adults, and with respect to our understanding of childhood among ethnographically-known juvenile hunter-gatherers.

Dangerous Devotion: Differential Mortality Among Edmonton's Religious Communities During Edmonton's Scarlet Fever Epidemic (1893-1894).

Highet, Megan J. Department of Anthropology, University of Alberta.

Human Biology and Ecology Talks. 10:00-10:15, Friday, 30th Oct.

An association between religious affiliation and patterns of differential mortality has long been of interest to researchers. While most recognize religiosity as somehow related to improved health, the nature of this relationship often remains elusive. Although some argue that any measure of religion is hopelessly confounded by other variables, it is nevertheless popularly held that increased church attendance, as well as internalized rather than institutionalized religiosity, both function to benefit the health of individuals when religion is factored into analyses of health outcomes. This study however, provides an example to the contrary of each of these prevailing assumptions. Edmonton's 1893-94 scarlet fever epidemic not only provides the opportunity to explore the relationship between religious affiliation and differential mortality from this cause, but also importantly, to explore the reason that such a trend was observed in the first place. A biosocial approach reveals that early Edmontonians were socially divided by their religious identity. In a bid to preserve the French cultural heritage in the predominantly English-speaking community, the clergy encouraged French-speaking Roman Catholics to socialize among those with whom they shared a common language, cultural identity and faith, thereby drawing people together into a tight-knit group determined by their congregation. It is thus shown that contrary to the usual assumption, religiosity can also serve as a risk-factor for certain health threats; as Roman Catholic children were found to be at a significantly greater risk of dying from scarlet fever than were their counterparts from all other religious communities combined.

Sleep site selection by white-faced capuchins (Cebuscapucinus) in Santa Rosa National Park, Costa Rica
Holmes, Teresa D., Bergstrom, Mackenzie L., Fedigan, Linda M. University of Calgary, Department of Anthropology.
Combined Topics Posters. 13:00-16:00, Thursday 29th Oct. and 13:00-16:00, Friday, 30th Oct.

Several hypotheses for sleep site selection have been proposed in response to the wide range of slumber patterns exhibited by primate species. We examined the "predation-avoidance" and "comfort and security" sleep site selection hypotheses for white-faced capuchin monkeys (*Cebuscapucinus*) in Santa Rosa National Park, Costa Rica. The predation-avoidance hypothesis proposes that primates use specific sites and behaviours that aid them in avoiding harm through predation. The comfort and security hypothesis proposes primates will sleep more often with other group members in the forks of exposed branches of living trees for comfort and security against falling. From February through April 2008, we recorded the plant species, height, diameter at breast height (DBH), canopy cover, bottommost branch height, subcanopy height, and phenology of sleep trees selected by three habituated study groups. White-faced capuchins preferentially selected sleep trees of tall, emergent height, with DBH > 65 cm, and a low percentage of canopy cover. The girth of their sleep trees was wider and the canopy cover was less than predicted from studies of other primate species. Emergent height, wide girth and low canopy cover are all hypothesized to reduce predation risk. Our findings suggest that white-faced capuchins employ a predation-avoidance strategy in their selection of sleep trees, while also taking into account the comfort and security of their sleep sites. By increasing our knowledge of the characteristics of preferred sleep sites we can improve our overall understanding of the needs and interdependence of white-faced capuchins and their environment.

First Metacarpal Trabecular Architecture in *Pan, Paranthropus*, and *Homo.*
Hublin, Jean-Jacques[1], Skinner, Matthew M [1], Tilgner, Rico[1] and Richard Lazenby[2]. [1]Department of Human Evolution, Max Planck Institute for Evolutionary Anthropology; [2]University of Northern British Columbia.
Combined Topics Posters. 13:00-16:00, Thursday 29th Oct. and 13:00-16:00, Friday, 30th Oct.

In the past decade 3D micro-CT imaging of trabecular bone has provided insight into questions of anthropoid form, function and phylogeny. However, its application to the hominin fossil record has been limited, in part related to issues of sample representation and quality of preservation. This paper reports results obtained from the distal first metacarpal for a sample of recent *Homo* (n=16), *Pan* (*P. t. troglodytes*, n = 5 and *P. t. verus*, n = 6) and two fossil specimens dated by U-Pb to ca. 1.4 – 1.8 Ma, SK 84 (from Member 2) and SKX 5020 (from Member 1). The former has been attributed to Homo erectus and the latter *Paranthropus robustus*, primarily based on provenience, though not without debate. First, we demonstrate the efficacy of the recently developed Ray Casting Algorithm segmentation protocol for resolving difficulties associated with inorganic matrix inclusion within the trabecular mesh. Second, we illustrate the potential of trabecular architectural variation to address questions of alpha taxonomy and behaviour. In this regard it is notable that trabecular morphology in SK 84, putatively *H. erectus*, shows striking affinities for almost all parameters measured (both mass and structure) with P. t. troglodytes (less so with *P. t. verus*). Conversely, the paranthropine SKX 5020 first metacarpal is demonstrably Homo-like in terms of its trabecular architecture.

The Taxonomic Utility of Femoral Shape.
Hutchinson, Vance[1] and Yokley, Todd R[2]. [1]Department of Anthropology, Tulane University, New Orleans. [2]Department of Basic Sciences, Touro University Nevada, and Department of Anthropology and Ethnic Studies, University of Nevada Las Vegas.
Palaeoanthropology Talks. 11:15-11:30, Saturday, 31st Oct.

The majority of phylogenetic research in palaeoanthropology has considered craniodental material to be evolutionarily stable and therefore an adequate proxy for phylogeny. The postcranium, on the other hand, is generally thought to be too susceptible to external influences and is more commonly used to investigate morphofunctional and behavioural differences between synchronic and diachronic groups. However, recent developmental research has raised theoretical issues with trait-based phylogenies, and many paleoanthropologists are becoming increasingly dissatisfied with activity-

based interpretations of the human postcranium. Neanderthals and anatomically modern humans provide a robust sample for comparing and understanding the nature of morphological variation between evolutionarily proximate groups. The present analysis uses three-dimensional geometric morphometric techniques to identify patterned epiphyseal and whole-bone variation in the femora of Neanderthals and various modern human groups. While discerning between heritable and epigenetic patterns in femoral shape is not straightforward, results indicate that Neanderthals and modern humans differ in femoral shape in ways that are at odds with certain behavioural interpretations. Patterns of variation which show low levels of within- and between-group variance can serve as baseline minimums for structural and systemic integrity in human locomotion as a whole. Patterns that show low within-group variability but high between-group variability are likely the result of genetic differences and therefore of high taxonomic utility. Patterns that show high within- and between-group variation are almost certainly phenotypically plastic.

Examination of Vertebral Compression Fractures in a Late Horizon Inca Population from Peru.
Jaagumagi, Alyson. University of Western Ontario.
Bioarchaeology Issues and Regional Studies Talks. 14:30-14:45, Friday 30th Oct.

Excavations of skeletal material at the late Horizon Inca site of Farfan, Peru uncovered a high percentage of young women showing vertebral compression fractures of the thoracic vertebrae. The fractures, occurring in single and multiple vertebrae, resulted in an increased kyphosis of the vertebral column likely causing pain and impaired mobility. Initial examination of the remains narrowed the potential diseases to Osteopenia or Scheuermann'skyphosis. Identification of the fractures employed a multi-method approach that combined methodologies used in both clinical and archaeological studies, specifically dual-energy x-ray absortiometry DEXA), plain film radiography, microCT and histology allowing for comparability to modern and ancient populations and access to a wider source of data. 37 samples were removed from excavated materials and examined for micro- and macroscopic changes in the mechanical structure of the bone. Identification of the fractures' etiology in this case is important to understanding cultural practices within this population as the organization of the site, which is similar to other sites in the area, suggests these burials had ritual significance. The identification of these fractures will also aid in expanding the understanding of the history and process of disease within the region and the effects of debilitating diseases, such as vertebral fractures, on the population. The preliminary results of these methods and their potential implications to our understanding of compression fractures and cultural practices will be discussed.

Forensic Anthropology Casework in southern Alberta.
Katzenberg, M. Anne. Department of Archaeology, University of Calgary.
Forensics Talks. 09:45-10:00, Thursday, 29th Oct.

This presentation provides information on my casework as the forensic anthropologist for southern Alberta over the past 25 years. I am called in as a consultant by the office of the Medical Examiner of Alberta and work primarily in their facility. The types of cases, requirements for reporting and integration with Medical Examiner's staff are all described for the purposes of comparing my consulting work to others similarly employed in other jurisdictions in Canada.

Forensic Anthropology and the International Criminal Law: The Problem of Definitions.
Kron, Hope. University of Alberta.
Combined Topics Posters. 13:00-16:00, Thursday, 29th Oct. and 13:00-16:00, Friday, 30th Oct.

In recent decades, scholars in various fields of the social sciences and the law have dedicated much attention to research on defining, understanding and handling mass-scale human rights violations such as genocide and crimes against humanity. Under customary international law, crimes against humanity are defined as acts carried out against a civilian population as part of a widespread or systematic attack that are of such gravity and severity as to offend the human consciousness as a whole and be intolerable in modern society. Genocide is a specific category of crimes against humanity. The 1948 Genocide Convention defines the crime as "acts committed with intent to destroy, in whole or in

part, a national, ethnical, racial or religious group." Despite the existence of these definitions in law and the extensive research dealing with these crimes carried out in many disciplines, there remains a significant gap in the way these crimes are defined and understood by different scholars. International crimes such as genocide and crimes against humanity are often misinterpreted in the social sciences, including forensic anthropology. As such, these crimes are not properly understood by some forensic anthropologists, which can lead to errors in investigation, ultimately hindering the legal proceedings of such criminal cases. In this paper, I will address the issues with the current gap in the definition of international crimes and mass-scale human rights violations that exists between the social sciences and the law and provide suggestions for the improvement of the current situation.

Contraction of the bony pelvis: An indicator of health in past populations?
Kurki, Helen K. Department of Anthropology, University of Victoria
Bioarchaeology Issues and Regional Studies Talks. 13:45-14:00, Friday 30th Oct.

The size and shape of the bony obstetric canal have been used by anthropologists and obstetricians as indicators of potential risk of cephalopelvic disproportion. Sibley et al. (1992) found a high number of female skeletons from Kulubnarti (Medieval Period Nubia) with "contracted" pelvic dimensions (below the modern clinical threshold for contracture resulting in increased risk of problem childbirth), and argued the population was under biological stress during growth resulting in reduced body size and compromised obstetric capacity. However, recent studies have demonstrated that among populations of differing body size, variation exists in the relative size of the pelvic canal. This study re-examines the use of clinical standards for pelvic contracture to evaluate health in past populations by comparing the frequency of contracture in nine samples (total n = 139) representing varying body sizes and proportions. The incidence of contracture varies among the samples, although small bodied samples show the highest frequency of contracted dimensions. However, lower frequencies of contraction, relative to Kulubnarti, are found in a sample of earlier period Nubians and Egyptians. These results support previous research that suggests modern clinical standards, based on European-American samples, do not take into account the variation in human body size and shape and the effect this variation may have on obstetric capacity without compromising obstetric function. Using pelvic contracture, in the absence of clear evidence of death during childbirth, to infer compromised obstetric function resulting from biological stress in archaeological samples is therefore problematic.

Forensic Anthropology in the Rural Remote.
Lazenby, Richard. University of Northern British Columbia.
Forensics Talks. 09:00-09:30, Thursday, 29th Oct.

This presentation explores some of the challenges and rewards of practicing forensic anthropology 'beyond Hope' with a dearth of physical resources offset by a surfeit of human good-will. Since becoming the de facto 'bone doctor' for much the geography of central and northern BC in 1994, I have amassed a case load now approaching 100 (excluding non-human remains, which easily account for 50% of all requests for identification received). Several of my human cases have been extremely difficult homicides (analytically and emotionally), of which frustratingly few have made it to trial. At the other extreme, a few cases occasionally approach the farcical. All are nonetheless illuminating. As I will illustrate, one of the major problems facing the FA in the rural remote is the fact that, more often than not, the dead are typically fragments of their former selves, having been appreciated previously by large carnivores (in the north, burial is the last recourse to disposal of a body). This talk will also touch on the importance of developing professional, practical, and yet informal relationships with the Coroner's Service, the RCMP, and the media in effectively doing FA within the context of a small university located in a small city situated in a vast region.

Animal models in taphonomic experiments: an interspecies comparison of cortical bone properties.
Marceau, Corinne M. Department of Anthropology, University of Alberta.
Combined Topics Posters. 13:00-16:00, Thursday, 29th Oct. and 13:00-16:00, Friday, 30th Oct.

This research compares the cortical properties of human, pig, and deer bones in order to examine the suitability of these animals as human analogues in forensic experiments involving skeletonised remains. The use of animal models in these kinds of experiments can provide a basis for determining time since death and reconstructing taphonomic events in forensic cases with extended post-mortem intervals. While previous research has investigated the use of domestic pigs as models for soft tissue decomposition in humans, no studies have investigated which species is best suited to serve as a model for the disintegration of human bone. The present study examines whether the skeletons of deer (*Odocoileusviginianus* and *O. hemionus*) and pigs (*Susscrofa*) are suitable human analogues based on the cortical and metric characteristics of the long bones of each species. The major long bones of humans, deer, and pigs were measured to compare the length, diameter, cortical density, cross-sectional area, and cortical thickness of these bones. While the limb bones of deer are more similar to those of humans in some respects, those of pigs are more comparable in others. The findings demonstrate that both species can serve as suitable models in forensic experiments based on their geometric and densitometric similarities to human bone. The results of this research have been applied to a taphonomic experiment using pig and deer carcasses to observe weathering changes in the skeleton and could prove valuable to future studies on post-mortem modification of bone. (Poster previously presented at AAPA annual meeting in Chicago, 2009.)

Artificial DNA Degradation Model for the Examination of DNA Preservation Patterns in Bone Samples.
McGrath, K., Arndt, U., Skinner, M. and D. Yang. Department of Archaeology, Simon Fraser University.
Combined Topics Posters. 13:00-16:00, Thursday, 29th Oct. and 13:00-16:00, Friday, 30th Oct.

A good understanding of DNA preservation is critical for authenticating degraded and ancient DNA. However, such knowledge is difficult to obtain from empirical data due to the fact that every burial environment represents a unique combination of physical, chemical and biological conditions, often resulting in unpredictable DNA recovery rates. This study employed an artificial DNA degradation model to examine DNA preservation patterns using a limited number of controllable factors. Temperature and length of time were selected as the controlled degradation factors to simplify the multivariate degradation process. To avoid the complication of human contamination, non-human bones, specifically sheep, were chosen as test samples. Standard PCR and real-time PCR methods were used to quantify DNA templates of variable lengths after each temperature treatment. Both mitochondrial and nuclear DNA were examined to investigate the possibility of differential preservation rates between the two types of DNA. Our preliminary results indicate that the model is functional, and relatively stable degradation patterns have been identified. Future studies will expand the current system to include more degradation factors. It is expected that this model will provide important information for assessing the quality and quantity of retrievable DNA from different recovery contexts, which will be extremely helpful in the analysis of DNA from both archaeological and forensic contexts.

An assessment of the impact of population history and risk on human weaning behaviour.
McKerracher, Luseadra[1], Sellen, Dan[2], Nepomnaschy, Pablo[3] and Mark Collard[1]. [1]Laboratory of Human Evolutionary Studies, Department of Archaeology, Simon Fraser University. [2]Department of Anthropology, University of Toronto. [3]Faculty of Health Sciences, Simon Fraser University.
Human Biology and Ecology Talks. 10:30-10:45, Friday, 30th Oct.

The weaning process varies considerably among human populations, but we do not yet understand why this is the case. With this in mind, we used data from 70 nonindustrial, natural fertility societies to test two evolutionarily-informed hypotheses concerning variation in the timing of key events in the weaning process (introduction of solids, introduction of liquids, introduction of any complementary food, cessation of breast feeding, duration of the weaning process). First, we used the Mantel test to evaluate the null hypothesis that the variation simply reflects population history. In this

analysis, genetic distance was used as a proxy for population history. Subsequently, we employed regression analysis and the partial Mantel test to evaluate the hypothesis that risk of resource failure affects the timing of events in the weaning process. In this analysis, we utilized several proxies for risk of resource failure, including latitude, elevation, variability in precipitation and effective temperature. We found that among-population variation in the timing of events in the weaning process is not correlated with genetic distance, and is only weakly correlated with the proxies for risk of resource failure. Thus, our analyses refuted the population history hypothesis and provided only limited support for the risk hypothesis. We conclude from this that among-population variation in the timing of events in the weaning process has been shaped by selection but, contrary to what we had expected, risk of resource failure is not the primary selective factor.

Non-Accidental Trauma in Human Skeletal Remains: Diagnosis of Child Abuse From Fragmentary Osseous Remains.
Merrett, Deborah C. Department of Anthropology, University of Victoria.
Combined Topics Posters. 13:00-16:00, Thursday, 29th Oct. and 13:00-16:00, Friday, 30th Oct.

Determining the cause of skeletal injuries from dry bone alone is fraught with uncertainly. It is particularly challenging when distinguishing between accidental and non-accidental injury in children. While the patterns of injury in the skeleton and in specific skeletal elements are useful in infants up to the age of two years, spatial patterning of injuries resulting from child abuse are much less specific in older children. However repetitive injury in a single skeletal element can support diagnosis of child abuse. Microscopic analysis of bone injury can provide evidence of multiple episodes of trauma. These issues of identification are compounded in fragmentary remains. Macroscopic, radiographic and microscopic analyses of a fragmentary bone showing signs of healing trauma were compared to assess their usefulness in identification of multiple injuries to a single skeletal element. The macroscopic and radiographic examinations indicated only that injury with some healing had occurred. These two standard techniques were not able to support a diagnosis of child abuse. Microscopic methods were then applied to the same bone fragment. Undecalcified thin sections of bone from the region macroscopically identified as injured were observed through polarized and bright field light microscopy. The microscopic analysis of bone thin sections provided strong evidence of multiple episodes of antemortem injury, each followed by periods of healing. This study illustrates the potential of microscopic analysis in the identification of child abuse from fragmentary skeletal remains.

From knowledge to practice: Vitamin D Network and maternal-child health of New Canadians.
Moffat, T.[1], Parra, E.[2], Sellen, D.[2], Wilson, W.[3], Anderson, L.[2], Amarra, S.[3], Angus, S.[1]. [1]McMaster University, [2]University of Toronto, [3]University of Calgary.
Human Biology and Ecology Talks. 10:45-11:00, Friday 30th Oct.

This paper presents the main findings from a Vitamin D Network workshop held in February 2008 at University of Toronto, Mississauga campus. The purpose of the workshop was to gather knowledge and opinions of medical professionals and social scientists working on issues pertaining to vitamin D nutrition and immigrant health related to maternal-infant supplementation. Themes explored: 1) current vitamin D recommendations; 2) Vitamin D deficiency among New Canadians; 3) reconciling recommendations to supplement exclusively breastfed infants with pro-breastfeeding policy; 4) Vitamin D deficiency among New Canadians as a health disparity. Main Findings: 1) For children, guidelines currently follow levels of vitamin D intake required to prevent rickets; there is disagreement regarding recommended levels of Vitamin D intake that maintain an adequate level of serum 25-hydroxy vitamin D. 2) To date there is little known about Vitamin D status of immigrants; refugees are probably most vulnerable; gender, age, income, education and food security status are main factors associated with supplement use. 3) There is a need for clear guidelines and educational information for parents and healthcare professionals about Vitamin D. 4) Health messages should be designed for specific vulnerable populations such as immigrants. Discussion: This workshop was a first step in taking stock of the current state of knowledge about Vitamin D and immigrant health in an emerging area of inquiry in Human Biology and Health Sciences.

Size Matters, but So Does Location: A Consideration of Human and Nonhuman Secondary Osteon Area for Bone Fragment Identification.

Morris, Zoe[1], Manhein, M.[2] and G. Listi[2]. [1]University of Western Ontario; [2]Louisiana State University FACES Lab.

Bioarchaeology Methods Talks. 13:30-13:45, Thursday, 29th Oct.

Species-specific variables exist that change the structure and morphology of cellular bone tissue. Identifying and quantifying these differences is necessary in the evaluation of fragmentary bones in order to assign specific species identification. To understand the influence of species of origin on microscopic bone tissue, the influence of development and biomechanical forces specific to a skeletal element must also be assessed. The research has bioarchaeological and forensic implications, suggesting additional means to differentiate human and non-human fragmentary remains. This presentation is a synthesis of work by the author analyzing the mid-shaft cross-section of the femora, humeri, and mid-thoracic ribs of deer (*Odocoileusvirginianus*), dog (*Canisfamiliaris*), and pig (*Susscrofadomesticus*) with published human histomorphometric data in order to assess whether significant differences exist in the osteon area of human and non-human species. This initial research concludes that rib fragments of human and non-humans can be differentiated histologically based on secondary osteon size. On the other hand, long bone histological differentiation proves more challenging and we suggest use of multiple histological measures, such as the inclusion of Haversian canal area, as more diagnostic. A consideration of biomechanical influence on secondary osteon development and spatial arrangement in long bones is necessary for future research to advance the utility of histology in bioarchaeology and forensic applications.

The UQAM Mummy – The Use of Non-Destructive Imaging to Reconstruct an Ancient Osteobiography and to Document Modern Malfeasance.

Nelson, AJ[1,5], Wade AD[1], Hibbert, R[2], MacDonald, B[2], Donaldson, M[2], Chatelain, R[2], Nguyen, N[3], Lywood, V[4], Gibson, G[5], Trumpour, M[5], Friedman, SN[6], Granton, PV[6], Holdsworth, DW[6]& Cunningham, IA[6]. [1]Department of Anthropology, The University of Western Ontario; [2]Department of Radiology, The Ottawa Hospital; [3]Department of Anatomy, The University of Western Ontario; [4]John Abbot College; [5]The Royal Ontario Museum; [6]Imaging Research Laboratories, Robarts Research Institute.

Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

An Egyptian mummy, identified as Hetep-Bastet, and her coffin were donated to the École de Beaux Arts in Montreal in 1927. This mummy has been in the collection of the Université du Québec à Montréal since 1967. In 1969, the mummy was attacked by a protester, who caused extensive damage. The mummy was scanned once over a decade ago. However, CT technology has advanced a great deal since that time, and some conclusions were somewhat suspect (e.g. that she suffered from a large dental abscess caused by "drinking too much beer"). Thus, when Hetep-Bastet was transported to Gatineau to be part of the "Tombs for Eternity" exhibit at the Canadian Museum of Civilization, we took the opportunity to rescan her. Hetep-Bastet was an elderly female, 162.8cm tall, had mild osteopenia and was in extremely poor dental health. A notable pathological finding was that she suffered from atherosclerosis, as documented by the density of her femoral arteries. A notable cultural finding is that her brain was removed through the foramen magnum, a practice that was rare in ancient Egypt. A facial reconstruction is underway. Before the exhibit, the coffin was painstakingly restored by CMOC staff. We scanned a portion of the coffin and were able to demonstrate that two different woods used were used in the coffin's construction and the presence of a plaster undercoating for the coffin's paint. This multidisciplinary, collaborative project demonstrates the important information that can be garnered by using cutting-edge, non-destructive imaging techniques on ancient mummies.

Cross –talk between the stress and reproductive axes in eumenorrheic women.
Nepomnaschy, Pablo A. Faculty of Health Sciences, Simon Fraser University.
Human Biology and Ecology Talks. 11:00-11:15, Friday, 30th Oct.

It is estimated that only one in five women at risk of conceiving will begin a successful pregnancy at any given menstrual cycle. This rate of fecundability has led some health scientists to describe human reproduction as inefficient and, therefore, an evolutionary paradox. In contrast to this pathological vision of women's reproduction, evolutionary theorists propose that reproductive suppression may have originated as an adaptation that, in dire circumstances, helps avoid the onset of a new reproductive venture. The results of this debate are of critical importance as they can affect both fertility diagnoses and treatments. I will examine the modulating role of the cross talk between the so called stress and reproductive axes (hypothalamic-pituitary-adrenal and hypothalamic-pituitary-gonadal axes) on women's fecundability. Stress is commonly reported to lead to reproductive suppression. Most of the available evidence to support this claim, however, has been derived from animal and clinical or retrospective studies. I will present data from a longitudinal study conducted among Kaqchikel Maya in the southwestern highlands of Guatemala. The activation of the stress axis appears to affect ovarian function, implantation and early pregnancy fate. The implications of the evolutionary and pathologic paradigms for the treatment of sub-fertility are considered.

Autoimmune diseases in archaeological populations.
Nikitovic, Dejana[1] and Sikanjic, Petra R.[21]Department of Anthropology, University of Toronto; [2]Institute for Anthropological Research, Zagreb, Croatia.
Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

Autoimmune diseases appear as a result of immune system activation in the absence of any external threat to the organism, leading to tissue damage. Recent clinical studies found a high prevalence of different autoimmune diseases within families and at the population level, indicating that certain genetic factors predispose to autoimmunity in general, while the development of a specific autoimmune disease depends on genes that govern specific organ vulnerability. Among over 40 recorded autoimmune diseases that can affect any tissue in the body, very few of them leave lesions on skeletal tissue (autoimmune joint diseases), making them visible in archaeologically derived skeletal populations. Published papers of autoimmune joint diseases from archaeological context usually represent isolated case studies or report the prevalence of a specific disease within the population. Instead of concentrating on specific autoimmune joint disease, we were interested in the presence of different diseases within the same skeletal sample, which would suggest population susceptibility and accumulation of the alleles responsible for autoimmunity in general within the sample. Anthropological analysis of the skeletal material from the late medieval site Uzdolje-Grablje, Croatia, revealed three cases (out of 9 adults and 16 juveniles) of different autoimmune joint diseases. Although further genetic analyses are required to confirm this hypothesis, the high prevalence of autoimmune joint diseases among individuals buried at this site are in agreement with clinical studies that have found genetic bases for autoimmune response.

Life and Death at a Medieval German Poorhouse: Evidence from Stable Isotopes.
Olsen, K.[1], Haebler, K.[2], McGlynn, G.[3], Grupe, G.[2,3], White, C. [1] and F. Longstaffe[4]. [1]Department of Anthropology, The University of Western Ontario; [2]Department of Biology I, Biodiversity/Anthropology, Ludwig-Maximilians-University Munich; [3]State Collection for Anthropology and Palaeoanatomy, Munich, Germany; [4]Department of Earth Sciences, The University of Western Ontario.
Bioarchaeology Issues and Regional Studies Talks. 14:45-15:00, Friday, 30th Oct.

Isotopic data (δ13C, δ15N, δ18O) are used to explore the diet, health and geographic origins of individuals from a Medieval period (12th - 16th century) cemetery located in Regensburg, Germany. The cemetery has been associated with an early form of social care facility known as a poorhouse or almshouse. Poorhouse tenants represent an underprivileged and unhealthy group within the community that included pregnant women, the elderly and destitute individuals who were unable to care for themselves because of illness or handicap. Here, osteological evidence for

disease and isotopic data are combined to evaluate the quality of life experienced by the poorhouse population and to situate the population within the social context of Late Medieval society. Preliminary isotopic data for bone collagen (δ13C, δ15N) and bone carbonate (δ13C) indicate no sex differences in diet. A narrow range in carbon-isotope values suggests that neither C4 foods (e.g., millet) nor marine fish were consumed by this population. A higher variability in nitrogen-isotope compositions could represent differential access to dietary protein including freshwater fish and dairy products. However, the possible influence of disease states on nitrogen-isotope compositions is also under investigation. The range in bone carbonate oxygen-isotope compositions (δ18O) indicates that the poorhouse may have served a larger-than-local geographic region. Some oxygen-isotope compositions are indicative of foreigners, which suggest that these individuals had only recently moved into the poorhouse prior to their deaths.

It's A Wonderful Life: The present and future of forensic anthropology in Nova Scotia.
Peckmann, Tanya. Saint Mary's University, Halifax, Nova Scotia.
Forensics Talks. 10:30-10:45, Thursday, 29th Oct.

Consulting for the Nova Scotia Medical Examiner Service (NSMES) is an extraordinary experience. The Chief Medical Examiner (Dr. Matthew Bowes)supports me in every way possible by providing space at the "teeny-tiny" morgue for my analyses, field equipment for recoveries, personnel, a budget, and vehicles to the scene. The law enforcement officers always go out of their way to assist us in any situation. Together, Dr. Bowes and I have created and implemented a co-op program, at the NSMES, for M.Sc. forensic anthropology students at Saint Mary's University. Currently, a state-of-the-art forensic science institute has been approved for Nova Scotia with the goal of delivering first rate death investigation as well as training for future professionals.

Characterizing Microbial Biodeterioration: A Histological Study of Bone from Ancient Mesopotamia.
Pitre, Mindy C. [1], Correia, Pamela Mayne[1], Mankowski, Peter J. [2], Klassen, Jonathan[2] and Randy S. Currah[2]
[1]Department of Anthropology, University of Alberta; [2]Department of Biological Sciences, University of Alberta.
Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

For researchers studying bone, microbial decay of the skeleton is the final stage in the decomposition of the body. Such destruction, often referred to as biodeterioration, can occur via microorganisms such as fungi, bacteria, and cyanobacteria. The activity of such organisms can have serious consequences for structural, isotopic, molecular, and biochemical analyses carried out on bone. The Tell Leilan skeletal collection from Syria (c. 2900 – 1900 BCE), which had been considered reasonably well preserved (at both the macroscopic and microscopic levels), was found to contain considerable signs of biodeterioration. This change, recognized during the routine preparation of thin sections for pathological analysis, appears to have occurred during the curation of the material over the last decade. A combination of microbial cultures and DNA analysis was used to isolate and identify three likely causal microorganisms: Penicillium chrysogenum, Amycolatopsis sp., and Cladosporium sp. This biodeterioration will be characterized using the Histological Preservation Index (HPI); a scale of 0-6 (6 indicating unaltered bone). Although preliminary, 100% of the samples exhibit some form of biodeterioration. Only with an understanding of the responsible microorganisms and their destructive patterns will it be possible to slow or even arrest this natural process and thus ensure the validity of research results.

Pubic symphysis stress injury in a small-bodied forager.
Pfeiffer, Susan. Department of Anthropology, University of Toronto.
Bioarchaeology Issues and Regional Studies Talks. 14:00-14:15, Friday, 30th Oct.

Osteitis pubis, or pubic symphysis stress injury, has been associated with difficult childbirth and with vigorous athletic activities. The assumption of natural selection for obstetric adequacy would predict the occasional discovery of skeletal evidence for inadequacy, yet such cases are rare. Here stress injuries to the pelvic ring are associated with a slightly misshapen pelvis linked to partial agenesis of the right sacral ala. The small, middle aged woman lived about 2000 years ago and pursued a physically vigorous life as a coastal forager on the South African Cape coast. The six articular faces of

the asymmetrical pelvis all show coarsely porous new bone remodelling and extensive eburnation. The left pubic face has shifted dorsally, making contact with the ventral aspect of the right pubis. The sacrum is asymmetrical, the right ala being about 5 mm narrower than the left. There is incomplete fusion of the first and second sacral elements. Adjustments to the altered pelvis include erosions and osteophytes at sites of ligament attachment, and prominent bilateral insertion areas on the tibiae for the iliotibial band. It is highly probable that childbirth introduced joint instability, exacerbating the skeletal changes. This case joins a small literature on the condition, and illustrates the mechanisms through which natural selection for pelvic size and shape characteristics may have occurred.

Tracking Neanderthal mobility using strontium isotope analysis.

Richards, Mike and Christine Verna. Department of Anthropology, UBC and Department of Human Evolution, Max Planck Institute for Evolutionary Anthropology.

Palaeoanthropology Talks. 11:30-11:45, Saturday, 31st Oct.

There are long-standing debates over the mobility and ranges of European Neanderthals. The archaeological evidence for Neanderthal range sizes is limited, and studies of lithic raw material sources at Mousterian sites have found that the sources were relatively close, pointing to a small geographic range. Here we present the first stages of our project to directly measure Neanderthal mobility using strontium isotope analysis of Neanderthal teeth. As this is a destructive method we developed a laser ablation method to minimise damage to the teeth, and have now been able to apply this method to a small number of Neanderthals from Greece, Belgium, France and Spain. Strontium isotope analysis relies on a thorough understanding of the background strontium isotope values in the region of interest, so much of our work has been in establishing these strontium baselines. This labour-intensive work is still on-going, but in this talk we will present the preliminary results of our analysis, showing that there was a range of Neanderthal mobility behaviours.

Did human fingers and toes co-evolve?

Rolian, Campbell[1], Lieberman, Daniel[2] and Benedikt Hallgrímsson[1]. [1]Dept. of Cell Biology and Anatomy, University of Calgary; [2]Department of Human Evolutionary Biology, Harvard University.

Palaeoanthropology Talks. 09:45-10:00, Saturday, 31st Oct.

Human hands and feet have similarly derived digital proportions compared to African apes, including longer, more robust first rays, and shorter lateral rays. These similarities are often assumed to be independently-evolved adaptations for manipulative activities and bipedalism, respectively. However, hands and feet are serially homologous structures that share virtually identical developmental blueprints, raising the possibility that some aspects of digital morphology coevolved in human hands and feet because of underlying genetic/developmental linkages that increase phenotypic covariation between them. Here we show that magnitudes of covariation between homologous traits in the feet and hands of Homo, and especially Pan not only exceed the average level of covariation across all traits, but also exceed covariation magnitudes within these structures. Further, when subjected to episodes of simulated directional selection, this increased covariation causes the fingers and toes to evolve along highly parallel trajectories, even when selection pressures push their means in divergent directions. Our estimates of the selection pressures required to produce human-like fingers and toes from a chimpanzee-like ancestor indicate that selection on the toes was substantially stronger, and likely led to parallel phenotypic changes in the hands. Our data not only support the hypothesis that human hands and feet coevolved, but also suggest that the evolution of long robust big toes and short lateral toes for bipedalism led to changes in hominin fingers that may have facilitated the emergence of stone tool technology.

Influence of locomotion on the hominoid humeral distal joint.

Robert, Julie. Department of Anthropology, University of Montreal.

Palaeoanthropology Talks. 09:15-09:30, Saturday, 31st Oct.

In hominoids, the tensile and compressive forces generated by locomotion and upper-limb use are transmitted through the elbow joint. It has been noticed that the distal humerus of hominoid is morphologically very similar across species.

However, some studies have suggested that articular shape varies relative to size and locomotor modes. This study is an attempt to characterize more thoroughly distal humeral variation in hominoids. It considers the humeral trochlea not only as a structure by itself, as it has been done before, but as an articulation that varies in orientation relative to the diaphysis. Indeed, there is evidence that articulations have a minimum size and are generally oriented to better resist habitual loads. This study tested the hypothesis that predominantly arboreal species are expected to present joints that have a size, position and orientation of articular surfaces to better resist shear loads generated by the strong flexors fingers and wrist muscles crossing the elbow obliquely, while predominantly terrestrial species should present articulations shape and orientation that are better to resist axial load generated by ground reaction forces. Results show that orientation and position of humeral trochlea joint surfaces correlates with locomotor modes and that length of the articular surfaces seems to be better correlated with size. The main hypothesis suggesting that stress related to locomotion in hominoids should influence the morphology of distal humeral joints is therefore supported.

The feasibility of HR-pQCT for imaging and analysis of archaeological human bone.
Robertson, Heather. Centre for Hip Health and Mobility, Vancouver, BC.
Bioarchaeology Methods Talks. 13:45-14:00, Thursday 29th Oct.

This study measured bone mineral density (BMD) in 30 human bones (14 tibiae and 16 radii) and obtained mircoarchitectural information of cortical and trabecular bone using three-dimensional high resolution peripheral quantitative computed tomography (HR-pQCT). This data was evaluated against previous in vivo and ex vivo studies using the same scanning and analysis protocols to assess the quality of data captured. HR-pQCT is a non-destructive imaging technology that provides detailed and accurate (1% machine error) measurement of BMD, cortical thickness (C.Th), cortical area (C.A.), average bone density (D100), compact bone density (Dcomp), trabecular area (TR.A.), trabecular number (Tr.N.), trabecular thickness (Tr.Th), and trabecular separation (Tr.Sp). Previous methods of obtaining this information are either destructive to the bone (histology) or inaccessible and expensive (Synchrotron). Standard HR-pQCT tibia and radius protocols were used at the standard resolution of 82 microns (for in vivo scans) and compared to the maximum ex vivo scan resolution of 41 microns. The high resolution scan, as expected, produced statistically significant results for calculating trabecular number (Tb.N), the lower resolution overestimated Tb.Th., and Tb, Sp, due to partial volume effect. However the trabeculae are fragile and prone to breakage in dried bone making their measurement data unreliable. There were no significant changes to cortical bone measurements between resolution settings and the HR-pQCT 3D images identified porus cortical bone similar to that of osteopenic and osteoporotic patients from in vivo and ex vivo studies that would have never been seen in these specimens except by destroying them.

Upper Pleistocene hominin from Sicevo (Serbia) and its larger implications.
Roksandic, Mirjana[1],Mihailovic, Dušan[2], Mercier, Norbert[3]. [1]University of Winnipeg; [2]Belgrade University; [3]Université de Bordeaux.
Palaeoanthropology Talks. 10:45-11:00, Saturday, 31st Oct.

Neandertals and their immediate predecessors, the Pre-Neandertals, are commonly considered as the only humans inhabiting Europe in the Middle and Upper Pleistocene. All Middle Pleistocene Western European specimens show evidence of developing Neandertal morphology, supporting the notion that these traits developed at the extreme West of the continent due – at least partially –to the isolation produced by glacial events. A recent discovery of a mandible BH-1 from Mala Balanica (Serbia), with primitive character states comparable to the Early Pleistocene mandibular specimens, produced an unexpectedly young date of 113 +72-43 ka. The combination of primitive morphology and an Upper Pleistocene date suggests that hominin evolution in Europe could have followed a multilinear rather than a unilinear model. BH-1 could thus signal the existence of a fossil hominin population in Europe that, whilst contemporaneous with Neandertals, does not share any of their derived traits. Similarly to the relic fauna in this "hotspot of biodiversity," a more primitive hominin form could have survived and coexisted with the Upper Pleistocene hominins, stressing the need for more concentrated research in the Balkans.

Examining compositional changes associated with microbial biodeterioration of bone minerals.
Scharlotta, Ian. Department of Anthropology, University of Alberta.
Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

Diagenetic alteration of skeletal materials is an ongoing concern in many aspects of physical anthropological research. Many details of the exact nature and progression of changes embodied by diagenetic alterations remain elusive. With regard to bone chemistry studies of diet and mobility (e.g., C, N, O, Sr, Pb isotope analysis), prevailing wisdom holds that a suite of changes can occur that will leave distinct signatures on samples. Numerous data are collected (e.g., C/N ratio; CI; etc…) to ensure analytical data quality and that it reflects anthropogenic and not diagenetic information about the sample. Such measures generally do little to examine the microstructure of bones, proceeding via the assumption that laboratory procedures are effectively removing primarily diagenetic overprinting or alterations. Post-depositional chemical alteration will generally proceed via water contact with the skeletal materials, primarily altering (leaching, depositing) portions of bone already open to contact, namely on the surface and through the Haversian system. Current research into microbial alteration of human and animal bone has shown that such impacts often proceed in the reverse of the water system, with newer osteons with intact cement lines showing the greatest resilience to attack. Thus, laboratory procedures attempts to "clean" samples will be effecting changes on different portions of the bone depending on whether samples are handling as solid pieces or completely powdered. Presented here are preliminary results of research into the nature and progression of chemical changes in the bone matrix due to microbial attack using laser ablation inductively coupled plasma mass spectrometry.

Putting public nutrition recommendations for infant and young child feeding in evolutionary perspective.
Sellen, Daniel. University of Toronto.
Human Biology & Ecology Talks. 09:00-09:15, Friday, 30th Oct.

The idea of a return to a "natural", "ancestral" or "evolved" diet has tremendous appeal to the general public, but extreme care must be taken in applying such approaches to influencing caregiver decisions about infant and young child feeding because inappropriate use of data can generate food fads and cause potential harm. Most attempts to model what our ancestors ate in the past focus on adult diets and do not fully consider the widely differing dietary needs of individuals over the life history or what our ancestors ate as young children. While nutritionists are struggling to understand the causes of suboptimal (i.e. non-recommended) patterns of breastfeeding and complementary feeding, human biologists have developed a conceptual framework for understanding past and present variation in human lactation and complementary feeding, and suggested that humans have evolved an unusually flexible strategy for adaptive feeding of young in ancestral environments. An evolutionary analysis suggests that current evidence-based clinical recommendations for optimal feeding practices are feasible but can be promoted successfully only if the social and economic context of breastfeeding, complementary feeding and weaning is addressed. Data on ancestral first foods suggests that some current suggestions for infant feeding may be inconsistent with infant health.

First known endocasts of *Microsyopsannectens* and the evolution of the brain in primitive primates.
Silcox,M.T. [1], Benham, A.E.[1] and J.I. Bloch[2]. [1]Department of Anthropology, University of Winnipeg; [2]Florida Museum of Natural History, University of Florida.
Palaeoanthropology Talks. 09:00-09:15, Saturday 31st Oct.

Relatively large brain size is often cited as a distinguishing feature of crown primates (Euprimates). Data from stem primates are needed to elucidate the evolution of that trait. Two endocasts are described for the stem primate *Microsyopsannectens* from the middle Eocene of Wyoming: a virtual endocast produced from an ultra high resolution X-ray computed tomography scan of a complete skull (UW 12362), and a natural endocast (UW 14559) from the same site. Interestingly, these two specimens differ in the degree of exposure of the midbrain, with the caudal colliculi being visible dorsally in UW 14559 but not UW 12362. This variability, coupled with the fact that euprimates have covered caudal

colliculi, suggests the possibility of parallel expansion of the caudal cerebrum in euprimates and microsyopids. Cranial capacity of UW 12362 is estimated as 5.9 cubic centimeters, yielding an encephalization quotient (EQ) of 0.26-0.39 (Jerison's equation) or 0.32-0.52 (Eisenberg's equation), depending on the body mass estimate used. This range overlaps the lower end of the range for fossil euprimates and Ignacius. As in other plesiadapiforms, the olfactory bulbs of *Microsyops* are large, and the cerebrum does not extend onto the cerebellum or form a ventrally protruding temporal lobe, suggesting less development of the visual sense than in extant euprimates, and a greater emphasis on olfaction. The contrasts between the endocasts of *M. annectens* and those known for early Tertiary euprimates support the hypothesis that brain size increase was related to improvements to the visual system in early primate evolution.

Forensic Anthropology at Simon Fraser University: Is it working?

Skinner, M.F. Centre for Forensic Research, Department of Archaeology, Simon Fraser University.

Forensics Talks. 09:30-09:45, Thursday, 29th Oct.

The Department of Archaeology at SFU has offered a service in forensic anthropology and archaeology since 1976. During that time we have worked on hundreds of cases ranging from the trivial to the horrific and included dozens of undergraduate and graduate students in the cases. The goal of this presentation, as part of the Forensic Anthropology-Standards and Service Symposium, is to evaluate how good or bad a job we have been doing in comparison to other laboratories/practitioners across Canada. The motive for this presentation is a sense of strong frustration arising from trying to respond to university and societal expectations. I report a history of casework in terms of source (heritage, non-human, recent), significance (suspicious or non-suspicious death) and changing caseload. In 2007, SFU created the Centre for Forensic Research with specialized but under-equipped labs creating a difficult situation for faculty and students trying to respond to a greatly increased caseload. Our analyses and reports are becoming longer and more standardized while revenues remain modest. Ultimately, I evaluate whether higher standards and greater standardization expected by the discipline for our work can be sustained or is even realistic. The historical marginality of forensic anthropology in relation to the hiring and funding by coroners service, police, and national funding agencies is inappropriate.

Implications of an outlier: examination of the EDJ morphology of the large Paranthropus molar from Gondolin, South Africa.

Skinner, Matthew M.[1], Gunz, Philipp[1], and Frederick E. Grine[2]. [1]Department of Human Evolution, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; [2] Departments of Anthropology and Anatomical Sciences, Stony Brook University.

Palaeoanthropology Talks. 10:30-10:45, Saturday, 31st Oct.

The crown dimensions of the *Paranthropus* mandibular M2 (GDA-2) from Gondolin, South Africa are more than 3 SD above corresponding *P. robustus* sample means, but within observed sample ranges of *P. boisei* from eastern Africa. Accordingly, it has been suggested that GDA-2 represents 1) a very large *P. robustus* molar, 2) the first indication of *P. boisei* in South Africa, or 3) possibly a novel species. Each scenario has significant implications. Aspects of the occlusal morphology (cusp proportions) of GDA-2 suggest affinity with *P. robustus*, and this attribution is seemingly favoured by biogeographic considerations. While the occlusal surface of GDA-2 is moderately worn the enamel-dentine junction (EDJ), which can be a source of taxonomic information, is preserved. We employ micro-computed tomographic scanning to image the morphology of the EDJ of the GDA-2 crown, and geometric morphometrics to compare EDJ shape between mandibular M2s of *Australopithecus africanus* (n = 4), *P. robustus* (n = 5), and *P. boisei* (n = 2) to further assess the taxonomic affinities of GDA-2. Although comparisons are limited by small sample sizes for each taxon, the EDJ morphology of GDA-2 is more similar to *P. boisei* than to *P. robustus*, suggesting that GDA-2 is not simply a very large specimen of the latter. Qualitatively, the EDJ of GDA-2 also resembles the *P. boisei* sample in its lack of expression of the protostylid, a feature that occurs on the buccal face of the EDJ and which is often present in *P. robustus* molars.

The Practice of Forensic Anthropology in Southwestern Ontario.
Spence, Michael W. University of Western Ontario.
Forensics Talks. 10:45-11:00, Thursday, 29th Oct.

Until the mid-1980s some of the duties now associated with forensic anthropology were handled (rather haphazardly) in southwestern Ontario by a few archaeologists, medical researchers and doctors. Those duties, however, did not include field recoveries and autopsies of the recently deceased, which were done by police and pathologists. Eventually police and coroners became more aware of the special skills of physical anthropologists and began calling on them regularly for assistance in the field investigation and identification of found bone. These calls have expanded to include the full range of forensic anthropological duties, and have also involved investigations that might more specifically be described as forensic archaeology. Through the last two decades this process had become increasingly formalized and centralized.

Size Effects on Musculoskeletal Stress Markers (MSM).
Steinmetz, Susanne. Department of Anthropology, University of Victoria.
Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

Muscle scar patterns are frequently used to infer activities of archaeological populations. Musculoskeletal Stress Markers (MSM) are commonly employed to determine if sexual division of labour existed within a population. However, Weiss (2007) has shown that size can play a role in the expression of MSM. Size is an important factor to consider when evaluating MSM data. This study examines the confounding effects of size in a sample of Medieval Period Danish skeletons. Humeral and femoral measurements were used to obtain proxies for body sizes. Spearman's correlations were employed to evaluated both upper and lower limbs independently of one another for both males and females (total n=48). The results have demonstrated a correlation between size and the degree of MSM scarring: For this sexually dimorphic population, increased body size results in increased expression of MSM. When considering MSM activity patterns from a sexually dimorphic population, it is necessary to account for the effects of size within the sample that may have confounding effects upon MSM data. Neglecting to account for size when evaluating MSM can lead to misinterpretations regarding male and female activity patterns.

The Professional Education of Forensic Anthropology Students.
Stratton, Sabine. Kwantlen Polytechnic University.
Forensics Talks. 11:00-11:15, Thursday, 29th Oct.

The major concern of any student entering university is whether or not they will obtain employment upon completion of their degree. There are no courses that teach a student how to make the transition from being a student to a professional in the forensic field. As part of graduate training, students may be taught professional skills but there are other factors a newcomer needs to learn that are not intuitive or part of academic training. The hypothesis examined in this presentation is that there are other types of education that are required for a person to become a successful professional forensic anthropologist. For example, nowadays a student with field experience has greater marketability compared to one presenting only a theoretical degree. But, how does one go about obtaining that experience? Another factor required of a professional forensic anthropologist, by necessity, is the ability to work in a multidisciplinary field with others who may not share the same goals you do, or have the intention to use procedures that would be of most benefit to the goals of forensic anthropological analysis. It is the contention of this author that one must examine one's educational goals, networking capabilities, and personal ethics in order to succeed in the forensic anthropology field; not only in Canada, but also internationally.

Craniofacial Growth and Development in the Roebuck Sample.
Symchych, Natalie. Department of Anthropology, University of Manitoba.
Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

The growth and development of the craniofacial bones in the Roebuck sample were investigated to determine the overall health of the population. The Roebuck site (BeFv-4) is a precontact (A.D. 1390 +/- 100) palisaded village site in Augusta Township, Grenville County, Ontario. The Roebuck collection represents the largest studied sample of St. Lawrence Iroquois skeletal material. Excavated by W.J. Wintemberg in 1912 and 1915, the remains were curated at the Canadian Museum of Civilization (CMC) until 1998, at which time they were repatriated to the Akwesasne Mohawk for reburial. Osteologists at the CMC collected osteological data on all 87 individuals prior to repatriation; the present study focuses on the 29 subadult individuals with available cranial measurements. Seventy-eight standard cranial measurements were analysed. The results of the analysis with respect to growth and the health of this population are presented and discussed in comparison to other archaeological populations.

Vigilance and group size in ursine colobus monkeys (*Colobus vellerosus*): disentangling the effects of predation risk and food competition.
Teichroeb, Julie A. and Pascale Sicotte. Department of Anthropology, University of Calgary.
Primate Behaviour & Ecology Talks. 15:15-15:30, Thursday, 29th Oct.

Two frequently cited benefits of group living are decreased predation risk and shared vigilance. Individual scanning rates (i.e. vigilance) often decrease with increasing group size; though this effect may actually be due to more food competition and faster/more feeding in larger groups rather than decreased predation risk. These two influences on vigilance have proven difficult to isolate. We analyzed vigilance in four differently-sized groups of ursine colobus monkeys (*Colobus vellerosus*) at the Boabeng-Fiema Monkey Sanctuary, Ghana during 13-months. Scanning rates were collected using focal-animal sampling (217.5 hours). Feeding and resting observations were separated to determine if a group size effect was discernable in these two contexts. We used linear mixed-models and tested other potential effects on vigilance, including age-sex class, number of adult/subadult neighbours within five meters, height in the canopy, and home range location (overlap versus non-overlap with other groups), while controlling for the presence of other groups, extra-group males, and/or new immigrant males. No group size effect on vigilance was found during either feeding or resting, though a slight decrease in larger groups when feeding is likely due to food competition. Height showed the greatest effect on vigilance, with individuals scanning more when lower in the canopy. Vigilance also increased when individuals had fewer near neighbours during feeding and resting. Thus, near neighbours were more important in reducing vigilance than larger group size. Percieved predation risk for ursine colobus likely depends on the number of close associates, calling into question the biological relevance of definitions of group size.

An Early Byzantine Osteotheke from Athens.
Toth, Ferenc. University of Alberta.
Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

This poster presents the findings of an analysis of a deposit of human skeletal remains from the Athenian Agora dated to the Early Byzantine period (7th century AD). The Agora was the marketplace as well as the centre of cultural, social, and political life of the ancient Greek city (polis). By the beginning of the Byzantine period the Agora was no longer the heart of the city and was now populated by residential houses. The skeletal material for the study was excavated from a back room of a large house in the southern part of the Agora. The study sought to gain insight into the lives and mortuary treatment of the individuals through skeletal analysis. The analysis of the commingled remains indicated that a minimum of 26 individuals were interred in the *osteotheke* (ossuary). Various pathological conditions were seen in numerous individuals, including infectious disease, trauma, dental disease, and congenital abnormalities. The bone count revealed an interesting side difference which raised questions about secondary burial practices.

Sexual dimorphism of metacarpal lengths in catarrhine primates

Tripp,L.[1], Schillaci, M. A.[1], Patel,B. A.[2] and D. Marchi[3]. [1]Department of Anthropology, University of Toronto, Scarborough; [2]Department of Anatomical Sciences, Stony Brook University; [3]Department of Evolutionary Anthropology, Duke University.

Combined Topics Posters. 13:00-16:00, Thursday 29th Oct. and 13:00-16:00, Friday 30th Oct.

Over the last 30 years, adult sexual dimorphism in anthropoids and explanations for variation in the levels of sexual dimorphism across primate taxa have been extensively studied. Lacking in these dimorphism studies, however, are details of whether or not long bones also display various levels of dimorphism. In particular no study has examined the pattern of sexual dimorphism in metacarpal lengths in nonhuman primates. Here, we assess the levels of metacarpal length dimorphism across various mating systems and examine the relationship between metacarpal length dimorphism and other anatomical measures. We predicted that sexual dimorphism in metacarpal lengths would reflect patterns in sexual dimorphism observed in body mass and canine lengths, which covary with intermale competition. Comparisons of sexual dimorphism levels for thirteen catarrhine species (including humans) using the maximum lengths of metacarpals II-V, body mass and canine length were conducted using correlation analyses. The most dimorphic species: *M. sphinx*, *P. anubis*, and *G. gorilla* exhibited average metacarpal length dimorphism levels greater than 20%. *C. guereza*, *T. cristata* and *P. troglodytes* displayed the lowest scores with averages of 5.5-7.5%. Metacarpal length dimorphism was found to be lower than that of canine length and body weight dimorphism, suggesting metacarpal length is likely not a trait associated with sexual selection. Patterns of metacarpal length dimorphism, however, were strongly correlated with body mass dimorphism ($r=0.581$, $p<0.05$) and even more similar to patterns of canine length dimorphism ($r=0.683$, $p<0.05$).

If I Only Had A Brain: Variability of Brain Treatment in Egyptian Mummification.

Wade, Andrew D. University of Western Ontario.

Bioarchaeology Issues and Regional Studies Talks. 15:00-15:30, Friday, 30th Oct.

Perhaps the most sensational and best-known feature of Egyptian mummification, the removal of the brain, was commonly practiced from the New Kingdom onward. Indeed, many Egyptian mummies do exhibit signs of brain removal (excerebration), most frequently with indications that the procedure was performed transnasally. Variability both within and between excerebration techniques, however, is poorly appreciated in the literature. Gray's (1972) large-scale radiological survey of mummies housed throughout the UK very clearly demonstrated the presence of variations in mummification technique over time and across social strata. Reporting of excerebration indications, however, is often inconsistent, greatly simplified, or simply absent in the descriptions of mummified remains, making detailed comparative studies difficult if not impossible. In order to demonstrate both the limitations of the literature and some of the variability in mummy excerebration this study makes use of two samples: (1) a large sample of 125 mummies adequately described in the literature, and (2) a small sample of 6 mummies examined radiologically at the University of Western Ontario. Three primary treatments of the brain in mummification, transnasal craniotomy, transforaminal craniotomy, and the absence of excerebration are discussed in relation to their treatment in the literature and their radiological indications, technical considerations, and variations over time and social strata.

Thoracic Vertebral Morphology and its Potential for Determining the Biological Profile and Positive Identification of Human Remains.

Watamaniuk, Lelia and Tracy Rogers. University of Toronto at Mississauga.

Forensics Talks. 11:30-11:45, Thursday, 29th Oct.

The ability of investigators to describe systematic methods of identifying human remains and provide statistically supportable results in court has been made clear by both the Daubert (USA) and Mohan (Canada) rulings. Currently, only the comparison of cranial sutures is recognized to conform to Daubert/Mohan standards, however, research, such as that described below, continues to provide potential methods for investigators. As previously presented (CAPA 2004,

London, ON), thoracic vertebral morphology was shown to vary sufficiently to positively identify healthy adult male individuals in the sample studied. Using chest radiographs, several morphological variants of the sides of thoracic vertebral bodies were identified and the frequency of their occurrence in the test sample was calculated and statistically determined to be stable. Variants were then tested to determine which occurred independently of each other. Chest x-rays of unknown individuals were compared to a known sample population to identify unknown individuals and the frequencies of independently occurring traits were multiplied together to quantify the strength of the identification, either positive or presumptive (21 of 24 individuals were positively identified). The current presentation will present the results of the same protocol on a female sample as well as the comparison of male versus female data and the implications for sex determination. Given the necessity of reliable positive identification techniques and an accurate biological profile in the identification process as well as the post mortem survivability of vertebrae in several environments, a vertebral method for both sex determination and positive identification is well worth pursuing.

A review of fire related deaths in the Edmonton Area.
Waterhouse, K. University of Alberta.
Forensic Talks, 10:00-10:15, Thursday, Oct. 29th

Fire related deaths and burnt human remains represent a significant part of forensic anthropological investigation. As a result, there has been a developing interest in fire-related research; however, for this research to be valuable to criminal death investigations, it must be compared to real death circumstances and also include efforts to identify areas of investigative uncertainty. To ensure this relevance, an understanding of the circumstances associated with fire related deaths - and how these correlate with victim data - is required prior to conducting any meaningful field-based research. The research reported on here provides an overview and analysis of fire deaths occurring in the Edmonton, Alberta area over a ten year period. Results of the analysis of 135 fire incidents representing 162 victims has determined that the majority of fire victims died from residential (65%)or vehicle fires (25%) and that the victim and burn profile is dependent upon fire type. Children and the elderly demonstrated a high risk of dying in residential fires but are less frequently involved in vehicle fires. Victims of residential fires typically died from smoke inhalation, whereas highway fire victims died from blunt force trauma. The degree of burning of the remains was markedly more severe in vehicle fires than residential fires. Finally, residential fires showed a distinct seasonal pattern, not observed in vehicle fires.

Analysis of endogenous cortisol in archaeological human hair: a new approach to assessing individual systemic stress.
Webb, Emily[1], Thomson, Steven[2], Nelson, Andrew [1], White, Christine[1], Rieder, Michael [2,3,4,5,6], Koren, Gideon [2,3,4] and Stan Van Uum[3,5]. [1]Dept. of Anthropology; [2]Dept. of Physiology and Pharmacology; [3]Dept. of Medicine; [4]Dept. of Paediatrics; [5]Lawson Health Research Institute; [6]Robarts Research Institute. All at the University of Western Ontario.
Bioarchaeology Methods Talks. 14:00-14:15, Thursday, 29th Oct.

Stress is a multicausal perturbation of an individual's physical or psychological state that is expressed physiologically. In past societies, patterns of stress are evaluated using an array of skeletal indicators that record disruptions of homeostasis during childhood and adulthood, most of which cannot be attributed to specific causes. Just as stress can be assessed in modern clinical research by analyzing systemic cortisol levels in hair, which fluctuate in response to real and perceived stress, so should it also be possible to reconstruct stress levels in ancient people by analyzing cortisol levels in archaeological hair. In this pilot study, we selected hair samples of varying lengths from ten individuals from five different archaeological sites in Peru, and analyzed cortisol levels in hair segments to investigate possible changes in stress levels in the months/years preceding death. The results demonstrate that biogenic patterns of cortisol production are well preserved, and that individual experiences of stress can be reconstructed for the period of time preceding death represented by each hair sample. Analysis of cortisol levels in hair is, therefore, a potentially valuable method for indicating homeostatic disruptions occurring in the months/years prior to death. It will augment traditional pathological, histological and biochemical methods of reconstructing health and well-being, and may help to refine etiological interpretations of ancient morbidity and mortality.

Isotopic Evidence for Western Basin Childhood Diet in Southwestern Ontario: Implications for Subsistence Economy.
White, Christine[1], Watts, Christopher[2] and Fred Longstaffe[3]. [1]Department of Anthropology, The University of Western Ontario; [2]Department of World Cultures, Royal Ontario Museum; [3]Department of Earth Sciences, The University of Western Ontario.
Bioarchaeology Issues and Regional Studies Talks. 15:15-15:30, Friday 30th Oct.

In this study we reconstruct diet using the stable isotope compositions of human enamel carbonate (δ13C) and dentine collagen (δ13C, δ15N) in first and second molars from ten individuals associated with the Krieger site (AcHm-1), a late thirteenth century Western Basin Tradition occupation in southwestern Ontario. Archaeological evidence indicates that Western Basin groups in this region had a diffuse economy and settlement pattern geared toward the occupation of short-term campsites, unlike their Iroquoian contemporaries who were sedentary horticulturalists. Our research suggests, however, that the Krieger population was consuming as much maize as their Iroquoian counterparts, a finding which implies an equivalent level of horticultural intensity and the necessity for storage and year-round consumption. A hunter/fisher/gatherer component to the diet is nonetheless indicated by consumption of high trophic level fish that might have come from riverine or littoral contexts. Furthermore, there is no evidence of a weaning transition in the dental tissues, which points to the introduction of solid foods at a very young age. This infant feeding behaviour implicates women in the role of maize production and may also have had demographic consequences. The ability of Western Basin people to accommodate horticulture without major changes to other aspects of the subsistence-settlement regime suggests the need for revising current notions of food production and their relationship to social organization and landscape use in the lower Great Lakes region.

Male dispersal patterns in ursine colobus (*Colobus vellerosus*) in Ghana.
Wikberg, Eva C., Teichroeb, Julie A. and Pascale Sicotte. Department of Anthropology, University of Calgary.
Primate Behaviour & Ecology Talks. 15:30-15:45, Thursday, 29th Oct.

Most mammals show male dispersal, but its function is seldom investigated in long-lived species due to the difficulty of collecting longitudinal demographic data. This study investigates two main hypotheses regarding the function of male dispersal in *Colobus vellerosus*: the inbreeding avoidance and the mating competition hypotheses. Demographic and behavioural data were collected between 2000 and 2009 from seven groups at Boabeng-Fiema Monkey Sanctuary, Ghana. During this time, we recorded 51 males immigrating, 28 males emigrating and 37 males disappearing. Natal males always emigrated voluntarily, and most of them left their natal group before reaching adulthood (14/16 males). Since females may breed in their natal group, it is likely that natal males disperse to avoid mating with close kin. In contrast, secondary dispersal often occurred after increased male-male aggression. These males dispersed from groups that most likely contained unrelated adult females. Therefore, secondary male dispersal cannot be explained by inbreeding avoidance. In cases of natal and secondary dispersal where we know the fate of the dispersing male, the majority of males transferred to groups with a more beneficial male to female ratio (n=15, Wilcoxon Signed Ranks Test, W=10, p=0.004). All males gained higher dominance rank within three months of immigration (n = 7, Wilcoxon Signed Ranks Test, W= 0, p = 0.011). We conclude that our data support the inbreeding avoidance hypothesis when investigating natal dispersal, while secondary dispersal occurs due to mating competition. However, both types of dispersal increase access to adult females.

A possible genetic contribution to linear growth faltering among Makushi children in Guyana.
Wilson,W.M. and E. Barr. Department of Archaeology, University of Calgary.
Human Biology and Ecology Talks. 11:30-11:45, Friday 30th Oct.

Because well-nourished children of diverse ethnic backgrounds around the world follow similar growth curves, the WHO holds that one set of growth standards is appropriate for use among all ethnic groups. The purpose of this study is to assess the etiology of variation in height-for-age among 525 children less than 11 years of age, living in similar environments in seven neighbouring villages in central Guyana, who have either Makushi Amerindian or mixed ancestry.

Consistent with the WHO and the majority of the literature on growth in childhood, we hypothesized that there would be no difference in the height-for-age of children of Makushi and mixed ancestry. To evaluate this hypothesis, we used several statistical models to explore the possible relationship between the independent variables (ancestry, village of residence, wage labour, birth order, and family size) and the dependent variable (height for age). The analysis presented here fails to support the hypothesis; children of Makushi ancestry had mean height-for-age z-scores (HAZ) which were significantly lower than those of children of mixed descent ($t=3.014$, $p<0.05$) and children of Makushi ancestry were significantly more likely to have a HAZ<-2 than those of mixed ancestry ($c2= 5.811$, $p= 0.008$). Moreover, a binary, step-wise, backwards logistic regression model reveals that, of all of the independent variables considered here, ancestry is the variable that best explains the observed variation in HAZ. These data suggest a genetic difference in growth potential between these two groups and that international growth standards may not apply to the Makushi Amerindians of Guyana.

Human Bioarchaeology in China.

Yang, Dongya[1], Zhang, Hua[1] and Di Wang[1,2]. [1]Department of Archaeology, Simon Fraser University, Canada;[2]Department of Archaeology, Shandong University, China.

Bioarchaeology Posters. 09:00-12:00, Thursday, 29th Oct. and 09:00-12:00, Friday, 30th Oct.

This poster reviews the progress, problems and prospects of bioarchaeological research on human skeletal remains in China. Most Chinese bioarchaeological studies prior to the 1990s focused on population affinities, aiming to reconstruct population migrations and movements. Since 2000, new research approaches such as isotopic and ancient DNA analyses have been used to study human remains; new questions related to disease, health and adaptation of past populations have become important research topics. These trends are illustrated through analyses of recent peer-reviewed publications in both Chinese and English journals. The new challenges now facing Chinese bioarchaeology are: 1) integrating bioarchaeology and other lines of evidence to more effectively address archaeological questions; 2) consolidating Chinese standards and protocols for skeletal examinations with those from other countries and regions; 3) curating the vast number of human remains unearthed yearly across China. Through new international and interdisciplinary collaborations, and with additional forthcoming government funding, many of these difficulties can be gradually overcome in the future.

Toy or Healing Amulet: Reinterpretation of a Sadlermiut 'Doll' Found in a Burial Context.

Young, Janet and Karen Ryan. Canadian Museum of Civilization.

Bioarchaeology Issues and Regional Studies Talks. 15:30-15:45, Friday 30th Oct.

Unusual perforations were identified in a human figurine found in a Sadlermiut grave. These perforations parallel pathological changes in the associated female skeleton. The similarities noted between the 'doll' and the human remains suggest the modified figure was no longer a toy but some type of healing or health related amulet. This interpretation moves beyond the entrenched belief of the Inuit 'doll' as a simple plaything to explore its role in health and disease and, in so doing, introduces a venue to better understand the impact of pathology on the individual.

Origin of a suspected 'trophy skull' with dried soft tissue: multidisciplinary input.

Zhang Hua, Grace[1], Edinborough, Kevin[1], Fonseca, Stephen[2], Goldberg, Paul [3], Mathewes, Rolf [1], Northey, Dale[1], Robertson, Heather [4], Skinner, Mark [1], Speller, Camilla[1] and Dongya Yang[1]. [1]Simon Fraser University; [2]BC Coroners Service; [3]Boston University; [4]Centre for Hip Health and Mobility.

Combined Topics Posters. 13:00-16:00, Thursday, 29th Oct. and 13:00-16:00, Friday, 30th Oct.

Dry old skulls are notoriously difficult to find how old they actually are. In a forensic setting such skulls may be of heritage concern, recent origin or fall into that grey zone of uncertain forensic importance dating back two or more generations. We examine the costs and benefits of trying to determine the origin, antiquity and social/scientific significance of a skull (09-7) bearing dried soft tissue, hair and skin fragments seized many years ago by Canada Post

which mouldered in a police station for many years devoid of documentation other than it was thought to be "Mongolian". Researchers at the Centre for Forensic Research and allied laboratories volunteered their time and expertise in the following ways: documentation of the cranium and mandible through professional photography, C-arm scanning, pQCT 3000 scanning, AMS radiocarbon dating, sediment analysis, pollen and botanical analysis, aDNA of the bone and skin, anthropological analysis. We report our opinion of the origin and age of the case based on these multiple lines of evidence. The costs of analysis to resolve cases such as this exceed available resources external to or within the Centre; the benefits include case resolution for the BC Coroners Service, the promotion of research team awareness and ethically accessible images of scientific aspects of forensic anthropological casework.