35th Annual Meeting
Canadian Association for Physical Anthropology
November 14-17, 2007
Banff, Alberta

Welcome from the Organizing Committee

Dear Colleagues:
On behalf of the conference committee, we would like to welcome you to the 35th annual meeting of the Canadian Association for Physical Anthropology. We hope you enjoy the setting and have an opportunity to explore Banff and to make use of the wonderful facilities of the Banff Centre. Most of all, we hope that the meetings will provide an atmosphere conducive to learning and exchanging ideas.
Welcome.

Warren Wilson Anne Katzenberg

We gratefully acknowledge our sponsors:

University Research Grants Committee
Faculty of Medicine
Faculty of Social Sciences
Department of Anthropology
Primatology Visiting Speakers Fund
Department of Archaeology
University of Calgary Bookstore

Pearson Education Canada

Oxford University Press, Canada

PROGRAM AT A GLANCE

Please note that all sessions will be held in the Max Bell Building, Room 252. Posters will be on display throughout the conference in Room 253.

WEDNESDAY, NOVEMBER 14, 2007

19:00 – 21:00	Registration
	Reception Max Bell Building

THURSDAY, NOVEMBER 15, 2007

07:00 – 08:30	Breakfast (Vista Dining Room, Sally Borden Building)
08:30	Opening Remarks and Welcome
08:40 – 10:45	Session 1: Ethics Symposium
11:00 – 12:00	Session 2: Bioarchaeology
12:00 – 13:30	Lunch (Vista Dining Room, Sally Borden Building)
13:30 – 14:45	Session 3: Human Biology
14:45 – 15:15	Break ***Sponsored by Pearson Education Canada***
15:15 – 17:00	Session 4: Epidemiology and Health
17:30 – 19:30	Dinner (Vistas Dining Room, Sally Borden Building)

FRIDAY, NOVEMBER 16, 2007

07:00 – 08:30	Breakfast (Vista Dining Room, Sally Borden Building)
08:30 – 10:00	Session 5: Anatomy and Functional Morphology
10:00 – 10:30	Break
10:30 – 11:00	Session 6: Bioarchaeology and Cultural Identity
11:00 – 12:00	Session 7: Primate Population Ecology
12:00 – 13:30	Lunch (Vista Dining Room, Sally Borden Building)
13:30 – 14:30	Session 8: Primate Dietary Adaptations
14:30 – 16:30	Session 9: Primate Behavior
16:30 – 17:30	Business Meeting (Donald Cameron Hall, Private Function Room 3)
18:00 – 19:30	Reception (Donald Cameron Hall, Private Function Room 3)
	Sponsored by the University of Calgary Primatology Speakers Fund
19:30	Banquet (Donald Cameron Hall, Private Function Room 3)
	Speaker: Dr. Benedikt Hallgrimsson
	"Postgenomic Biological Anthropology and the Study of Variation"

SATURDAY, NOVEMBER 17, 2007

07:00 – 08:30	Breakfast (Vista Dining Room, Sally Borden Building)
09:00 – 10:00	Session 10: Forensic Anthropology
10:00 – 10:30	Break
10:30 – 12:00	Session 11: Forensic Anthropology Symposium
12:00	Closing comments
12:15	Lunch (Vista Dining Room, Sally Borden Building)

CAPA / ACAP 2007 Schedule of Papers and Posters

Thursday, November 15
Max Bell Building, Room 252

08:30-08:40 **Opening Remarks / Welcome to the conference**
Dr. Warren Wilson

Session 1: Symposium on Ethics
Chair: Tracey Galloway

08:40-08:45 Introduction to Symposium on Ethics: Tracey Galloway
08:45-09:00 Jocelyn Williams: Ethical issues surrounding the application of stable isotope analysis to archaeological questions
09:00-09:15 Jerome Cybulski: Bioarchaeology, Ethics, Cooperation, Collaboration
09:15-09:30 Sylvia Abonyi and Marion Maar: Lost in Translation? Interpreting Health Systems and Human Bodies in the Ethical Space between Indigenous and Western Systems of Knowledge
09:30-09:45 John Albanese: Ethical and Research Implications of a Typological Approach to Investigating Human Skeletal Variation
09:45-10:00 Linda Marie Fedigan: Ethical Issues Facing Field Primatologists

10:00-10:15 Coffee Break/ Posters (Max Bell Building, Room 253) ***Sponsored by Pearson Education Canada***

Posters

1a Andrea Bombak and Michele Buzon: Dental Pathology of New Kingdom Nubia
1b Nancy Lovell: Multiple fractures in an adult male from Mesheikh, Upper Egypt (ca. 2100-1900 BC)
1c Andrew Nelson, Xavier Demondion, Laurel Clegg, John Rogers, Lorne Parnes, Steve Kruithof, Christian Cardell Corbett and Carney Matheson: Avion #1: The Osteobiography of a World War I Soldier
1d Mindy Pitre: Human remains from the 2007 field season at Nag el Qarmila, Aswan, Egypt
1e Janis McEwan, Diana Rossi and Simon Mays: DXA, histomorphometry and differential diagnosis in a skeleton from medieval England

10:15-10:30 Tracey Galloway and Tina Moffat: Ethical Issues for Human Biologists Conducting School-based Research with Children
10:30-10:45 Tracy Rogers: The Ethics of Objective Forensic Science
10:45-11:00 Discussion

Session 2 Bioarchaeology:
Chair: Tamara Varney

11:00-11:15 Lisa Rudolph: A Paleopathological Examination of the Forest Centre Cemetery Individuals, Prince Albert, Saskatchewan

11:15-11:30 Jennifer McKenzie, Alyson Jaagumagi and Mirjana Roksandic: A Burial Reconstruction from the Mesolithic-Neolithic Transition in the Muge Valley, Portugal

11:30-11:45 Crystal Forrest: Histological Examination of Teeth from Perinatal Infants from the Draper Site (AlGt-2): Preliminary Investigations

11:45-12:00 Hope Kron: Spatial analysis of morphogenetic traits in the Kellis 2 Cemetery, Dakhleh Oasis, Egypt

12:00-1:30 Lunch (Sally Borden Building, Vista Dining Room)

Session 3: Human Biology
Chair: Sylvia Abonyi

1:30-1:45 Daniel Sellen: The evolution of human complementary feeding

1:45-2:00 Patricia Palmer and Warren Wilson: A Biocultural Approach to Understanding Growth Variation and Diet in Makushi Amerindian Children

2:00–2:15 Linda Larcombe, Pamela H. Orr, and Peter W. Nickerson: Differential functional gene polymorphisms in Manitoba's First Nations populations – another reason why the Pan-Aboriginal approach doesn't work.

2:15-2:30 Mana Dembo, Alan Cross and Mark Collard: Ecogeographic variation in modern human limb proportions: a reassessment

2:30-2:45 Tamara Varney and Stacie Burke: Evaluating Health in the British Caribbean: Antigua, 1863-1872.

2:45-3:15 Discussion and Nutrition Break/ Posters (Max Bell Building, Room 253)

Posters

3a Karen Bernofsky: The Effects of Environment on Respiratory Health in Early Medieval Northeast England

3b Tina Moffat, Daniel Sellen and Warren Wilson: Anthropological Investigation of Vitamin D Deficiency among New Canadian Mothers and Children: An Emerging Issue

3c Shawn Phillips: Epidemiologic transition in a Caribbean population: A study of disease ecology and modernization

3d Catherine Merritt: SNP genotyping using Luminex technology and its application for anthropology

3e Masako Fujita: An Evolutionary Perspective on Mother-Offspring Vitamin A Transfer: Preliminary Analyses

Session 4: Epidemiology and Health
Chair: Ann Herring

3:15-3:30 Megan J. Highet: Rushing to the Grave: Typhoid During the Klondike Gold Rush (1898-1904)

3:30-3:45 Lisa Sattenspiel and Tamela Smith: Interactions between a 1916-17 measles epidemic and the 1918-19 influenza epidemic on Newfoundland

3:45-4:00 Stacie Burke, Annmarie Adams and David Theodore: Relocating Healthcare in the Urban Environment: Toronto in the Interwar Period

4:00-4:15 J. Christopher Dudar and Martin C. Solano: Osteological evidence of medical care, or lack thereof, in 19th Century Upper Canada and Upstate New York
4:15-4:30 Megan Gardiner: The Discovery and Documentation of a Rare Dental Anomaly in an Archaic Upper Ottawa Valley site: A Case of Dens Evaginatus
4:30-4:45 Sarah Swayze and Mark Skinner *Sus scrofa* as an animal model for LHPC
4:45-5:00 Discussion

Dinner/ Fun

Friday, November 16
Max Bell Building, Room 252

Session 5: Anatomy and Functional Morphology
Chair: Benedikt Hallgrimsson

8:30-8:45 Julia Boughner, Steve Wat and Benedikt Hallgrimsson: The developmental mechanisms of craniofacial variation in primates: a morphometric case study of the "short-faced" Crf4 mouse mutant
8:45-9:00 Matt Tocheri: From hominoids to hominids to hobbits: Wrist morphology speaks volumes about our evolutionary history
9:00-9:15 Richard Lazenby, Matthew Skinner and Jean-Jackues Hublin: A Micro-CT Study of Variation in Trabecular Microarchitecture in the Metacarpus of the West African Chimpanzee (Pan troglodytes verus).
9:15-9:30 David Cooper, Richard A. Lazenby, Roberto Macchiarelli and Luca Bondioli: Directional Asymmetry in Metacarpals I – V Assessed by pQCT
9:30-9:45 Michael Schillaci and Erik Meijaard: The Effect of Island Area on Body Size in a Single Primate Species
9:45-10:00 H.K. Kurki, J.K. Ginter, J.T. Stock, S. Pfeiffer: Estimating adult body mass and stature in a morphologically unique Later Stone Age sample from southern Africa.

10:00-10:30 Discussion and coffee break/ Posters (Max Bell Building, Room 253)

Posters

5a J. Blumenfeld and S.R. Leigh: Patterns of variation in the ontogeny of supraorbital form in species of Homo and Pan
5b Morgan Campbell: Biomechanical Modification of the Øm Kloster site, Denmark: Results and Interpretations
5c A. Wade, A. Nelson, G. Garvin, D. Holdsworth: Assessment of Human Trabecular Architecture in the Pubis by Three Radiographic Modalities
5d Korpal Yannick: Sphenoid Bone in the Basicranial Shape
5e Kristinn McCulloch, Richard Lazenby, and Niels Lynnerup: Semi-automated analysis of femoral histological variation in a contemporary sample.

Session 6: Bioarchaeology and Cultural Identity
Chair: Anne Katzenberg

10:30-10:45 Christine White, Jay P. Maxwell, David Pendergast and Fred J. Longstaffe: An Exploration of Personhood and Sentiment in an Ancient Maya Burial and its Sociopolitical Implications

10:45-11:00 Michael Schillaci: Evolutionary process and the fabric of cultural identity: An example from the American Southwest

Session 7: Primate population ecology
Chair: Mary Pavelka

11:00-11:15 Bright Kankam and Pascale Sicotte: The population of *Colobus vellerosus* at Boabeng Fiema Monkey Sanctuary, Ghana is increasing

11:15-11:30 Greg Bridgett: Factors influencing the ranging patterns of Central American black howler monkeys (*Aloutta pigra*)

11:30-11:45 Katharine M. Jack and Linda M. Fedigan: Long-term population trends in howler (*Alouatta palliata*) and capuchin (*Cebus capucinus*) monkeys in a regenerating Costa Rican dry forest

11:45-12:00 Fernando Campos: Coping with dry heat: behavioral thermoregulation in wild capuchin monkeys.

12:00-1:30 Lunch (Sally Borden Building, Vistas Dining Room)

Session 8: Primate Dietary Adaptations
Chair: Linda Fedigan

1:30-1:45 Jennifer Prew: A Comparison of the Influence of Habitat on Social Spacing and Niche Exploitation Observed among Three Groups of Verreaux's sifakas (P. v. verreauxi) at Berenty Reserve, Madagascar

1:45-2:00 Lisa Gould: Dining amongst the thorns: Lack of sex differences in the feeding behavior of Lemur catta residing in spiny desert habitat, southern Madagascar

2:00-2:15 Alison Behie: How the quality of the food supply affects population recovery in black howlers following a major hurricane

2:15-2:30 Sarah Carnegie: Geophagy in white-faced capuchins (*Cebus capucinus*) in Santa Rosa National Park, Costa Rica

Session 9: Primate Behavior
Chair: Steig Johnson

2:30-2:45 Peter Henzi, Louise Barrett, Parry Clarke and Drew Rendall: Reproductive skew and concession in chacma baboons

2:45-3:15 Break

3:15-3:30 Eva Wikberg: Group fission in ursine colobus (*Colobus vellerosus*)

3:30-3:45 Julie Teichroeb: Social Correlates of Testosterone in *Colobus vellerosus* at Boabeng-Fiema: A Test of the 'Challenge Hypothesis'

3:45-4:00 Hugh Notman: Lost in Transmission: Contextual Variation in Chimpanzee Pant Hoots and its Implications for Referential Communication

4:00-4:15 Ian Colquhoun: Along the Way from Entebbe to Edinburgh: An Unofficial History of the International Primatological Society Ad-hoc Committee on Community Assistance and Conservation (2006 -- Present)

4:15-4:30 Discussion

4:30-5:30 Business Meeting (*Donald Cameron Hall, Private Function Rooms 3, 4 and 5)*

6:00 Reception (*Donald Cameron Hall, Private Function Rooms 3, 4 and 5)*
Sponsored by the University of Calgary Primatology Speakers Fund

7:30 ***Banquet (Donald Cameron Hall, Private Function Rooms 3, 4 and 5)***
Speaker: Dr. Benedikt Hallgrimsson,
Faculty of Medicine and Biological Anthropology Graduate Programme, University of Calgary
"Postgenomic Biological Anthropology and the Study of Variation"

Saturday, November 17
Max Bell Building, Room 252

Session 10: Forensic Anthropology
Chair: Richard Lazenby

9:00-9:15 Yasmin Carter: Lost Heads: The Inception of the Maori Mummy Project (MMP)

9:15-9:30 Leigh Doyle: Examining the effect of maceration on lamellar tissue in *Sus scrofa*

9:30-9:45 Corinne Marceau: Bone Weathering and Time-Since-Death in a Cold Climate

9:45-10:00 Tanya R. Peckmann, Mary H. Manheim, Ginesse L. Listi and Michel Fournier: 3-D Facial Reconstruction: Using ultrasound technology to aid in positive identification of missing peoples of Canadian Indigenous ancestry

10:00-10:30 Discussion and Break/ Posters (Max Bell Building, Room 253)

Posters

10a Stephanie E. Osley and John Albanese: A Test of the Stature Estimation Feature of FORDISC 3.0

10b Alexis Chapeskie: Subadult facial reconstruction

10c Christine Landry and Tricia Fernandes: CSI Halifax in Miami: the importance of creating practical courses in the forensic sciences

Session 11: Symposium on Forensic Anthropology
Chair: Tracy Rogers

10:30-10:45 Amber Gallant: Alternate Light Sources in the Detection of Bone Remains after an Accelerated Fire

10:45-11:00	Meaghan Huculak: Reconstructing sequence of events surrounding body disposition based on colour staining of bone
11:00-11:15	Martyna Wrobel-Janjua: Diagenesis of Weathered Bone: Femur vs. Metatarsal Using Frost's 'Rapid Manual Method
11:15-11:30	Brenda Williams: Evaluating the Impact of Edentulousness on Cranial Sex Determination
11:30-11:45	Tracy Rogers: Sex Determination of the Adolescent Skeleton
11:45-12:00	Stephanie Calce: Evaluation of age estimation technique: Testing traits of the acetabulum to estimate age-at-death in adult males

12 noon Closing comments

12:15 pm *Lunch (Sally Borden Building, Vista Dining Room)*

ABSTRACTS (by first author)

ALBANESE J.

Ethical and Research Implications of a Typological Approach to Investigating Human Skeletal Variation

University of Windsor

The race concept is one of the original founding concepts in Physical Anthropology. With over a century of distance between ourselves and the foundation of the discipline, it is clear that the adoption of this pre-Darwinian and pre-Mendelian concept was due to political and economic reasons and certainly not scientific reasons. Yet, the race concept has persisted into the 21st century under different politically fashionable terminology with no change in the underlying typological assumptions about human variation. Using a reflexive historical review of "race," sex, age, and stature methods, in this paper I will argue that we as researchers have a responsibility to ask two questions. First, why have researchers used and continue to use a racial or typological approach when investigating human variation? And second, what are the alternative approaches for investigating human variation? Answers to these questions indicate that there are two significant problems with the continued use of a racial/typological approach. First, a racial approach, particularly in research that receives a lot of media and student attention (for example, forensic anthropology), reinforces harmful scientific and popular racial stereotypes. Second, racial categories are not coarse but useful categories for studying human variation. Instead, racial approaches have been and continue to be impediments to research on human variation.

ABONYI S[1] and M Maar[2].

Lost in Translation? Interpreting Health Systems and Human Bodies in the Ethical Space between Indigenous and Western Systems of Knowledge

[1] University of Saskatchewan
[2] Laurentian University

Aboriginal communities across Canada are increasingly assuming control of the planning and delivery of health and social services to their constituents. In so doing, they are working within dominant western ideologies and structures around health and well-being to develop their own Indigenous health frameworks, programs, and services. As anthropologists conducting research in this arena, we find ourselves challenged to negotiate a messy and often contentious intersection of systems of knowledge. These include not only the aforementioned western biomedical and Indigenous ideologies of our research partners and stakeholders, but also our own anthropological critical social science views of the world. In this presentation we will draw on some of our recent experiences working with health systems and human bodies that seek to translate western and Aboriginal ideologies into the planning, delivery, and evaluation of services. In particular we will draw on one Indigenous researcher's notion of ethical space as the place in which it may be possible to work across systems of knowledge from an epistemological perspective. We also intend to examine the divide between academic ethical guidelines and Aboriginal value systems as well as how the Canadian Research Councils (SSHRC and CIHR) have responded to this issue. We discuss potential implications for research design, recruitment of participants, language, women's issues and academic freedom.

BEHIE A.

How the quality of the food supply affects population recovery in black howlers following a major hurricane

University of Calgary

This study examines the protein/fiber ratio of the 20 most abundant tree species in the Monkey River forest relative to the biomass of black howlers monkeys both before and 4 years after a major hurricane severely damaged the site. The hurricane resulted in 35% mortality to major howler food trees and an initial loss of 42% in the monkey population. This decline continued for 3 years and then stabilized at 20% of pre-hurricane numbers, and we seek to understand what role the food supply played in the population decline following the storm. Milton (1979) proposed that for folivorous species it not the quantity of food that is important in determining population size, but the availability of high quality foods (mature leaves with high protein/fiber ratios) that is a good predictor of biomass. Several studies have found positive correlations between colobine

biomass and this index of leaf quality. To test the protein/fiber model, we collected mature leaves from the 20 species that made up the greatest basal area in the Monkey River forest. Samples were dried in a food dehydrator and analyzed in duplicate at the University of Florida where the protein content was assessed using Kjeldahl procedures and fiber (ADF) was measured using the methods of van Soest [1963]. It was found that in May 2001 the biomass of the howlers was 800 kg/km2, which corresponded quite well to what would be predicted, based on the existing data used to test Milton's model. However, in May 2005 the protein/fiber ratio of available leaves was higher than in 2001 but the population biomass was only 250 kg/km2. This indicates that the mature leaves available after the hurricane were of high quality, possibly reflecting the successional stage of the area and that the protein/fiber ratio is not limiting population recovery.

BERNOFSKY K. (POSTER)

The Effects of Environment on Respiratory Health in Early Medieval Northeast England

University of Durham

This study explored the relationship between the external environment and respiratory health by comparing the prevalence rates of chronic maxillary sinusitis and inflammatory rib lesions between two populations with similar lifestyles and environments. The adults from two closely located cemetery samples with an agricultural economy dated approximately AD 8thC- 13thC were analyzed (Spofforth and Bishopsmill School). Comparisons were made of those individuals affected by maxillary sinusitis and/or rib periostitis, by age and sex, and any associations between dental disease and sinusitis were also recorded; methods used adhered to those described by Boocock *et al (*1995*)* and Buikstra and Ubelaker (1994). In those individuals with a minimum of one sinus observable and ribs preserved, at Bishopsmill School 24 of 40 sinuses (60%) in 20 of 25 individuals (80%) had evidence of maxillary sinusitis. At Spofforth, 18 of 55 sinuses (32.7%) in 15 of 36 individuals (41.67%) were afflicted. These results are significantly different (χ^2=6.9835, p≤ 0.01); however, nine individuals with sinusitis at Bishopsmill School and one at Spofforth also had evidence of dental disease. When these were removed the difference ceased to be significant (χ^2=2.3978, p≤ 0.20). The prevalence rate for Bishopsmill School is (significantly) the highest recorded for the period, the next highest being Raunds Furnells (50%, χ^2=7.2014, p≤ 0.01). Only one rib fragment with periostitis was found (Spofforth). There were no significant differences between age and sex groups within the populations for either condition. Although previous research has suggested a strong link between the environment and these conditions, these results suggest that the environment is not a predominant cause of maxillary sinusitis in all past populations. More bioarchaeological research needs to be undertaken to determine what factors play significant roles.

BLUMENFELD J. and SR Leigh (POSTER).

Patterns of variation in the ontogeny of supraorbital form in species of Homo and Pan

University of Illinois, Urbana-Champaign

This study examines patterns of variation in the ontogeny of supraorbital form in species of Homo and Pan. Previous studies have offered conflicting results for the presence of a widely shared craniofacial ontogenetic pattern among and between hominins and nonhuman primates. This study investigates this controversy further, and tests for variation in ontogenetic trajectories within a single skeletal element: the frontal bone of the skull. Variation in supraorbital morphology has often been used in studies of human evolution to distinguish between different species and sexes, and this project tests the hypothesis that major differences in frontal bone form may actually be the result of small changes in size that manifest themselves as significant differences in browridge shape during growth. Three-dimensional data from the supraorbital region of the frontal bone was collected from an ontogenetic sample of anatomically modern humans, Neandertals and chimpanzees (Pan troglodytes) through the use of a newly developed photometric method called ShapeCam. These data were then subjected to geometric morphometric methods of analysis (GPA and PCA). Differences in shape correlate with differences in size in all three species, and results indicate a modern human supraorbital ontogenetic trajectory that involves little shape change from birth to approximately 5 years of age, with an accelerated change in shape shortly afterwards. This may indicate the presence of complex allometry in this sample. The Neandertal sample appears to follow a similar trajectory, albeit to a much larger endpoint. These results and their implications will be discussed.

BOMBAK A[1] and M Buzon[2]. (POSTER)

Dental Pathology of New Kingdom Nubia

1 University of Calgary
2 Purdue University

New Kingdom Nubia was characterized by Egyptian colonization, and the beginning of the establishment of the Napata Kingdom that would rule Egypt during the 25th Dynasty. The study of individuals buried at the site of Tombos, located in Upper Nubia at the third cataract of the Nile, allows for an examination of the lifestyles of the middle class Tombos residents during this pivotal time period (ca. 1400-1050 BC). This investigation was undertaken to compare the oral health of the Tombos sample (N=100) with geographically proximate populations to explore what demographic and social factors may have contributed to different rates of disease within populations that shared a homogenous agricultural diet. The frequencies of caries, abscesses, AMTL, and the severity of tooth wear were examined. This contributes to an assessment of the influence on health that the colonization by Egypt had on the middle class of Nubia and the manner in which the dental afflictions examined interacted with and exacerbated one another. The results revealed that compared to other populations examined, Tombos individuals suffered from an intermediate level of oral health. Caries were found at low frequencies in all populations, and abscesses were found at intermediate levels. Tombos males were particularly affected by high levels of tooth wear and AMTL. Given the lower rates of caries and abscesses, it is likely that the high levels of tooth wear contributed to the high rate of AMTL and intermediate rate of abscesses, but may have also reduced the level of caries by eliminating surfaces for food to adhere. The high rates of tooth wear in the sample may be attributed to an abrasive diet of vegetable cellulose and dried fish, the high levels of inorganic particles that characterize Egyptian bread, and windblown sand. The significant difference in AMTL between males and females may be related to a division of labour that precipitated a different diet, interpersonal violence, the use of the teeth as tools, or males being exposed to windblown sand for longer periods.

BOUGHNER J[1], Wat S[2]* and B Hallgrimsson[1]

The developmental mechanisms of craniofacial variation in primates: a morphometric case study of the "short-faced" Crf4 mouse mutant

* equal contribution as JC Boughner
1 University of Calgary
2 University of Alberta

Phenotypic shortening of the basicranium and face is a hallmark of human evolution. Compared to wild-type, the Crf4 mutant mouse was a previously uncharacterized strain with an apparently shorter head. Thus, this mutant was potentially a valuable model for understanding the mechanisms underlying human craniofacial development and evolution. As such, we investigated Crf4 craniofacial developmental morphology. We statistically quantified craniofacial skeletal variation between Crf4 and wild-type mice using 3D landmark data taken from micro-CT scanned Crf4 and wild-type embryos, neonates and adults. Landmark data were analyzed using a combination of Euclidean Distance Matrix Analysis, and Generalized Procrustes and Principal Components Analyses. Samples were age and size corrected. Morphological variation was statistically different between strains, comparable across all three age groups, and highly correlated with the allometric variation related to head size. Crf4 phenotype was characterized by shortened face, basicranium and cranial vault lengths, increased neurocranium height and globularity, and increased face and neurocranium widths. We found evidence of the developmental mechanism of the Crf4 phenotype as early as embryonic stages. During this time, the earlier midline fusion of the Crf4 nasal processes may contribute to the mutant phenotype. However, the cellular mechanism(s) regulating differences in timing of facial prominence outgrowth remains uncertain. Lastly, we present the results of a novel protocol that combines immunohistochemical and morphometric analyses in order to test our hypothesis that strain-specific differences in cell proliferation is a primary cause of the observed variation in murine craniofacial length.

BRIDGETT G.

Factors influencing the ranging patterns of Central American black howler monkeys (Aloutta pigra)

University of Calgary

Central American black howler monkeys (*Alouatta pigra)* are typical energy minimizing folivores that

are inactive for 60 – 80% of the day. However, like some other folivores, they prefer fruit and will consume it in accordance with its availability. For this study, I investigated the variation in different ranging patterns of *A. pigra* in relation to the availability and consumption of fruit and leaves, and the distribution of fruiting trees. Fruit consumption varied over sample periods from 0 to 98% of the diet, with 40% of time spent feeding on fruit over the entire study period. As expected, the degree of frugivory was significantly and positively correlated with fruit availability and fruiting trees were patchily rather than evenly distributed. Three multiple regression equations were run to examine the effects of food availability, diet and fruit tree distribution on three measures of ranging: day journey length, index of wander and home range coverage. The percentage of ripe fruit eaten was the strongest predictor of both day journey length and home range coverage. Day journey length was also positively influenced by an increase in new leaves eaten and negatively influenced by an increase in the clumped distribution of fruit trees. Conversely home range coverage was positively influenced by an increase in the availability of mature leaves. None of the independent variables proved to be significant predictors of the index of wander. Thus, while feeding preferentially upon patchily distributed high quality fruit, *A. pigra* still shows evidence of scramble competition in that they do travel farther and cover more of the home range. However, probably due to small group sizes, when fruiting trees are clumped in distribution they are still able to minimize daily distance traveled.

BURKE S[1], Adams A[2] and D Theodore[2].

Relocating Healthcare in the Urban Environment: Toronto in the Interwar Period

[1] University of Manitoba
[2] McGill University

Models of healthcare delivery in biomedicine changed significantly over the late 19th and early 20th centuries in Canada. Adopting a case-study approach, this paper investigates important changes in the practice of healthcare in the city of Toronto. The Toronto Medical Arts building, a 10-storey office building designed by architect Ferdinand Marani, opened in the summer of 1929. Located at 170 St. George Street, at the intersection of Bloor and St. George streets, the Medical Arts Building was strategically located in Toronto's downtown core. This building marked an important change in the mode of healthcare delivery, moving away from small-scale or independent physician practices, often operated out of their own homes. An even earlier model involved visiting patients in the patients' homes. Of the 926 physicians advertising their practices in Might's Toronto City Directory in 1930, 97 or 10% located their offices in the new Medical Arts Building. Archival research reveals that many of these physicians already knew each other, either by attending medical school at the University of Toronto at the same time, or through involvement in the university's medical service during World War I. By 1934 the number of physicians in the Medical Arts Building had increased to 183, or 19% of the 962 physicians advertising a medical practice in the Directory, indicating an important intensification in the localization of Toronto's physicians. This paper addresses how both technology and architecture would act to influence the culture and experience of healthcare in the city. While the model of the Medical Arts Building revolutionized medical practice, it may have also held certain epidemiological significance since, similar to hospitals, it encouraged the large-scale clustering of patients.

CALCE S.

Evaluation of age estimation technique: Testing traits of the acetabulum to estimate age-at-death in adult males

University of Toronto

The ability to estimate age at death of human remains is an important tool used in medicolegal and bioarchaeological investigations. The purpose of this research is to evaluate the accuracy and precision of an age estimation technique using seven morphological traits of the fused acetabulum. 100 randomly selected male os-coxae from the Grant Collection were used to test this method. The seven variables for examination were: (1) acetabular groove; (2) acetabular rim shape; (3) acetabular rim porosity; (4) apex activity; (5) activity of acetabular fossa; (6) activity of outer edge of acetabular fossa; and (7) porosities of acetabular fossa. Each variable was scored based on a series of states within each observed morphological condition. Estimated age at death was obtained for each specimen using Bayesian inference and a computational application (IDADE2) which required the input of a reference population to test scores against. In order to yield reliable results, the chosen reference population must be close in geographical and temporal context to account for variability in the aging process of the skeleton. In a forensic context, where ancestry of an individual may not be known, this condition proves problematic since the appropriate reference collection may not be

chosen or available to test. The age range of specimens used in the Grant Collection was 17-89. The reported inaccuracy in using this method is 8 years in difference between the estimated and known age. The bias indicates that on average, this technique consistently underestimates the age of the individual. For age classes 17-49, the bias shows that this technique overestimates age at death; while for age classes 50-89, the technique underestimates age at death. The age categories 42-46 and 67-76 showed the largest inaccuracies (0.7); notably, the age categories 47-66 and 77-89 showed the smallest inaccuracy (0.2) suggesting that this method would be appropriate to estimate age for individuals over 40 years. 83% of age estimates were within ±12 years of known age; 79% were within ±10 years of known age; and 62% were within ±5 years of known age. When estimating age of any individual, as many indicators of age as are available should be considered for evaluation. Since the acetabular region is well-preserved in the os-coxa, it is an exemplary skeletal element for research.

CAMPBELL M. (POSTER)

Biomechanical Modification of the Øm Kloster site, Denmark: Results and Interpretations

University of Manitoba

Shifts in repetitive activity and behaviour are often reflected in the skeletal record of a population. Specific shifts in economic activity that may effect behavioural patterns are particularly interesting because they allow a layered interpretation of the past population through the known change in economic behaviour and its unknown repercussions on the population. The focus of this poster is to illustrate the influences of shifts in agricultural practices on the patterns of daily repetitive activities and their associated manifestations on the skeletal system within Denmark, and in particular the population interred at the Medieval cemetery of Øm Kloster. Denmark experienced broad changes in agricultural production after the Black Death, with a shift in the primary form of agricultural production from grain cultivation to livestock rearing. These changes in economic activities are hypothesized as being reflected in modification of the musculoskeletal system. Individuals were assessed for biomechanical modification to ascertain if the changes in agricultural production could be traced through the skeletal system by way of musculoskeletal markers (MSM's). The results suggest a decrease in robusticity and overall musculature from the grain producers to those who rear livestock, as well as more apparent trends such as differences between the sexes and statuses. These comparisons delineate trends of distinct labour divisions between and within certain groups reflected in specific suites of muscles and bones of the assessed individuals. Of particular interest, is an individual from the lower status group which illustrates some of the more marked differences represented within the sample.

CAMPOS F.

Coping with dry heat: behavioral thermoregulation in wild capuchin monkeys.

University of Calgary

Like all homeothermic animals, primates can use both physiological and behavioral adjustments to regulate their body temperature during periods of thermal stress. I examined thermoregulatory behaviors in a wild population of white-faced capuchins (*Cebus capucinus*) inhabiting a highly-seasonal dry forest in Santa Rosa National Park (SRNP), Costa Rica. The dry season in SRNP lasts approximately five months and is characterized by high ambient temperatures regularly exceeding 37°C, low relative humidity, and the near absence of precipitation. This study demonstrates that capuchin monkeys travel shorter distances and rest more during the hottest and driest hours of the day, and might apply urine to their limbs and extend their tongues to lower body temperature via evaporative cooling. Seasonal weather patterns and group movement data reported here are based on 940 hrs of observations on four social groups of capuchins (wet season: 370 hrs, dry season: 570 hrs). Home range usage shifted seasonally as areas containing permanent water sources were utilized more heavily in the dry season. Distance traveled between location points taken at half-hour intervals decreased significantly as temperature increased in both seasons, and the negative correlation was stronger in the dry season. In the dry season only, the proportion of time spent resting increased at higher temperatures whereas the proportion of time spent traveling decreased. Striking seasonal differences were observed in the frequencies of several self-directed behaviors. Focal animals were observed to stick out their tongues only once in the wet season and 268 times in the dry season. Temperature was significantly higher and humidity significantly lower for "tongue-out" events than expected for a random event in the dry season. Similarly urine-washing, the practice of rubbing urine onto the hands and/or feet, was observed 66 times in the wet season and 1346 times in the dry season. Urine washes occurred at higher mean temperature and lower mean humidity compared to a baseline of weather data recorded

systematically throughout the day in both wet and dry seasons. These results and recent evidence that urine-washing is an olfactory signal related to aggression in captive capuchins suggests that this behavior is probably multi-functional.

CARNEGIE S.

Geophagy in white-faced capuchins (Cebus capucinus) in Santa Rosa National Park, Costa Rica

University of Calgary

The deliberate ingestion of soil, geophagy, has been reported in many species of animals from reptiles to birds and mammals, including human and non-human primates. It has been hypothesized that soil is consumed to relieve gastrointestinal disorders by adsorbing toxins, acting as an antacid, acting as an anti-diarrhoeal, and/or by offsetting endo-parasitic infections. Soil may also provide essential minerals and elements by supplementing nutrient poor diets. Among non-human primates, geophagia has been reported in all of the major radiations, but it has never before been reported in the neotropical monkey *Cebus capucinus* (white-faced capuchin). This report is the first to describe geophagy events in this species as well as provide geochemical and micronutrient analysis of the consumed soils. Geophagy was observed seven times during a 20-month field study on the reproductive ecology of white-faced capuchins in Santa Rosa National Park, Costa Rica. Both adult and juvenile monkeys were observed to consume soil from five different sites distributed throughout the park. Soil samples were collected from four of these feeding sites and from two control sites and then analyzed for their complete chemical and micronutrient contents. The results of the soil analysis revealed that the consumed and the control soils were similar in their content of micronutrients (Ca, Mg, Na, K), their pH (neutral pH), and their percentage of organic matter. However, the concentration (ppm) of several minerals (Fe, Zn, Cu and Mn) between the consumed and control soils varied depending on the location of the feeding site. Since the micronutrient and mineral contents are similar among all samples, it is unlikely the monkeys are consuming soil to supplement their diet. It is also unlikely that soil is consumed to adsorb plant toxins/tannins since capuchins do not eat leaves or unripe fruit. Current research on the natural features of the consumed soil (i.e. % clay, sand, silt) will test the anti-diarrhoeal hypothesis, but future studies that can compare the chemical analysis of capuchin foods, and/or endo-parasitic infections to geophagy events will allow us to more closely identify the function of this behaviour.

CARTER Y.

Lost Heads: The Inception of the Maori Mummy Project (MMP).

University of Manitoba

That the native people of New Zealand, the Maori, practiced mummification is not widely known, but today many specimens of the embalmers art languish untouched in collections around the world. The tattooed and preserved heads known as *Mokomokai* were sometimes stolen, but often legitimately traded. Little research on Maori mummification has been completed since Orchiston and Skinner in the 1960's. Standard practice today, is that of non-contact, absolutely no study of Maori remains is allowed without the express permission of the *Iwi* (tribes) involved, and herein lays our problem. Most remains are unable to be identified to a specific group and so they end up in limbo, neither returned to their people for reburial nor studied. Many Maori are not against respectful research and modern methods, including imaging, open up a whole new range of minimally-invasive techniques for study, which most Maori groups are wholly unaware of. It was with this in mind that the Maori Mummy Project (MMP) was created. The project was established with three main goals as a base:

1. To locate and record mummified Maori remains including but not limited to *Mokomokai.*
2. To facilitate research where appropriate and encourage dialogue between researchers and *Iwi.*
3. To provide information education on Maori mummification to the general public, researchers, students and particularly to the Maori themselves.

Future plans for the project include: expanding the current database to encompass all Maori remains: skeletal, dental and *Taonga* (treasures). With funding we hope to create a computer program, which examines and compares tattoos to be used to identify individuals back to an *Iwi*, thereby opening up discussion between the *Iwi* and researchers. The importance of this project cannot be overestimated. Our understanding of the pre-contact population of New Zealand could be significantly increased by the data provided by these remains. Anthropological study of the indigenous people of New Zealand is a balancing act between two unavoidable realities; the needs of the scientists and those of the Maori themselves must be included as one, if the field is to survive and flourish and this is what the MMP aims to achieve.

CHAPESKIE A. (POSTER)
Subadult facial reconstruction
University of Western Ontario
The subject of facial reconstruction is one that has fascinated anatomists, artists, and anthropologists for centuries. However, the reconstruction of children's faces has traditionally been neglected in the study of the human face and its reconstruction. Recently, anthropology has begun to pay greater attention to the role children play within a society. This interest has translated into the development of a bioarchaeology of children, where methodologies are tailored to address the difficulties in excavation, analysis, and interpretation of subadult skeletal remains. An accurate facial reconstruction relies heavily on accurate age, sex, and race determination; however, in the case of a child reconstruction, this information cannot be deduced, aside from age. While this would pose a problem in adult facial reconstruction projects, this "problem" is of little significance in a subadult project, as the differences in sex are indistinguishable until puberty in the living and data on race soft-tissue differences does not vary widely. The reconstruction of a five-year-old child, whose skeleton dates to approximately 8000 years before present, will be utilized to illustrate the process, problems, and merits in the reconstruction of a child's face from the skull. This project will hopefully generate awareness and interest in a topic that has certainly been a void in the literature on facial reconstruction until very recently.

COLQUHOUN I.
Along the Way from Entebbe to Edinburgh: An Unofficial History of the International Primatological Society Ad-hoc Committee on Community Assistance and Conservation (2006 -- Present)
University of Western Ontario
This paper describes the formation, and ongoing work, of the ad-hoc Committee on Community Assistance and Conservation, a current initiative of the International Primatological Society (IPS). The beginnings of the ad-hoc committee were organic. At the 2006 IPS Congress in Entebbe, Uganda, Vernon Reynolds presented a paper examining how primate field projects in Africa were also undertaking measures towards local poverty reduction. Subsequent to this presentation, a roundtable organized by Tammie Bettinger and Reynolds, and involving over 40 participants, supported the notion of undertaking specific, targeted poverty reduction measures at the local community level to help advance primate conservation efforts. Further, roundtable participants called on Bettinger and Reynolds to bring these issues forward in a proposal to the IPS Council. Following a June 2006 meeting, IPS Council asked Bettinger and Reynolds to strike an ad-hoc committee that was charged with the task of formulating a position statement on primate conservation that incorporates a statement on how community-level poverty reduction and economic development might contribute to biodiversity, and primate, conservation. Additionally, the committee is to draw up guidelines for field researchers who plan to have community-level poverty reduction measures as an aspect of their primate field studies. An email inviting IPS members interested in contributing to the work of the ad-hoc committee was sent by Bettinger and Reynolds in October 2006, with the goal that the progress of the ad-hoc committee on formulating the primate conservation position statement and field researcher guidelines would be reported back to the IPS at the 2008 Congress in Edinburgh, Scotland. On the calendar, we are now more than halfway between the Entebbe and Edinburgh Congresses. How has the work of the ad-hoc committee developed to this point? The composition of the ad-hoc committee and some of the preliminary inputs of committee members are described, although neither the primate conservation position statement nor field researcher guidelines have yet been finalized. Any relevant comments or suggestions from CAPA's field primatologists will be welcomed.

COOPER D[1], Lazenby RA[2], Macchiarelli R[3] and L Bondioli[4].
Directional Asymmetry in Metacarpals I – V Assessed by pQCT
[1] University of Saskatchewan
[2] University of Northern British Columbia
[3] Université de Poitiers
[4] Museo Nazionale Preistorico Etnografico 'L. Pigorini'
Previous research has demonstrated a strong right-bias in geometric measures of bone mass and strength in the upper limb. The presence of directional asymmetry (DA) is concordant with our species-level right handedness, and has been taken as a proxy for variation in mechanical loading within and among human populations past and present. In this paper we extend prior work with the second metacarpal to all five metacarpals. We examine the following propositions: Does DA characterize all elements within the palm? Is the magnitude of DA equivalent among metacarpals? Peripheral quantitative computed tomographic (pQCT) images were obtained at midshaft from n = 34 paired MC I – V

selected on the basis of quality of preservation from the Isola Sacra necropolis sample (200 – 300 CE; 22M, 12F). Cross-sectional geometric properties were obtained with ImageJ using MomentMacro. Here we report on Total Area (TA), Percent Cortical Area (PCA), Polar Moment of Area (J) and SHAPE (ratio of Imax/Imin). Relative asymmetry was determined as [(R-L)/((R+L)/2) * 100]. Bonferroni-adjusted t values assessed side differences within rays (against a null hypothesis of symmetry); nested ANOVA with 'Ray' and 'Ray(ID)' as factors assessed differences among metacarpals. A significant right-hand bias (all $p < 0.001$) was found for TA and J for all metacarpals. No differences were found for PCA. Only DA in the MC I differed with respect to departure from circularity ($p = 0.020$), with the right side more 'ovoid' in shape. ANOVA found no differences for DA among rays. While a right-hand bias was anticipated, the absence of between-ray variation was not as rays within the hand are not equitably engaged in stabilizing and manipulating objects in either precision or power grip categories. Three hypotheses are considered for this outcome: 1. levels of DA are canalized within hands (genetic model); 2. differences in mechanical loading among rays are insufficient to produce demonstrable variation in geometric properties (local functional model); and/or 3. mechanical loading at one more heavily loaded site produces a systemic modeling response at adjacent sites (global functional model). In this case, consideration of within-individual, between-element differences leads us to favour the third alternative.

CYBULSKI J.

Bioarchaeology, Ethics, Cooperation, Collaboration

Canadian Museum of Civilization

Almost 30 years ago, the Canadian Association for Physical Anthropology published guidelines for the excavation, treatment, analysis, and disposition of human skeletal remains from archaeological sites. The concept was given equitable treatment from the standpoints of ethnicity and culture, but a separate section was devoted to the concerns of native people including First Nations and Inuit in Canada. Various authors have since advocated cooperation and collaboration with native people to achieve what some perceive to be common goals. This paper reviews both formal (i.e., institutional) and informal (i.e., personal) approaches to cooperation and collaboration that have furthered the goals of bioarchaeology in Canada from the perspectives of both First Nations and scientists.

DEMBO M, Cross A and M Collard:

Ecogeographic variation in modern human limb proportions: a reassessment

Simon Fraser University

In 1978 Derek Roberts presented the first systematic assessment of the impact of climate on human morphological variability. One of his key findings was that humans follow Allen's Rule, which holds that there is a positive correlation between peripheral body part size and temperature in homeothermic species. Roberts' conclusions regarding the applicability of Allen's Rule to humans have been widely accepted. However, three features of his analyses are potentially problematic. Specifically, Roberts used a sample that was strongly biased towards warm climates, he maximized the sample size of each limb segment at the expense of among-segment comparability, and he ignored the confounding effects of phylogeny. In the study reported here the reliability of Roberts' conclusions regarding Allen's Rule were evaluated in relation to the aforementioned problems. First, Roberts' correlations were replicated to ensure our dataset was suitable for comparison. Next, the impact of over-representation of warm temperature populations was evaluated via analyses of samples stratified by temperature. Subsequently, the preceding analyses were repeated using only populations with data for all six limb segments so that a whole-body pattern could be identified. Lastly, the influence of phylogeny was investigated through phylogenetically controlled correlation analyses. Our preliminary analyses were consistent with Roberts' correlations indicating that the dataset was suitable for comparison. Stratifying samples on the basis of temperature supported the idea that over-representation of warm climate populations is problematic as only two of the six limb segments yielded statistically significant correlations with temperature. Further constraining the dataset to assess whole-body responses to temperature produced a global pattern of limb proportion variation that did not support previous analyses, suggesting that Roberts' decision to maximize sample size at the expense of among-segment comparability is problematic. Phylogeny was found to have a significant impact on the results of correlation analyses. Together, the analyses cast doubt on the claim that global variation in human limb proportions is consistent with Allen's Rule.
Research funded by SSHRC-CGS# 766-2006-0940, SSHRC-CGS# 767-2006-1902 and the Canada Research Chairs Program.

DOYLE L (Bess).

Examining the effect of maceration on lamellar tissue in Sus scrofa.

Simon Fraser University

Defleshing is an ever-present task that is fundamental to the practice of physical anthropology. The available methods vary widely, but the majority are similar in having potentially destructive effects on bone. The potential for damage from soft-tissue removal is well-known, but its scope has not been discussed: comparisons of the effects of different chemical methods on bone integrity have focussed primarily on delicate immature or cancellous bone, usually at the macroscopic level. To construct a more complete picture of the risks associated with maceration I chose to examine the stability of normal and traumatized lamellar bone at the microscopic level, where evidence of chemical activity is first visible. I defleshed 26 segments of rib from Sus scrofa using three common macerating agents: an acid (3% H2O2), a base (5.25% NaOCl), and a detergent (President's Choice Dishwashing Liquid), with a water control group. I then evaluated their effects on the integrity of surficial cortical bone and on bone that had been cross-sectioned using a hacksaw. Bone quality was excellent for both the control and the detergent groups, except for some slight discoloration resulting from dyes in the detergent. Both NaOCl and H2O2 treatments resulted in discoloured and friable external surfaces, while examination under reflected-light microscope revealed patterns of disintegration on the sawn ends in each group. Although the hacksaw striations were still clearly distinguishable, their integrity had been severely compromised at the microscopic level. Given the ever-increasing sophistication of analytical technology in physical anthropology, there is a need to minimize loss of information by reducing the damage sustained as a result of soft-tissue removal. This paper demonstrates that compact bone can be easily compromised by chemical maceration, increasing the risk of altering informative features, such as pathologies, on long bones or other elements with a high proportion of lamellar tissue.

DUDAR JC and MC Solano.

Osteological evidence of medical care, or lack thereof, in 19th Century Upper Canada and Upstate New York

Smithsonian Institution, National Museum of Natural History

The observation of traumatic injuries on archaeologically recovered skeletal remains provides insight into the overall occupational hazards and access to medical care of the associated population creating the burial ground. While the Act of 1839 incorporated the College of Physicians and Surgeons of Upper Canada, it is unknown how the ascension of Western medical procedures and technology impacted more rural areas and scattered urban centers. This paper will compare the published osteological data collected from 19th Century cemeteries in Upper Canada (now the Province of Ontario), including the rural Elmbank Roman Catholic Mission cemetery in Toronto Township, composed of N=634 burial features. In addition, the contemporaneous Albany County Almshouse cemetery, Albany, New York (N=1205), provides a fascinating contrast as these skeletal remains are largely comprised of the lowest socioeconomic strata. Evidence of post-mortem investigation, such as craniotomy, is present in both of the featured cemeteries and may provide further insight into the social dichotomy of exposure to medical care.

FEDIGAN LM.

Ethical Issues Facing Field Primatologists

University of Calgary

Primatologists face unusual ethical issues in conducting research. On the one hand, we study animals rather than people and so, unlike most anthropologists, we receive approval for our projects from animal care committees. On the other hand, nonhuman primates are often considered to be special types of animals because of their similarities to humans. Primate research therefore receives more than the usual amount of attention from animal welfare groups. Some have even suggested that great apes be accorded the same rights as humans with regard to constraints on research. Thus, ethically-speaking, primate research takes place in a boundary zone that shares some similarities with ethology and some with concerns about vulnerable human groups. Many legal regulations exist regarding research on captive animals, including primates, but few of these are appropriate to field studies. Although still contested by animal rights groups, studies of captive primates in laboratories are highly scrutinized and rule-bound. Primate field studies are typically considered to be non-invasive and non-controversial from ethical perspectives. However, some field studies include capture, mark and release procedures, or sampling of biological tissues, or experimental field procedures that raise welfare or ecological issues in the minds of some. Even purely observational studies can raise concerns about disease transmission from humans to nonhuman primates and vice versa. Habituation of our study subjects to close human presence can lessen their fear

of all humans, thereby facilitating undesirable behaviors such as crop-raiding and/or rendering them vulnerable to harm from non-scientists. Finally, field primatologists work in foreign countries with their own national laws and customs that must be taken into account. As conservationists, primatologists must often negotiate between the resource needs and cultural practices of local people and the interests of the nonhuman primates, their study animals. In spite of these pervasive dilemmas, most of the ethical debate is focused on biomedical research and the "3R" principles (refinement, replacement, reduction), which are only debatably relevant to field work. Suggested solutions are increased dialogue among ourselves and more powerful lobbying of animal care committees to better adapt their considerations and certification forms to the circumstances of field research.

FORREST C.

Histological Examination of Teeth from Perinatal Infants from the Draper Site (AlGt-2): Preliminary Investigations

University of Toronto

The remains of fifteen individuals were recovered from fourteen burial features at the Late Ontario Iroquoian Draper village site (AlGt-2) near Pickering, Ontario in the late 1970s. This included the remains of five perinatal infants beneath four house floors. With the permission of the Canadian Museum of Civilization, thin and thick sections were prepared for microscopy using one tooth from each perinate, and were examined using light microscopy and scanning electron microscopy in order to investigate the age at death of each of these individuals. Preliminary results suggest that all five of the perinates were stillborn or died very shortly after the birth event. It is argued that this may indicate a separate burial form for perinates. While ethnographic accounts are valuable in understanding proto-historic Iroquoian lifeways, some patterns of burial ritual may have been overlooked. Direct study of the skeletal remains of Iroquoians contributes to our knowledge of these patterns.

FUJITA M.

An Evolutionary Perspective on Mother-Offspring Vitamin A Transfer: Preliminary Analyses

University of Washington

Vitamin A deficiency (VAD) is associated with elevated morbidity and mortality. Newborns have meager VA stores, and are dependent on breastmilk for physiological needs and for building liver stores needed after weaning. VAD mothers produce breastmilk with low VA, compromising their children's VA status. It has been documented that VA concentrations in breastmilk decline across the first year postpartum in women from both developed and developing nations, but the reason for decline has been left uninvestigated and assumed to be a sign of depleting maternal liver stores. However, studies indicate that the decline occurs even in mothers with adequate liver stores. Why the decline is pervasive despite adversity on child health merits investigation. By applying the concept of life-history tradeoffs, it is hypothesized that declining breastmilk retinol across postpartum months is an evolved maternal reproductive strategy optimizing physiological reallocation of VA between competing needs. Namely, it is hypothesized that the maternal body will prioritize breastmilk VA over the liver VA during the early postpartum months to ensure the survival of the infant, but it would reverse the priority for maternal health or future pregnancy as time advances. This presentation tests this hypothesis using the preliminary data from 2006 dissertation fieldwork among 241 lactating Ariaal women in northern Kenya. Subsample analyses reveals a curvilinear trend in maternal liver VA stores across the first postpartum year (p≥0.045, R2=.1842, n=27), suggesting that maternal liver VA stores decline for ~150 days followed by a recovery during the subsequent 200 days, consistent with the prediction. The policy implications of this finding will be explored. Supported by NSF Dissertation Improvement Grant #0622358, The Wenner-Gren Foundation, and the Micronutrient Initiative.

GALLANT A.

Alternate Light Sources in the Detection of Bone Remains after an Accelerated Fire

University of Toronto at Mississauga

The early detection of a forensic component relating to a fire scene is integral to the subsequent investigation. Arson and/or the presence of human remains complicate the process of fire investigation, initiating a protocol involving fire, police, and coroner's investigators. The sooner a forensic approach is instigated, the greater the chance of recovering evidence relating to the cause and nature of the events. The purpose of this study is to evaluate the ability of a YAG laser to assist in the detection of bone that was exposed to the effects of an accelerated fire. This was studied by measuring the presence and level of fluorescence of the bone in relation to that of the surrounding debris. If successful, the YAG laser can be used to quickly identify bone and expedite the initiation of a proper investigative procedure, with

minimal disturbance to the scene, thereby minimizing contamination and aiding in the recovery of the remains. Twenty-two pig bones (including 2 heads) were placed in the bedroom of a home that was ignited and fuelled by an accelerant under the control of the Office of the Fire Marshall. After extinguishing the fire, charred remains were photographed in situ while being illuminated by the YAG laser. A second study was performed at a crematorium to assess how various levels of burnt flesh affects the ability of the bone to respond to the YAG laser. The human cadaver was photographed through-out the process of the cremation with and without the inclusion of the YAG laser. The results of both studies were successful in detecting bone after an accelerated fire, providing the bone was not covered by debris. More studies are necessary to address the wide range of variables that can occur in a fire. The application of this study could be expanded to include the detection of bone in rubble after earthquakes, large building collapses, plane crashes and other scenes of disaster that would need quick detection of bone remnants, at scenes where contamination issues are not a first priority.

GALLOWAY T and T Moffat

Ethical Issues for Human Biologists Conducting School-based Research with Children

McMaster University

This paper considers the ethical aspects of collecting data from children. The authors draw on their experiences conducting two school-based studies of child growth and nutrition conducted in the province of Ontario, Canada. The authors examine how widespread societal views of children's incompetence and vulnerability, while well-intentioned, have been institutionalized in ethical guidelines for research and in research practice. Due to inertia, and the fact that these societal views are deeply embedded in social institutions such as schools, recent emphasis on children's agency in the child research literature has not translated into altered ethical guidelines or research practices. The authors suggest a number of avenues to advance children's agency in human biological research. Attention to the processes of informed consent and assent can address the legal and ethical responsibilities of providing safety and privacy for child respondents. Particular attention to the structural relationships between children and various authority figures including teachers and researchers, and among the children themselves, is necessary in order to respect the autonomy and authority rights of children, and to preserve and enhance children's self-esteem.

GARDINER M.

The Discovery and Documentation of a Rare Dental Anomaly in an Archaic Upper Ottawa Valley site: A Case of Dens Evaginatus

Canadian Museum of Civilization

This paper will provide an overview of a rare dental anomaly, dens evaginatus (DE), encountered in 2005 during the inventory and analysis of human remains from Allumette Island in the Upper Ottawa Valley. This trait was identified during the detailed recording and documentation process, both written and photographic, of these remains at the Canadian Museum of Civilization prior to their repatriation. DE, also known as occlusal enamel pearls, is a developmental anomaly of the premolars found primarily among individuals of Asian descent, including Inuit and North American Aboriginal peoples. It is an abnormal tubercle composed of dentin, with or without a pulp horn, rising from the occlusal surface of the tooth. As the individual ages, the tubercle is usually broken off or worn away, leaving either no trace or premature pulp exposure and subsequent abscess formation. Not surprisingly, this trait is most commonly observable in children with mixed dentition and young adults. The recent examination of the skeletal remains from Allumette Island identified a single case of DE in a child of approximately 11 years. The individual was represented by only 9 teeth and a longbone epiphysis. Three upper premolars were associated with this individual and all were found to have 'extrusions' of enamel arising from the occlusal surface of the buccal cusp. Although each tooth expressed the trait differently, it is suggested here that the most likely diagnosis is DE.

The identification of this rare trait during preparation of remains for repatriation demonstrates the importance of detailed and thorough written and photographic documentation. Without such documentation, these data would not be available for or accessible to future researchers.

GOULD L.

Dining amongst the thorns: Lack of sex differences in the feeding behavior of Lemur catta residing in spiny desert habitat, southern Madagascar

University of Victoria

Nutritional requirements for mammalian females during gestation and lactation can be two to ten times higher than in non-reproductive animals. Strong

resource seasonality in Madagascar means that for ring-tailed lemurs in the dry south of the country, pregnancy and early lactation periods coincide with low food availability, so that weaning of all infants in a group is timed with increasing resources at the onset of rainy season. Lactating when food is scarce results in high energetic demands on reproductive females who must maximize metabolic requirements until infants are weaned. Feeding data were collected on two groups of ring-tailed lemurs residing in rare spiny desert habitat at Berenty Reserve, southern Madagascar, during late gestation/early lactation period of 2006 to determine if reproductive females spend more time feeding, feed more often, and have a greater intake rate than males in this habitat. No sex differences were found in average number of feeding bouts per hour, average time per feeding bout, percent of total observation time spent feeding, overall intake rate, or consumption by plant type. These results contrast with an earlier report of sex differences in feeding ecology in gallery forest habitat at Beza Mahafaly Reserve in southwestern Madagascar. Potential reasons for such differences could be related to variation in home range overlap (few intergroup agonistic encounters in the spiny desert means less feeding competition by neighboring females), marked diversity in plant food species used by lemurs between habitats, and size and spatial arrangement of the food items themselves. Research funded by Natural Sciences and Engineering Research Council of Canada (NSERC).

HENZI P[1], Barrett L[1], Clarke P[2] and D Rendall[1].

Reproductive skew and concession in chacma baboons

[1]University of Lethbridge
[2]University of Bolton

Chacma baboon (Papio hamadryas ursinus) males consort sexually receptive females. To a greater extent than other savannah baboon subspecies, this reproductive access is rank-related. If alpha males have reproductive priority, we might predict that they would father most if not all infants. Nevertheless, 11 years of data from one study troop indicate that a substantial fraction of infants were conceived when their fathers were subordinate. As the possibility of subordinate paternity is not tied to overlap in female conceptive cycles, nor to the naivety of new alpha males, we consider the prospect that alpha males concede reproductive opportunities to offset the reproductive costs associated with a high risk of infanticide. Time permitting, we will address the implications for baboon socio-ecology.

HIGHET MJ.

Rushing to the Grave: Typhoid During the Klondike Gold Rush (1898-1904)

University of Manitoba

Presented here is a preliminary analysis of mortality from typhoid, the second most common cause of death following accidental deaths during the Klondike Gold Rush (1898-1904). The health consequences of the rapid settlement of a large population in the Dawson City area, in combination with the struggle to develop infrastructure and introduce sanitary provisions is explored in order to explain the high levels of mortality from infectious disease, particularly typhoid, during the early years of the gold rush. This population offers the opportunity to examine the combined consequences of rapid development and population growth in response to adverse environmental and social conditions since Dawson City was built in a permafrost climate, on a swamp that flooded annually, and evolved from a haphazard tent-pitching site to a frontier boomtown within a few weeks time. The seasonal pattern of mortality observed for waterborne diseases such as typhoid is consistent with the conclusion that inadequate sewerage, drainage and waste management services not only contaminated the local drinking water, but also made Dawson City a breeding ground for infectious diseases in general. The fact that typhoid mortality significantly declined as improvements to these services were introduced is evidence that inadequate sanitary services were a significant factor contributing to deaths from infectious disease during this period.

HUCULAK M.

Reconstructing sequence of events surrounding body disposition based on colour staining of bone.

University of Toronto at Mississauga

The purpose of this research is to determine if it is possible to differentiate between bone that is buried for 1 month, then exposed on the ground surface for 1 month (scenario 1) from bone that has been deposited on the surface for 1 month, then buried for 1 month (scenario 2), based on bone colour changes. Samples of 40 processed juvenile pig (Sus scrofa) humeri with a minimum amount of flesh remaining were examined for each scenario. An additional 20 humeri, 10 per scenario were used as controls to determine if the presence of decomposing soft tissue affects the colour of the bone relative to the predominately defleshed bone used in this experiment. Bone colour was recorded prior to

initiating the scenario, after burial, and after exposure (regardless of the sequence of events) using Munsell colour charts under a natural daylight light bulb. Following completion of each scenario, each diaphysis will be sectioned and examined under a dissecting microscope to assess the degree of penetration of discolouration and to seek evidence of patterning that would indicate the sequence of events, i.e. burial followed by surface exposure or surface exposure followed by burial. Buried scenario 1 humeri underwent multiple scavenging incidents. Scenario 1 epiphyses had separated from the diaphyses after 8 weeks in the field (4 in ground, 4 on surface). There is a notable surface colour difference between both scenarios. After excavation, scenario 1 sample bones exhibit soil staining, bleaching, and staining from blood seepage. In addition to soil staining and minute signs of bleaching, scenario 2 sample bones show a great degree of fungi growth presented as green and orange deposits. Cross-sectioning is pending to establish whether or not the prior event can be determined. This research may aid in the reconstruction of ancient burial practices and help corroborate or refute statements produced by eyewitnesses or the defendant concerning body disposition.

JACK KM[1] and LM Fedigan[2]:

Long-term population trends in howler (Alouatta palliata) and capuchin (Cebus capucinus) monkeys in a regenerating Costa Rican dry forest

[1] Tulane University
[2] University of Calgary

In 1983, we began studying the responses of howler (*Alouatta palliata*) and capuchin (*Cebus capucinus*) monkey populations to forest regeneration in Santa Rosa National Park (SRNP), Costa Rica. Here we provide an update on the population trends for these primates based on our 2003 and 2007 park-wide censuses. Population sizes for both species more than doubled between 1983 and 2007, with the number of howlers increasing from 281 to 613, and capuchins increasing from 321 to 742. However, the rate of growth for howlers has leveled off (-0.12% between 1999 and 2003; 0.40% between 2003 and 2007); whereas the capuchin population continues to grow (3.0% between 1999 and 2003 and 3.4% between 2003 and 2007). The increase in capuchin population size since 1999 is mainly attributable to an increase in the number of adult males in our population. In the 24 years that we have been censusing capuchin groups in SRNP, we have documented a shift in the adult sex ratio; in 1984 the average M:F ratio was .55, in 1999 it was .86, and in 2003 the sex ratio became skewed towards males (1.2), a pattern that held in 2007. Based on these most recent findings it appears that the howler population in SRNP has reached carrying capacity with regards to the current state of forest regeneration, whereas the capuchin population continues to grow, likely due to their ability to exploit marginal and early successional habitats. We suggest that the high rate of parallel dispersal and coalitionary aggression that characterizes male capuchins in SRNP, accompanied by the ever decreasing anthropogenic pressures, has lead to decreased male mortality rate in our population.

KANKAM B and P Sicotte.

The population of Colobus vellerosus at Boabeng Fiema Monkey Sanctuary, Ghana is increasing

University of Calgary

Most forest-living primates in West Africa face logging and hunting pressures that eventually lead to population decrease. In Ghana, the Boabeng-Fiema Monkey Sanctuary contrasts with this situation. Indeed, the population of *Colobus vellerosus* at the site has increased since the early 1990, because of the protection offered in this forest fragment by the villagers, who view the monkeys as tabooed, and because of the creation of a successful small eco-tourism program (Saj et al. 2005). Here, we report on the continued growth of the population by presenting the results of our 2007 census. Five days of census were conducted in August 2007 by B.K. and 29 trained research assistants. At least three group counts per day were obtained per group. A maximum of 275 monkeys were counted in 19 groups in 2007, as compared to 241 in 15 groups during our 2003 census (Wong & Sicotte 2006). In 2003, three of the five smaller forest fragments surrounding BFMS contained *C. vellerosus* (app. 60 individuals in 4 groups). In 2007, 68 monkeys were found in four of these fragments (in 8 groups). Furthermore, a small population of 22 monkeys in two groups was found in an additional fragment much further from BFMS. The population of *C. vellerosus* in BFMS and surrounding forest fragments thus continues to increase. It is not known at this point whether the habitat is reaching a saturation point, although behavioral studies point to an increase in scramble competition (Teichroeb in prep).

KRON H.

Spatial analysis of morphogenetic traits in the Kellis 2 Cemetery, Dakhleh Oasis, Egypt

University of Alberta

This paper analyzes the spatial distribution of three non-metric morphogenetic traits, trochlear spur, divided hypoglossal canal and fronto-temporal articulation, in the Kellis 2 cemetery, Dakhleh Oasis, Egypt, using GIS spatial statistics software. This research is a pilot study for the use of GIS in bioarchaeology. It tests the hypothesis that this cemetery is organized along familial lines. If the cemetery is organized according to kinship, morphogenetic traits are expected to show spatial clustering. On the other hand, random or dispersed distribution of morphogenetic traits would argue against familial organization. This hypothesis is tested using four spatial statistics tools within ArcGIS software. The results show support for the hypothesis that the Kellis 2 cemetery is organized according to kinship. The test of local spatial autocorrelation using the Moran's I statistic is indicated to be the most useful for intra-site spatial analysis of bioarchaeological data. This research supports the use of rare morphogenetic traits for kinship analysis and demonstrates that GIS is a useful tool for spatial research. However, current GIS software is incapable of adequately handling bioarchaeological data and the development of archaeology-specific software is recommended.

KURKI HK[1], Ginter JK[1], Stock JT[2] and S Pfeiffer[1].

Estimating adult body mass and stature in a morphologically unique Later Stone Age sample from southern Africa.

[1] University of Toronto
[2] University of Cambridge

Body size (e.g. stature and mass) estimates are integral to understanding adaptation of past populations. For skeletal samples, it is critical to match the body proportions of the study sample to those of the reference sample; however, the availability of known-stature reference skeletal samples is limited. Body size estimation of an archaeological skeletal sample can be problematic when the body size or proportions of the population are distinctive. One such population is that of Later Stone Age (LSA) foragers from southern Africa. With small stature (mean femoral length = 405 mm, n = 53) and narrow pelves (mean = 211 mm, n = 35), adult body size/shape is distinctive, making it difficult to identify appropriate body size estimation methods. Stature estimates based on skeletal anatomical linear measures (the Fully method) and estimates based on femur length are compared, along with body mass estimates derived from morphometric (bi-iliac breath-stature) and biomechanical (femoral head diameter) methods, using a skeletal sample from the Later Stone Age (n = 53) from Holocene-age archaeological sites in Southern, South-western, and Eastern Cape regions of South Africa. Material culture, morphology and culture history link the Later Stone Age foragers with the living hunter-gatherer groups of the Kalahari, collectively known as the Khoe-San. For body mass, McHenry's 1992 femoral head regression formula produces body mass estimations most consistent with the morphometric method, particularly for the females. Some individual male skeletons display disagreements between body mass estimates from different methods as high as 91% (23 kg). Stature estimates vary with the formula used, although there is a higher degree of agreement among methods than is seen with body mass. Of the stature formulae employed, the Trotter and Gleser Average Stature produces the tallest stature estimates, and the highest levels of sexual dimorphism in stature. These values are most consistent with the statures of the Khoe-San. The Fully anatomical method produces the shortest statures for both sexes. These results highlight the need for formulae derived from small-bodied and short-statured reference samples to expand the reliability of methods to a wider range of body sizes.

LANDRY C and T Fernandes (POSTER)

CSI Halifax in Miami: the importance of creating practical courses in the forensic sciences

St. Mary's University

I have witnessed the student interest in forensic science grow tremendously over the past few years, however a practical approach to the topic is very rare. Within North America and Europe, forensic cases are highly guarded and treated as 'top secret' by police departments and Medical Examiner's offices; only a select few individuals receive security clearance to examine and analyse human remains, therefore making it almost impossible for a novice to gain this very necessary 'realistic' forensic experience. However, in May 2007, a unique and groundbreaking practical hands-on internship was created by the collaboration of Saint Mary's University and the Miami-Dade County Medical Examiner's Office. During this course, students gained a rare and comprehensive knowledge of applied forensics; they were exposed to the multi-disciplinary nature of

forensic investigation and mentored by experts in the field of forensic science.

LARCOMBE L[1,2], Orr PH[1,3,4], and PW Nickerson[3,5]

Differential functional gene polymorphisms in Manitoba's First Nations populations – another reason why the Pan-Aboriginal approach doesn't work.

[1] Department of Medical Microbiology, University of Manitoba
[2] Department of Anthropology, University of Manitoba
[3] Faculty of Medicine, University of Manitoba
[4] J.A. Hildes Northern Medical Unit, University of Manitoba
[5] Transplant Immunology Laboratory, Winnipeg, Manitoba

The rate of tuberculosis among Canadian-born Aboriginals is higher than Canadian-born non-Aboriginals and it is highly variable even among ethnically distinct Aboriginal groups (636/100,000 for the Dené; 113/100,000 for the Cree). The high incidence of tuberculosis disease among Aboriginals has primarily been attributed to socioeconomic and environmental factors however the role of genetic polymorphisms which can affect the quality of the host immune response to infectious pathogens has not been explored in this context. The use of the pan-ethnic term "Aboriginal" to characterize a study cohort assumes that Aboriginals are constant over time and across space and potentially masks the effects of the unique experiences of Aboriginal peoples. Using a candidate gene approach, functional vitamin D receptor (VDR) and cytokine single nucleotide polymorphisms (SNPs) were examined in Dené, Cree and Caucasian cohorts. The Dené and Cree maintain a high frequency of the SNPs associated with low VDR function, low production of IFNγ and TNFα, and high production of IL-6 as compared to the Caucasian cohort. Moreover, the Dené maintain a SNP profile that is even more skewed than the Cree cohort. Given the important role of TNFα, IFNγ and vitamin D as key mediators facilitating macrophage containment of *M. tuberculosis* then the observed cluster of ethnic allele variation may contribute to the high rate of tuberculosis observed in this population. Although the Dené and Cree hunter-gatherers shared a common adaptation to a specific pathogen environment, genetic drift and differential selective pressures at the time of contact with Europeans likely had some influence on the observed immunogenetic differences. Although there has been a tendency to consider Canadian Aboriginal populations as a single group, distinct from Caucasians, the Pan-Aboriginal approach may serve to hide important genetic and health differences.

LAZENBY R[1], Skinner, MM[2,3] and J-J. Hublin[3].

A Micro-CT Study of Variation in Trabecular Microarchitecture in the Metacarpus of the West African Chimpanzee (Pan troglodytes verus).

1. University of Northern British Columbia
2. The George Washington University
3. Max-Planck-Institute for Evolutionary Anthropology

Micro-CT analysis of the human second metacarpal has demonstrated significant differences in trabecular mass and structure in the proximal and distal epiphyses. These differences are explainable vis-à-vis lateralized behaviour and directional asymmetry (left versus right) as well as joint stability and mobility at the carpometacarpal and metacarpophalangeal arthroses (head versus base). These findings raise the possibility for the noninvasive investigation of manipulative ('handedness') and locomotory (bipedal / quadrupedal) behaviour among fossil hominins through analysis of internal skeletal morphology. However, addressing such issues must be predicated on an understanding of comparative primate – specifically ape – trabecular anatomy. In this paper we report the first micro-CT results for epiphyseal trabecular microarchitecture in paired metacarpals for rays I, II and V from a sample of Tai Forest chimpanzee, *Pan troglodytes verus*. Elements were selected from n = 4 adult individuals, 2 each male and female, and scanned at a nominal pixel resolution of 13.56 microns on a SkyScan 1172 micro-CT scanner. SkyScan's proprietary software NRecon and CTAn were used to reconstruct and analyze trabecular mass, structure and orientation from 4.5 mm spherical VOIs centrally located within the head and base. Density plots indicate an absence of directional asymmetry within any of the rays; and sides were pooled for subsequent analyses. The most striking outcome is a marked distinction in magnitude and pattern within and between epiphyses for the pollical metacarpal compared to the second and fifth metacarpals. For example, bone volume fraction, connectivity, trabecular thickness and structure model index (plates versus rods) are all greater distally in MC I, but are greater proximally in MC II

and V; conversely, trabecular number is greater distally in MC II and V, but equal in MC I. In sum, trabecular microarchitecture confers relatively greater strength in the head of MC I in contrast to its base; and to a lesser degree in the base rather than the head of MC II and V, in which deficits of trabecular thickness and structure are partially compensated by increases in number. The MC II pattern for *Pan* departs quantitatively and qualitatively from that previously demonstrated for *Homo*.

LOVELL N. (POSTER)

Multiple fractures in an adult male from Mesheikh, Upper Egypt (ca. 2100-1900 BC)

University of Alberta

As part of a larger study of unpublished materials recovered during excavations at Mesheikh in 1912, I examined the human skeletal remains that are now housed at the Phoebe Hearst Museum at the University of California, Berkeley. The remains curated at the Hearst Museum consist only of complete or incomplete skulls, with one exception: the relatively complete skeleton of an older adult male was collected by the excavators, probably because of the many healed fractures that it exhibits: left and right scapulae, nine right ribs, transverse processes of two thoracic and two lumbar vertebrae, and the right foot. This poster presents osteobiographical data on this individual and considers his relationship to the larger skeletal sample and to the social and physical environment at Mesheikh.

MARCEAU C.

Bone Weathering and Time-Since-Death in a Cold Climate.

University of Alberta

Bone weathering patterns can be used to estimate time-since-death and reconstruct postmortem events in cases involving skeletonized remains, yet little research has been conducted on this taphonomic process by forensic anthropologists. This study represents the first field experiment to systematically observe weathering rates in a cold climate for the purpose of developing standards for the determination of postmortem intervals in forensic contexts. A field experiment used deer and pig carcasses as human analogues to investigate bone weathering processes in the subarctic climate of central Alberta. While pigs are typically used in forensic experiments, deer were also used in this study as their skeletons are similar in many ways to those of humans. Despite the densitometric and geometric similarities between the compact bone of humans and pigs, the bones of these species weather quite differently and deer were found to be better human analogues. This study examined the effect on weathering rates of freeze-thaw cycles, environmental conditions, scavenger activity, and skeletal element, as well as animal species and age. Carcasses were placed in forest or grassland microenvironments and exposed to natural processes of decomposition and scavenging. The bones were observed over a three year period for signs of cracking, flaking, and bleaching, and descriptions of weathering stages for different types of skeletal elements were developed. In order to compare the weathering patterns of animals to those of human skeletal remains, the weathering observed on deer and pig bones was compared with that observed in human bones from past forensic cases. The results of the field experiment show that, compared to semi-desert climates, less bleaching and flaking of bone surfaces result from less intense exposure to sunlight in a cold climate. Cracks caused by weathering are delayed compared to more arid climates but occur more rapidly than in a rainforest or temperate climate, likely due to the presence of freeze-thaw cycles. This research adds to the limited body of knowledge on weathering in a cold climate and will increase the precision with which weathering stages can be used to assign time-since-death in local forensic cases.

McCULLOCH K, Lazenby R and N Lynnerup (POSTER)

Semi-automated analysis of femoral histological variation in a contemporary sample.

[1] University of Northern British Columbia
[2] University of Copenhagen

Definitional inexactitude has plagued the study of histological variation in cortical bone, and to some degree underlies a lack of precision in applying bone remodelling to age-at-death estimation. In this study we test patterns of variation for two reproducible histological measures: (1) % remodelled lamellae (determined from both intact plus contiguous fragmentary osteons treated as a 'remodelling event'), and (2) intact Haversian canal area. The former is an index of bone turnover history, the latter of intracortical porosity. Complete cross-sections from 27 Danish males aged 23 to 86 (mean age 56.56 years) were selected from a large contemporary forensic autopsy series at the Dept of Anthropology, University of Copenhagen. Regions of interest (ROIs) covering 15.5 mm^2 were located with respect to the maximum and minimum axes of bending

rigidity, Imax and Imin, and remodelling event area (REA) and Haversian canal area (HCA) were determined using a Leica DM 2500 light microscope and SigmaScan 5.0 interfaced to a Wacom digitizing tablet. Nested ANOVA and LS regression were used to assess location and age relationships for mean and summed REA and HCA (Systat 11; $p < 0.05$). We found that, in this sample, mean REA and HCA did not vary by quadrant. However, both had significant relationships with age (Mean REA: $t = -3.124$; $p=.002$; mean HCA: $t = 2.381$; $p = .019$). The Sum REA and HCA values did not vary by quadrant or with age. The lack of regional variation in either remodelling history or porosity among mechanically-defined regions of cortex seems counter-intuitive, though may be explicable in light of recent criticism of such axes as indicative of differences in functional loading. The inverse relationship with age for REA coupled with the positive age relationship for HCA is also of interest, as it suggests a greater density of smaller Remodelling Events associated with fewer, but larger, Haversian canals. However, this could be an artefact of our sampling method, which may have alternately included remodelled lamellae but excluded the associated Haversian canal.

McEWAN J[1], Rossi D[1] and S Mays[2]
(POSTER)
DXA, histomorphometry and differential diagnosis in a skeleton from medieval England
[1]University of Alberta
[2]Ancient Monuments Laboratory, English Heritage, Portsmouth, UK
Several differing diagnostic techniques were employed in order to reach a tentative diagnosis in a skeleton from medieval England. G275, a female aged 25-35, had various abnormalities on macroscopic examination including a slipped femoral capital epiphysis and medullary stenosis observed at a post depositional break in the clavicle. Cortical index measurements taken at the radius indicated measurement 2 SDs greater than the norm with corresponding reduced medullary width. Plain X-Ray of the spine showed increased density at the vertebral end-plates. DXA at the radius and histomorphometry of the iliac crest confirmed that the individual exhibited diffuse osteosclerosis. The combination of anomalies led the investigators towards a differential diagnosis of osteopetrosis in the form of benign Albers-Schönberg type II disease.

McKENZIE J, Jaagumagi A and M Roksandic.
A Burial Reconstruction from the Mesolithic-Neolithic Transition in the Muge Valley, Portugal
Carleton University
Shell middens represent a good medium for bone preservation. Over time, the deposition of shell in the shell midden is compacted, forming a hard matrix called breccia. This breccia matrix acts as a cementing agent and can preserve aspects of original burial position even after excavation. Cases where shell midden burials occur can allow for unique opportunities to reconstruct burial position as is the case in the Muge Valley of Portugal. Burial reconstruction yields information about the context of the skeleton in situ, which is often lost in excavation. Skeletal collections from shell middens of sites in the Muge Valley, excavated in the late 19th and early 20th century, contain bones held together by breccia that preserved burial positions to varying degrees. The burial number 81.46.69 no.14 from the site of Cabeço de Arruda is an example that allowed almost complete reconstruction of the burial position and so was chosen to illustrate the process. We present here the means and the method of reconstruction of this burial and discuss its importance in understanding the bioarchaeology of the Muge Valley.

MERRITT C. (POSTER)
SNP genotyping using Luminex technology and its application for anthropology
University of Toronto
It has been estimated that any two people are 99.9% identical at the genetic level. Given that the human genome consists of over 3 billion base pairs, 0.1% represents millions of markers that are variable in humans, which contributes to our individual uniqueness and aids in our understanding of human evolutionary history. The completion of the Human Genome Project has opened the door to a new understanding of the relationship between genetic variation and biological function; consequently, a great deal of effort is being put into the development of robust, cost-effective, and high-throughput technologies for genetic variation analyses. Single nucleotide polymorphisms (SNPs) can be defined as sites where there are two allele variants present at or above a frequency of 1% in a population. SNPs in the coding region are of particular interest to researchers because an amino acid substitution can alter the function of a protein. Because DNA segments that lie near each other on a chromosome tend to be inherited together, SNPs can be used as an

indirect way of tracking the inheritance pattern of a gene that has not yet been identified but whose approximate location is known. Therefore, understanding this variation and developing multiplex SNP genotyping protocols are relevant to our knowledge of the evolution of our species, the adaptation of humans to different environments, and the disease risk differences between individuals and populations. Type 2 diabetes (T2D) is an epidemic in North America; however, there are some population groups where the incidence of T2D is even higher. In Canada, the prevalence of T2D is three to five times more common in First Nations people than in the general population. Similarly, in Native American and Mexican-American populations, T2D is now in epidemic proportions. Diet and lifestyle are factors, but there are also genetic susceptibility factors. Admixture mapping is a method used for identifying genetic risk factors involved in complex traits or diseases showing prevalent differences between major continental groups. Because the prevalence of T2D can be seen varying rates in different populations, admixture mapping is well suited to study the genetic basis of this complex disease.

MOFFAT T.[1], Sellen, D.[2] and W. Wilson[3] (POSTER).

Anthropological Investigation of Vitamin D Deficiency among New Canadian Mothers and Children: An Emerging Issue

[1]McMaster University,
[2]University of Toronto,
[3]University of Calgary

In recent years there has been an increase in the prevalence of rickets among Canadian children (Ward et al. 2007) and a burgeoning literature documenting low levels of serum vitamin D among young Canadian women and children (Vieth et al. 2001; Whiting et al. 2007). Vitamin D deficiency is of concern to Canadians as we live in the northern hemisphere at high latitudes and do not receive much sunlight throughout the winter. Moreover, we have a high proportion of new Canadians (immigrants and refugees), who may be more vulnerable to vitamin D deficiency if they have darker pigmented skin, live in food insecure households, or have cultural practices that limit exposure to UV radiation. For the past ten years Health Canada (2004) has universally recommended supplementation of vitamin D for all breastfed infants, as, unlike infant formula, breast milk does not have sufficient amounts of vitamin D. It is also recommended that mothers eat vitamin D-rich diets, as their levels can influence infant stores of vitamin D up to two months postnatal. In this paper we present a biocultural model of vitamin D deficiency among new Canadians, and propose that this is an emerging area of research in physical anthropology.

NELSON A[1], Demondion X[2], Clegg L[3], Rogers J[4], Parnes L[5], Kruithof S[6], Cardell Corbett C[7] and C Matheson[8]. (POSTER)

Avion #1: The Osteobiography of a World War I Soldier

1 The University of Western Ontario
2 Hôpital Roger Salengro, Lille, France
3 Department of National Defence
4 St. Joseph's Health Care, London, ON
5 London Health Sciences Centre, London, ON
6 National Research Council of Canada
7 Newfoundland and Labrador
8 Lakehead University

Avion #1 is a young adult male who was a soldier killed in action and buried near Vimy Ridge, France in June 1917. His skeletal remains were recovered in October 2003 by a local contractor, and have been curated since in the Commonwealth War Graves Commission headquarters in France. The skeleton, and another solider since identified as a member of Edmonton's 49th Regiment, were initially analyzed in 2005 and were reexamined and subjected to x-ray and CT analysis in April 2007. In this poster we report on two aspects of the ongoing effort to identify this individual by filling out his osteobiography. One of the most recognizable features of an individual is their face. Hence, we are making an effort to reconstruct the face of this individual. However, this presents a considerable challenge, as the cranium is in several pieces. At this point, we have created a computer model of the preserved portions of the skull based on the manipulation of CT scans of the calotte, maxilla, denture and mandible. A feature of this individual that became obvious upon first inspection of the CT scans of the calotte was the presence of a severe pathological condition of both ears. This condition involves increased density, particularly of the middle ear, which would have produced profound deafness. The differential diagnosis for this presentation suggests that this individual suffered from labryrinthitis ossificans, which may have affected this individual's hearing. In this poster we explore the implications of a hearing deficit in a battlefield context, and for recruitment practices at that point in the First World War. The face, denture and aural pathology of this individual are important elements to be used in the process of indentification.

Carney Matheson and colleagues from Thunder Bay and the Department of National Defence are pursuing other leads in a multidisciplinary effort to identify this individual, and to shed new light on life in the trenches in World War I.

NOTMAN H.

Lost in Transmission: Contextual Variation in Chimpanzee Pant Hoots and its Implications for Referential Communication

Athabasca University

There have been several previous studies of the loud, long-distance call of chimpanzees, termed a 'pant hoot'. Some have explored the possibility that there are acoustically distinct subtypes of pant hoots that communicate to distant listeners different information about the caller's behaviour, or ecological and social circumstances. However, results to date have been either inconclusive or conflicting. To help resolve these issues, I undertook research on pant hoots produced by wild chimpanzees (*Pan troglodytes schwienfurthii*) living in the Budongo Forest, Uganda. In this paper, I report the results of acoustic analysis of 201 pant hoot series produced by seven adult males. Principal components analysis (PCA) was used to identify key dimensions of structural variation in the calls, which were then related to a large set of behavioural, social and ecological variables associated with call production. Although there was little evidence for distinctive pant hoot subtypes according to many of the social and ecological dimensions traditionally recognized, a number of significant patterns were identified. Specifically, pant hoots were produced with higher probability at abundant food sources, and they were more likely to contain a 'let-down' phase when produced in specific behavioural contexts, such as travelling and upon arrival at a food source. In addition, pant hoots produced while travelling along the ground in small parties prior to joining-up with other community members were consistently different from all other pant hoots, varying reliably in the fundamental frequency of their build-up elements, the tonal quality of climax elements and in the presence of a let-down phase. I discuss the possible mechanistic bases for these differences in the pattern of calling and detailed spectral structure of the calls and consider the implications for referential communication.

OSLEY SE[1] and J Albanese[2] (POSTER)

A Test of the Stature Estimation Feature of FORDISC 3.0

[1] University of Central Lancashire
[2]University of Windsor

An estimate of living stature is an important datum in both forensic and bioarchaeological investigations. Along with the more widely known sex and "race" determination options, FORDISC 3.0 may also be used to estimate living stature from long bone lengths. In tests of various versions of FORDISC's "race" and sex determination features, the application has generally not performed well. Systematic tests have not been conducted of the stature estimation features. In this paper we use data from the femur, humerus, radius and tibia to test the stature estimation features of FORDISC 3.0, and the underlying assumptions about sex, "race," and secular change in the application. The test sample consisted of 28 "White" males from the Terry Collection who were born and whose growth was completed in the 19th century. Stature was estimated using FORDISC options for 19th and 20th century "Black" males and females, and 19th and 20th century "White" Males and Females. Accuracy and utility were assessed two ways: 1) mean absolute difference (MAD) between the actual stature and the predicted stature; and 2) does the estimated range bracket the living stature. Following the assumptions in the FORDISC approach, the 19th century "White" male equations should consistently provide the lowest MAD and the highest number of cases that are bracketed by the predicted range. We found that the 19th century "White" male equation did not consistently give the best results. Sex-specific equations performed marginally better. However, accurate and useful stature estimations were provided using various sex, "race," and birth cohort options. The best and most consistent equations were those with the largest reference sample regardless of sex, "race," or birth cohort. The "race" and birth cohort specificity complicates the FORDISC stature estimation feature without providing any increase in accuracy or utility. We recommend that users of Fordisc 3.0 ignore race (and sex) and select the "any" option for the 19th century reference sample. This combination of options will provide the largest reference sample size with the greatest amount of variation and will provide the best results most consistently.

PALMER P and W Wilson.

A Biocultural Approach to Understanding Growth Variation and Diet in Makushi Amerindian Children

University of Calgary

Recognizing that health and nutrition are affected both by human biology and human behavior, the objective of this paper is to determine how risk factors such as diet and food management within the household are affecting Makushi children's health. This mixed-method study followed a biocultural approach involving the triangulation of quantitative and qualitative data. The study population was selected from an anthropometric survey conducted in 2001 indicating a significant difference in prevalence of height-for-age Z-scores≤-2 in two villages of similar ethnicity and microclimates (23% in village 1 compared with 50% in village 2, $p<0.001$). Further, repeated measures of dietary recall surveys over a period of one year for 24 children under the age of 5 years (n=325), indicate important dietary differences between villages. Differences include higher carbohydrate consumption, particularly cassava, and lower consumption of protein and fat in village 2 as well as a lower intake of vitamins A and D. Family food management surveys (n=17) conducted in 2007 indicate the limiting dietary factor in both villages is likely food availability. Finally, follow-up anthropometric measurements (n=83) on children who participated in the dietary studies, and their siblings, indicate a significantly higher prevalence of height-for-age Z-scores≤-2 in village two (0% in village 1 compared with 40% in village 2, $p<0.001$), but a decrease in prevalence from 2001 in both villages. The results suggest that variation in childhood growth in these two villages is the result of dietary differences, in particular poorly balanced diets and lower intakes of vitamins A and D in village 2.

PECKMANN TR[1], Manheim MH[2], Ginesse LL[2] and M Fournier[3.]

3-D Facial Reconstruction: Using ultrasound technology to aid in positive identification of missing peoples of Canadian Indigenous ancestry

[1] Dept. of Anthropology, Saint Mary's University, Halifax, Nova Scotia
[2] F.A.C.E.S. Lab, Louisiana State University, Baton Rouge, Louisiana
[3] R.C.M.P., Forensic Facial Identification Services, Fredericton, New Brunswick

In forensic cases, when no identification is possible, facial reconstruction can aid in establishing an individual's identity. The purpose of this research is to add to the already existing databases of children and adults for use in 3-D facial reconstructions of unknown or missing individuals. When facial reconstruction is attempted, it is critical that the measurements utilized for facial tissue depths are standards valid for a specific population of origin. To date, North American indigenous populations are underrepresented in the forensic data. Presently, no data exist for facial tissue thickness in Canadian Aboriginal populations. This project utilizes ultrasound technology to measure facial soft tissue depths in living Canadian indigenous populations. Accurate measurements for facial tissue depth are an important and vital tool inside and outside of the medico-legal arena. In forensic contexts, this new data will aid in positive identifications for unknown skulls from peoples of indigenous ancestry. For the police, who are searching for a missing child, employing this new data may help a family reunite with their lost child. For traditional peoples, this new knowledge will give voice to a once forgotten group of peoples.

PHILLIPS S. (POSTER)

Epidemiologic transition in a Caribbean population: A study of disease ecology and modernization

Indiana State University

This study documents an epidemiologic transition in the Cayman Islands population in the early 20th century. The materials for the study include birth certificates, death certificates, and primary source records on medical practices and public health initiatives. The methods include standard demographic and epidemiologic measures such as life expectancy, cause of death, birth and death rates. The goal of the study is to model the Caymanian epidemiologic transition, which took place in the first decades of the 20th century, with the demographic and epidemiologic measures listed above and to then place the transition in the context of modernization that began to take place on the Caymans at that time. Furthermore, another goal of this study is to develop a model of the "2nd Epidemiologic Transition" as defined by Abdel Omran. To date, the scholarly debate surrounding such transitions has yet to be resolved. This study puts forth the argument that the underpinnings for populations that moved through this transition were initiated for very localized

reasons based on the immediate ecological environment, yet the outcome for nearly all the populations was quite similar.

PITRE M. (POSTER)

Human remains from the 2007 field season at Nag el Qarmila, Aswan, Egypt

University of Alberta

The 2007 field season at the site of Nag el Qarmila, in the Aswan-Kom Ombo region of Egypt, involved the rescue of a Pan-Grave (ca.1800-1600) and Predynastic/A-Group (ca. 3700-3600) cemetery. In addition to rescuing the sites from local building activities, the overall research goals of the project were to understand intercultural dynamics between Egyptians and Nubians in the region over time. Over 30 Pan-Graves were recorded, all of which were extensively plundered. Five graves were excavated and over 3000 fragments of human bone were collected. The preliminary skeletal analysis revealed an MNI of seven individuals, including women, men, and children. When compared to other Pan-Graves discovered in Egypt, the Nag el Qarmila site revealed a wider distribution of burial pits, larger stone tumuli, and a different pottery assemblage, demonstrating the existence of regional variation in Pan-Grave cemeteries and shedding new light on intracultural dynamics. At the Predynastic/A-Group cemetery, mostly disarticulated bone was found in the 4 x 16 m excavated area. However, the complete skeleton of a young female was also discovered with the body oriented NW-SE and the head facing south (upstream of the Nile), a position documented in several Predynastic cemeteries. The remains exhibited few signs of disease and there was no indication of how this young female died. There was organic preservation of soft tissue, leather, linen, and matting. Funerary offerings included a black-top jar, malachite, and a water-worn pebble. These observations, although preliminary, underscore the importance of further research at the sites and on the skeletal remains.

PREW J.

A Comparison of the Influence of Habitat on Social Spacing and Niche Exploitation Observed among Three Groups of Verreaux's sifakas (P. v. verreauxi) at Berenty Reserve, Madagascar

University of Victoria

Based on a subset data collected between June and August 2007 on three groups of Verreaux's sifakas (*P. v. verreauxi*) inhabiting spiny/scrub, gallery, and riverine forests of Berenty Reserve, Madagascar, I considered the role that variable habitats have on shaping predator-sensitive foraging behaviours displayed among populations of the same species, as well as on access to particular food types. Although Berenty Reserve is only 200-ha in size, differences in habitat between the study groups influenced the types of food resources available to and consumed by sifakas. Members of the scrub/spiny forest group had access to *Euphorbia* and *Allluaudia* species, unlike individuals within the gallery forest who had access to *Ficus*, or the riverine group who were able to feed on the bark of *Adansonia* and other introduced floral species located within their home-range. Discrepancies both in food resource availability and in the presence of predators based on habitat in turn dictated inter-group patterns of social spacing and niche exploitation. The degree to which free-living adult *P. v. verreauxi* expressed cohesive behaviour with conspecifics while feeding/foraging was found to differ based on habitat. During June 2007 sifakas in the spiny/scrub forest spent more time foraging within 1 to 2 meters of their nearest neighbour, whereas gallery forest animals were more spread out spatially, with a minimum of three meters between closest conspecifics. Spiny forest animals spent more time feeding/foraging either terrestrially or in the lower- canopy level, whereas the gallery forest group expressed a preference for feeding/foraging in the mid- to upper-canopy levels. These preliminary results suggest a compromise between animals in different habitats in terms of mitigating their vulnerability to potential predators while simultaneously fulfilling their daily nutritional requirements, and suggest that food resources and predation risk should not be considered homogeneous for all members of a given species. Thus, due to the fact that even minor fluctuations in habitat can result in behavioural and ecological differences between animals at the population level, the need for further intra-specific comparative studies not only among *Propithecus*, but in other primates, is warranted, if the effects of such diversity are to be understood.

ROGERS T.

The Ethics of Objective Forensic Science

University of Toronto

As is the case with any discipline, Forensic Anthropology is guided by ethical standards and expectations. Because of its cross-disciplinary nature, both forensic and anthropological standards should be upheld by Forensic Anthropologists. A comparison of the two demonstrates anthropological ethical guidelines, as outlined by the American Anthropological Association

(http://www.aaanet.org), are more comprehensive and detailed than those of forensic science, as stated by the American Academy of Forensic Science (http://www.aafs.org). The former explicitly addresses ethical behaviour toward colleagues, contacts, subjects, animals, and collections, as well as ethics in research, science and scholarship, teaching, applied practice, and toward the public. Forensic ethical standards include recommendations to avoid: professional or personal conduct that reflects badly on the AAFS; misrepresenting qualifications; conflict of interest; and confusing results and opinion. The guidelines champion objective, thorough, and truthful analysis of evidence, reporting results, evaluation of peers, and acquisition of cases, while maintaining confidentiality and sharing new developments in the field. The key difference between the anthropological and forensic ethical guidelines is that the former advocates the people, subjects, animals, and/or collections with which anthropologists work, while the latter stresses impartial professional practice. The purpose of this paper is to examine the ethics of objective forensic science. The paradigm of the objective expert permeates forensic science and influences its practice at every stage of the process from the amount of information police provide the expert, to recommendations regarding how experts should dress for court. This paper addresses the fallacy of objectivity in forensic analysis and discusses the ethics of advocacy in forensic science, particularly with respect to victims' rights.

ROGERS T.

Sex Determination of the Adolescent Skeleton

University of Toronto

Accurately determining the sex of immature skeletal remains can be problematic in the absence of DNA. Most sexually dimorphic features of the human skeleton develop as secondary sex characteristics during adolescence, thus few techniques of subadult sex determination have proven effective. During the transitional period of adolescence assessment of skeletal sex can also prove to be difficult due to individual variation in the rate, period, and duration of the adolescent growth spurt. Until puberty is complete male skulls appear less robust and smaller, more typical of the female skeleton, while female pelves have yet to widen into the distinctive adult female form. The purpose of this paper is to evaluate the accuracy of the Rogers' (1999) method of morphological sex determination using the distal humerus to assess the sex of adolescent skeletons. The sample consists of seven documented adolescent skeletons from the Christ Church Spitalfields collection at the British Museum of Natural History and 35 from the Luis Lopes skeletal collection housed in the National History Museum (Museu Bocage) of the University of Lisbon, Portugal. Ages range from 11-20 years. The analysis was conducted blind using all three of Rogers' criteria: olecranon fossa shape and depth; degree of trochlear symmetry; and presence or absence of medial epicondyle elevation. The technique achieved an accuracy of 81% on the combined sample of 42. This method can be applied to adolescent skeletons once the trochlea has begun fusing to the humeral diaphysis, which occurred by age 11 years in the test samples.

RUDOLPH L.

A Paleopathological Examination of the Forest Centre Cemetery Individuals, Prince Albert, Saskatchewan

University of Saskatchewan

In autumn of 2004, construction of the Saskatchewan Forest Centre in Prince Albert was issued a temporary stop order due to the exposure of human remains beneath the proposed parking lot. Subsequent archaeological survey and excavation of the construction zone revealed the existence of a historic cemetery. A comprehensive osteological investigation was conducted on each of the twenty-one individuals exhumed. In addition to determining the biological ancestry, sex, and age of each individual (where applicable), a macroscopic and radiological paleopathological assessment of the skeletal remains was completed. Archaeological and historic documentary evidence suggest that the cemetery was established after June 1866, when Rev. Nisbet founded the Prince Albert Presbyterian Mission. The 'Forest Centre' cemetery likely went into disuse by the 1880's following the establishment of the South Hill Cemetery and the construction of the 4th Presbyterian Church, the foundations of which overlapped a portion of the burial ground. Historic documentation referring to settler life in the Presbyterian Mission and subsequent settlement during the proposed time period affirm the presence of several pathological conditions present in the cemetery population. By placing physical foci within a historic framework, a representation of pioneer life in the latter half of 19th Century Prince Albert may be depicted. This presentation aims to describe the health status of this early population based on the results of the osteo-historic investigation.

SATTENSPIEL L. and T Smith.
Interactions between a 1916-17 measles epidemic and the 1918-19 influenza epidemic on Newfoundland
University of Missouri-Columbia
Newfoundland, like most other parts of the world, experienced one of the most devastating epidemics ever known, the 1918-19 Spanish flu. Less well known is a 1916 measles epidemic, which spread throughout Newfoundland, Iceland, and many other countries. Initial analyses of data collected from Newfoundland suggested an interaction between these two epidemics, with some indication that widespread exposure to measles may have reduced mortality during the flu epidemic. This paper addresses the question of whether that was, in fact, the case. Methods include: 1) mapping the locations of deaths during both epidemics by community throughout the entire island of Newfoundland, 2) determining the strength of correlations by community between the two diseases, 3) determining how correlations change when considering presence/absence of the epidemics versus severity in terms of numbers of deaths and death rates, 4) and comparing the age distribution of the two epidemics to determine the impact of age, sex, and/or type of infection. Calculated correlations varied widely depending on the test considered, but correlations did not, in general, support the hypothesis that prior exposure to the measles epidemic reduced the impact of the influenza epidemic. Analyses suggest, however, that many factors are involved that may obscure the ability to detect such an interaction, including a) a significant difference in the size of the two epidemics, b) population size differences among communities, c) outliers that skewed the values of calculated correlations, and d) differences in the age distribution of deaths among males and females for the two epidemics. Results of the study and the implications of these complicating factors are discussed. This study highlights the importance of considering the circulation of multiple pathogens when trying to understand the impact of infectious diseases on human populations. Support: Government of Canada–Canada Studies Faculty Research Grant Program, University of Missouri McNair Scholars Program

SCHILLACI M.
Evolutionary process and the fabric of cultural identity: An example from the American Southwest
University of Toronto Scarborough
The concept of cultural affiliation represents the fundamental component of federal repatriation legislation in the United States. As part of implementation of the Native American Graves and Repatriation Act (NAGPRA), physical anthropologists have played a central role in determining cultural affiliation of Native American human remains, funerary objects, and objects of cultural patrimony housed in federally funded institutions. Similar to the economic opportunities afforded archaeologists with the advent of CRM projects, NAGPRA-related compliance work has provided physical anthropologists with much needed employment and funding opportunities. Assuming the role of an applied anthropologist in order to benefit from NAGPRA-related opportunities has placed our field in an awkward position. As applied anthropologists determining cultural affiliation we are not called upon to explore concepts of ethnicity and culture and how they may affect the distribution of biological variation
through time and space, nor are we asked to investigate how cultural affiliation may be affected by evolutionary processes such as gene flow and genetic drift. Rather, as applied anthropologists employed for NAGPRA compliance work we are called upon to embrace the very malady we have been struggling to overcome: a typological perspective on human variation. My goal here is to illustrate the potential complexity of cultural affiliation stemming from population history and evolutionary processes. To illustrate this complexity, I focus on the much-contested determinations of cultural affiliation for the human remains from Chaco Culture National Historical Park—a world heritage site in dedicated in 1987 by the United Nations. The results from my analyses of biological variation indicate that evolutionary process operating prehistorically has resulted in a woven-like fabric of biological identity. This process, much like identity itself, is embedded in the oral tradition of present-day Native communities.

SCHILLACI M[1]. and E Meijaard[2].
The Effect of Island Area on Body Size in a Single Primate Species
[1]University of Toronto
[2]The Nature Conservancy, Indonesia Forest Program, Indonesia
Island ecologies often differ from mainland ecologies in many respects. Smaller islands may have limited resources, fewer predators, and reduced interspecies competition. It follows, therefore, that insular species may experience different selection pressures than

their mainland congeners. Insular populations, consequently, are more likely to follow rapidly divergent evolutionary trajectories and possible speciation. The effect of island area on body size evolution in mammals is perhaps the most widely recognized example of insular evolution. Sometimes termed the "island rule", island area seems to often promote gigantism in smaller insular species, and dwarfism in larger species. With the discovery of a possible insular hominid dwarf from the island of Flores, Indonesia, the island rule is now receiving more attention in the literature. To date, however, there have not been any published studies of the island effect on a single primate species which could inform ongoing research on the Flores hominid. Our primary purpose here is to examine directly the effect of island area on one species of primate endemic to the Sunda Shelf and mainland Southeast Asia. We chose long-tailed macaques because they are the only anthropoid primate with a wide geographic distribution for which data are available. The results of our analysis of macaque morphology indicated that island size does not effect body length or head length. Consistent with Bergmann's rule, female macaque body length seemed to covary with latitude and altitude. Female and male head length covaried with latitude and distance to the nearest island. Our comparison with other insular small-bodied frugivors suggests there may be a size-threshold effect influencing the expression of the island effect in mammals. Data from larger island-dwelling primates such as M. nemestrina, however, are needed to test the applicability the size-threshold hypothesis and island rule to primates more generally.

SELLEN D.

The evolution of human complementary feeding

University of Toronto

Given a common human biology and ancestry, why does breastfeeding practice vary so markedly among individuals, between populations and across time? Evolutionary, anthropological and ethnographic comparisons are used to develop a general conceptual framework to understand prehistoric, historic, and contemporary variation in human lactation and complementary feeding patterns. All available evidence suggests that humans evolved an unusually flexible strategy for feeding young within the last 7 million years. For example, several lines of indirect phylogenetic, developmental physiological and nutritional ecological evidence from humans and other extant primates are consistent with a hypothesis that complementary feeding and flexible weaning evolved as facultative strategies that together provided a unique adaptation for resolving tradeoffs between maternal costs of lactation and risk of poor infant outcomes. Although this evolved flexibility may have been adaptive in the environments in which humans evolved, it creates potential for mismatch between optimal and actual feeding practices in many contemporary populations. Such mismatch has recently become large and widespread and seriously hampers efforts in improve maternal, neonatal and child health in the modern world and is an important topic for study by biological anthropologists.

SWAYZE S[1] and M Skinner[2].

Sus scrofa as an animal model for localized enamel defects

[1] University of Toronto
[2] Simon Fraser University

Localized hypoplasia of the human primary canine tooth is an understudied but clinically significant enamel defect. It accounts disproportionately for enamel defects in baby teeth and often becomes carious requiring restoration. It was first recognized in ancient remains and has now been shown to be common in apes. Purposive research linked occurrence of the defect to malnutrition in early infancy resulting in osteopenia of facial bone producing, in turn, fenestration of the deciduous canine crypt and exposure of ameloblasts to local trauma/pressure effects; an unusual combination of systemic and local etiological factors in this type of enamel defect. Research on this topic has languished in recent years owing to a lack of an experimental animal model. We report the observation of a very similar looking defect on the buccal side of maxillary molars (permanent and/or deciduous molars of recent and fossil pigs) and its association, in recent pigs, with fenestration of the alveolar bone forming the crypt wall. Our demonstration of cementum deposits on the floor of some of the defects in pigs suggests an unusual contact of connective tissue with compromised reduced enamel epithelium. Our dissections suggest that simple pressure from adjacent fibres of the contracting temporalis muscle through fenestrated crypt wall during suckling and chewing may be a proximate factor in producing the enamel defect. We conclude that the domestic pig is a suitable experimental animal model to conduct further research on remote and proximate factors which cause localized enamel defects in humans.

TEICHROEB J.

Social Correlates of Testosterone in Colobus vellerosus at Boabeng-Fiema: A Test of the 'Challenge Hypothesis'

University of Calgary

Testosterone (T) suppresses the immune system (Folstad & Karter, 1992), so maintaining high levels of this hormone is costly for males. Developed from research on birds, the 'challenge hypothesis' states that T levels in adult males are closely linked with male-male aggression in a reproductive context and that, while a low baseline of T is needed for breeding, T levels should rise during challenges by conspecific males (Wingfield et al., 1990). To test this hypothesis on *Colobus vellerosus*, fecal samples (n = 109) were collected from >27 subadult and adult males in 7 groups during 13-months of research in Ghana in 2004-2005. The testosterone in the samples was determined by radio-immunoassay. Behavioural data was collected using focal-animal sampling and Ad libitum data collection during 2547 contact hours. There was a trend ($p = 0.055$) for adult males to have higher T than subadult males. However, there was no effect of rank on T levels, suggesting that during periods of stability higher-ranked males do not consistently maintain high T. The level of male-male aggression experienced by individuals was positively correlated with fecal T levels ($p < 0.0001$). A standard multiple regression showed that the number of male incursions experienced significantly predicted T values ($p = 0.03$) whereas the number of between-group encounters did not ($p = 0.69$). Since male incursions in this population are likely attempts by males to gain reproductive opportunities, the 'challenge hypothesis' is supported in this species of primate. Males appear to only increase their testosterone when they are faced with aggression from conspecific males in a reproductive context.

TOCHERI M.

From hominoids to hominids to hobbits: Wrist morphology speaks volumes about our evolutionary history

Smithsonian Institution

The primate wrist typically consists of nine bones—two of these articulate with the radius, two with the ulna, four with the five metacarpal bases, and one with its surrounding carpals. Most primates retain generalized wrist morphology that is likely primitive for mammals. However, as a group the hominoids show considerable changes in their wrist morphology relative to other primates. Even within the Hominoidea, morphological features easily distinguish between members at the genus, tribe, subfamily, and family level. In this paper, I review the morphological evidence that traces the major and minor themes of wrist evolution within the Hominoidea. In comparison to non-hominoid primates, gibbons and siamangs show a reduced ulnar-carpal joint, a highly-mobile mid-carpal joint, and a ball-and-socket 1st carpometacarpal joint. Within the Hominidae, all of which show complete loss of the ulnar-carpal joint, further derived wrist morphology is observed. In addition to showing a highly-mobile mid-carpal joint, orangutans have a radio-ulnarly expanded lunate, a reduced triquetrum, as well as modifications to the trapezium-trapezoid-2nd metacarpal joints. The hominines are characterized as a group by the incorporation of the centrale into the scaphoid during prenatal development, a feature also seen in OH7 (*Homo habilis*) and LB1 (*Homo floresiensis*). Although overall the wrists of *Gorilla*, *Pan*, and *Australopithecus* are quite similar, there are some distinguishing features. In particular, gorillas typically show complete loss of the trapezoid-capitate joint and modifications to the primary 2nd carpometacarpal joint. While the wrist of *H. floresiensis* is indistinguishable from that seen in African apes, *Australopithecus*, and *H. habilis*, the wrist in modern humans and Neandertals is considerably modified. These include changes in the shapes and articular configurations of the scaphoid, trapezium, trapezoid, capitate, and the 1st, 2nd, and 3rd metacarpal bases. When viewed within the broad context of primate evolution, the changes seen in the hominoid wrist document a continuous record of differing morphological specializations within this superfamily. Wrist morphology not only distinguishes apes from monkeys, but also hominids from hylobatids, hominines from pongines, and even modern humans from hobbits.

VARNEY T[1] and S Burke[2].

Evaluating Health in the British Caribbean: Antigua, 1863-1872.

1 Lakehead University
2 University of Manitoba

Colonized under the British Empire in 1632, the island of Antigua represented an important military, naval, and economic base in the Caribbean. While much has been written on the significance of Antigua's dockyard and sugar operations, comparatively less is known of the experience of the civil population which was emancipated from plantation slavery in 1834. This paper marks a beginning into the study of the demographic features of Antigua's civil population in the 19th century, including an assessment of selected health markers in

the colony. A local Births and Deaths Ordinance was introduced in 1856 calling for the compulsory registration of all birth and death events in the colony. Registers were maintained by officials in each of Antigua's six parishes and information on cause of death for the death certificates was supplied by parish physicians. This paper focuses on a comparative analysis of two parishes for the years between 1863-1872. The parish of St John, which included the densely populated city of St. John, and was Antigua's most urbanized parish (50-60% urban). The parish of St. Paul provides an important rural comparison, and includes the site of English Harbour (one of the more significant and navigable dockyards of the Leeward Islands). The urbanized parish of St. John was characterized by lower estimates of life expectancy at birth (St. John 22.6M, 24.8F; St. Paul 33.2M, 34.0F) and higher levels of infant mortality (261 infant deaths/1000 livebirths for St John; 224/1000 for St. Paul). Biometric analyses with slopes exceeding unity suggest that breastfeeding was common in both parishes, though infants deaths attributed to diarrhea and fever were common due to environmental dangers. Further analyses suggest that Antiguans experienced some unique health risks, such as neonatal tetanus and an inflated stillbirth rate, which are addressed in relation to the ecology and political-economy of the island.

WADE A[1], Nelson A[1], Garvin G[2], and D Holdsworth[3] (POSTER)

Assessment of Human Trabecular Architecture in the Pubis by Three Radiographic Modalities

[1] University of Western Ontario
[2] St.Joseph Health Care
[3] Robarts Research Institute

Plain film radiography, computed tomography (CT) and micro-CT provide researchers with a non-destructive option for assessment, digital preservation, and electronic data sharing of human skeletal remains, particularly those that are incompatible with macroscopic techniques (ie. fragmentary remains, wrapped mummies) and those culturally-sensitive archaeological and forensic materials which must remain unmodified for future researchers or for repatriation and reburial. This poster will discuss technical aspects of a current investigation into correlations between age-at-death and changes in the cancellous bone of the human pubis; including the data acquisition strategies used for plain film, computed tomography (CT), and micro-CT radiographic modalities. Plain film radiographs have high spatial resolutions and the required equipment is both portable and widely available at relatively low cost allowing for rapid assessment of results even in the field. Computed tomography, and its higher resolution counterpart micro-CT, can image in three dimensions the trabecular micro-structures internal to skeletal elements at spatial resolutions approaching those of plain films, but at higher contrast resolutions. The application of CT and micro-CT modalities, largely unexplored in age estimation, provides volumetric data that avoids the confusion of overlying trabecular structures and apparent increases in density with element thickness seen in plain film radiography. The methods for processing quantitative data from all three modalities are addressed here, along with the thresholding strategies applied to the CT and micro-CT scans. Quantitative measures of linear and area trabecular density in plain film radiographs were devised, making use of basic image analysis software such as Image Pro Express and Adobe Photoshop. Quantitative stereological measures from CT scans were made using GE Healthcare's MicroView software once scan regional thresholds were calculated using a half-maximum height (HMH) thresholding protocol on greyscale data. Stereological measures were made likewise from the micro-CT data using an HMH protocol modified for use with data in Hounsfield units. A novel, non-destructive, and non-transformative approach to addressing beam hardening artifacts in CT scans of dry archaeological bone, developed in the course of this investigation, is also discussed.

WHITE C[1], Maxwell JP[1], Pendergast D[2] and FJ Longstaffe[1].

An Exploration of Personhood and Sentiment in an Ancient Maya Burial and its Sociopolitical Implications

[1] The University of Western Ontario
[2] University College London

We report a uniquely sentimental and unusually positioned Postclassic (AD 1450 to 1500) Maya burial from Lamanai, Belize, that includes the skeletons of a male and female and infant who appear to have west Mexican cultural attributes. The isotopic composition (from food and water consumption δ13C, δ15N, δ18O) of the adults is not distinctive from their contemporaries, which suggests that the adults moved to the site at an early age (the infant reflects the mother's composition). Morphological and cultural data from the male indicate that he may have been a high status weaver, an occupation that informs us in

new ways about the nature of Maya elites. All three individuals manifest health stress, which was likely the cause of death for the infant. The meaning of their populational affinity and the persona of the male in particular has implications for interpretations of activities at the site and its regional importance during the Postclassic period.

WIKBERG E.

Group fission in ursine colobus (Colobus vellerosus)

University of Calgary

Group fission occurs when one social group splits into two or more smaller groups. Even though group fission is a rare event, it can have important consequences by affecting within-group competition, relatedness and social relationships. This study evaluates which of four hypotheses can best explain the function of a single observed case of group fission in ursine colobus (*Colobus vellerosus*). Pre-fission data were collected on the parental group (DA) in May to August 2006 (104.5 contact hours), and post-fission data on the two daughter groups in May to August 2007 (86 hours and 80 hours respectively). Behavioral data were collected during focal follows of adult and subadult females and ad libitum on all group members. Before the group fission, DA group was considerably larger than the three study groups that did not fission and also had a high number of subadult females. In 2006, several cases of severe female-female aggression were observed. Aggression was more likely to be directed towards females who later formed the smaller of the two daughter groups (NP). On 8 of 18 observation days in 2006, a small subgroup of DA monkeys was located separately from the remainder of DA group. Females who formed NP group were more likely to be a part of this subgroup compared to females who later comprised the larger of the daughter groups. By May 2007, the group fission was complete and the two daughter groups had established separate home ranges within the former range of the parental group. Levels of female-female aggression were significantly lower after the group fission, even when controlling for changes in group size. These findings support the hypothesis that females fission off in order to reduce female competition, and targeted aggression appears to be a means for limiting group size in ursine colobus. By accumulating data from a wider range of species, the role of group fission in maintaining flexibility in human and non-human social organization can be examined.

WILLIAMS B.

Evaluating the Impact of Edentulousness on Cranial Sex Determination

University of Toronto

The purpose of this study is to evaluate the impact of tooth loss and complete edentulousness on [1] the expression of cranial morphological traits and [2] the overall accuracy of cranial sex determination. With advanced tooth loss, the masticatory structures will exhibit varying degrees of alveolar resorption due to atrophy of the associated muscles and decreased mechanical loading. As a result of this resorptive process, it is expected that cranial morphological features will decrease in size, appearing smaller or more ‘female’ in expression, thus producing higher levels of accuracy of correct sex determination of edentulous females, than males. This study tested 20 morphological features and four commonly employed measurements of the skull [maximum length, maximum breadth, bi-zygomatic breadth and bi-auricular breadth] on a modern cemetery of known sex. The study sample consists of 100 complete adult crania [females=57, males=43] of European White ancestry. Additional research exploring the impact of edentulousness on facial bones indicated that resorption is affected by multiple factors such as the age of the individual, the location of tooth loss, the number of teeth, diet, and the length of time since edentulousness. In order to provide a clearer picture and eliminate the potential for confusion with interpretation, the decision was made to examine only completely dentate and edentate individuals. One hundred percent accuracy was obtained for edentate females [n=25] using all 20 traits in combination, and 95.7% accuracy using the high quality morphological characteristics [n=6] recommended by Williams and Rogers [2006]. As anticipated, cranial morphology was less accurate for dentate females reporting 71.9% and 75% accuracy, respectively. Edentulous males do not follow the expected pattern of decreasing accuracy [100%] with advanced tooth loss. These results may be the effect of the limited sample size [n = 10] due to the elimination of partially edentate individuals from the analysis. Metric results for males, however, do indicate a potential trend of decreasing accuracy from 76.2% [dentate] to 66.7% [edentate]. Dentate males performed as expected reporting ≥ 80% accuracy in both rounds of assessment.

WILLIAMS J.

Ethical issues surrounding the application of stable isotope analysis to archaeological questions

Trent University

Stable isotope analysis is an analytical technique increasingly utilized by bioarchaeologists, but there are a variety of ethical issues surrounding its application that must be considered. These include sample size, sampling technique, research design and permission. Isotope analysis is destructive, but advances in the technique have reduced sample sizes. Early isotope studies utilized large bone samples (e.g., an entire rib); whereas, current analyses can be completed with samples as small as 0.2 grams (even smaller samples are required in labs equipped with laser ablation technology). However, it is still common for researchers, particularly in North America, to publish data prepared from samples much larger than one gram. If we can produce high quality isotope data from much smaller samples, why do we continue to rely on large samples? Second, there is debate about whether certain bones are better for isotope analysis, but we must also consider that all bones do not provide the same level of osteological information. For example, if the rib, femur, and skull are all available and they each retain similar amounts of biogenic 'collagen', is it ethical to sample the femur or skull since they provide more osteological information (e.g., sex, stature) than the rib? Third, should isotope analysis be applied to all populations, or are there cases where there is enough archaeological and/or ethnohistoric information about diet that would eliminate the necessity for destructive analyses? Lastly, not all isotope studies are conducted with the permission and/or knowledge of local governments. How will this practice affect the ability of future researchers to conduct destructive analyses in these countries and the relationship between anthropologists as a group and local governments? Because stable isotope analysis is a destructive technique, we have an obligation to future researchers to conserve skeletal material by taking the smallest sample possible, sampling the least 'valuable' bones, carefully considering the questions that are best addressed using this technique and securing permission for these analyses. It is only by grappling with these ethical issues that we can produce high-quality isotope data that are also ethical and informed.

WROBEL-JANJUA M.

Diagenesis of Weathered Bone: Femur vs. Metatarsal Using Frost's 'Rapid Manual Method

McMaster University

The purpose of this research is to determine whether macroscopic changes due to weathering are an adequate indicator of histological preservation of cortical bone. Twenty-two metatarsals, twenty-four femora, and four tibiae were exposed to weathering for periods of nine months and two years. In a previous study, the changes due to weathering were observed and recorded. The thin sections were prepared using Frost's Rapid Manual Method, and the degree of diagenesis was determined using Hedges' and Millard's Histological Index, as well as the degree of birefringence. The Mann Whitney U test was used to perform statistical analyses. Size of bone seems to have an effect on the amount of birefringence, but not on the Histological Index. Contact with soil also results in changes to birefringence of small bones such as metatarsals, but does not affect large bones such as femora. Overall, the external appearance of surface scattered weathered bone is an accurate indicator of the degree of physical diagenesis of cortical bone within the first two years of exposure.

YANNICK K. (POSTER)

Sphenoid Bone in the Basicranial Shape

University of Montreal

The sphenoid is the central part of the skull base bone complex with the ethmoid and the basi-occipital. This sphenoid is associated with the skull vault bones, the face bones and indirectly with the vertebral column. Our method is based on the use of radiographs for 107 Homo sapiens, 27 Pan and Gorilla, in addition with 23 fossil hominids, Paranthropus, Australopithecus, Homo erectus and Homo neanderthalensis. Classical measures are completed by a new model for the endocranium profile, the "ellipses method". It's using coronal, transverse and sagittal radiographs of the skull. This study gives us a new point of view upon the classical skull base flexion in the human lineage. In Homo sapiens the skull base is very bent in the occipital bascule movement. Compared with the African Apes, this flexion could be split into five major processes: the sphenooccipital flexion, the pharyngeal flexion, the sphenoidal facial area and the dorsal expansion. The vault is seen in balance with the Sphenoid by the way of the "ellipses method". Then we can see that the Sphenoid gives rotation to the entire skull base, thus to the postural disposition of the axial skeleton. This

rotation is seen through four rotation stages, though we need a fossil ape to complete this approach.
*Keywords: spheno-occipital flexion/ pharyngeal flexion/ sphenoidal facial area/ dorsal expansion/ ellipses method/ rotation.