

CAPA/ACAP Conference 2004
The University of Western Ontario

Hosted at
London Delta Armories Hotel
October 27th – 30th 2004



CAPA/ACAP Conference 2004

The University of Western Ontario

EVENTS

Wednesday, October 27

7:00–9:00 pm Reception *Delta London Armories Hotel Officers' Club*
Cash Bar and Hors d'Oeuvres
Event sponsored by Pearson Education Canada

Thursday, October 28

Evening Business meeting after the presentations *Salons*
7:00 pm Student Reception *Elephant & Castle*
(Dundas & Wellington)

Friday, October 29

7:00 pm Banquet *Delta London Armories Hotel Gunnery Ballroom*
Cash Bar
Keynote Speaker *Jerry Conlogue*
Quinnipiac University, Hamden, CT

Saturday, October 30

5:30-8:00 pm *Soirée finale chez les Nelsons* – conference closing reception
and Halloween party – 22 Peter Street

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CAPA/ACAP Conference 2004

The University of Western Ontario

Wednesday, October 27

Evening	Registration	
	Reception	<i>Officers Club</i>
	<i>Reception sponsored by Pearson Education Canada</i>	

Thursday, October 28

08:15	Opening Remarks	<i>Salons</i>
08:30–09:45	Session 1: Repatriation Doesn't Have to be a Four-Letter Word Symposium Chair: J. Christopher Dudar What Significance do Bones Have? A Personal Perspective on Repatriation J. Christopher Dudar Human Remains and the Canadian Museum of Civilization David Morrison Repatriation – Resisting Assimilation: Kitigan Zibi's Journey From Honouring Our Past to Protecting Our Future, Part 1 Gilbert Whiteduck Repatriation – Resisting Assimilation: Kitigan Zibi's Journey From Honouring Our Past to Protecting Our Future, Part 2 Brenda Odjick The China Lake and Big Bar Projects: Community Based Research in Physical Anthropology and Mortuary Archaeology Jerry Cybulski <i>et al.</i>	
09:45–10:00	Coffee & Tea Break	
10:00–11:45	Session 2: Human Biology – Medical Anthropology Session Chair: Tracey Galloway Students' Beliefs About Contagion and Implications for Antibacterial Soap Use Catherine Ahern*	

* note: an asterisk indicates that this paper is eligible for a student prize

Nutrition and Infectious Disease: The Significance of Body Mass Index Among Tuberculosis Sanatorium Patients

Stacie D. A. Burke and Lawrence A. Sawchuk

A Syndemic Perspective on Whooping Cough Epidemics at York Factory

Claire Young* and D. Ann Herring

More Sickness, Less Death? Conflicting Patterns in Morbidity and Mortality During the 19th Century Mortality Decline

Janet Padiak

Results of Anthropometry in a Sample of Rural Ontario Schoolchildren

Tracey Galloway*

Putting Health in its Place

Tracy Farmer

The 1918-1919 Influenza Pandemic at Norway House and Fisher River, Manitoba

Karen Slonim*

11:45-13:15 Lunch

13:15-15:00 Session 3: The Application of Microtechniques to the Study of Past Populations

Symposium Chairs: Tanya von Hunnius and Jodi Lynn Barta

Isotopic Analysis of Seasonality from Single Osteons, Wadi Halfa, Sudan

Henry Schwarcz et al.

Histological Identification of Syphilis in Pre-Columbian England

Tanya von Hunnius et al. ~~Darman~~

Dental Histology for Dummies – Demystifying the Techniques

Charles FitzGerald and S. R. Saunders *odontochronology*

Reconstructing an Epidemiology of Parasite Infection on the Northwest Coast

R. Bathurst *

Abney Cannon: Fisheries Archaeol. Research Ctr - MCM

Going to the Dogs: What Can Ancient Dogs Tell Us About Past Human Activity Patterns in the New World?

Jodi Lynn Barta 165 dogs, 24 sites; mtDNA

SIMS secondary ion mass spectrometry (Oak Ridge, Tenn) caesium 130 + 13C ions machine: only apatite

eggs from shell midden auger samples roundworm at residence sites - feces

Wamu site

IL 6: chromo. #7.
G-G correl. w/
< resistance to TB
> parasites,
fungi

5-6 extractions/tooth
★

teeth best

14/18 typable
all intermed or high
none CC

Detection of Single Nucleotide Polymorphisms in the Cytokine Promoter Regions of Nuclear DNA: What This Means for a Contemporary Aboriginal Population
Linda A. Larcombe*

The Origins of AIDS: from Archive to DNA Sequence
D. Poinar and H. Poinar

15:00-15:15 Coffee & Tea Break

15:15-17:00 Session 4: Skeletal Biology
Session Chair: Christine White

Maresh standard = short from infancy
Impact of Environmental Insults on Dental vs Skeletal Development: Preliminary Data from a Study of a Modern Documented Subadult Skeletal Sample $N=59$ 3mo-12yr.
117 < 20yrs old
Hugo F. V. Cardoso* Lisbon

alkaline + acidic types of peat
The Iron Age Bog Bodies of the Archaeologisches Landesmuseum, Schloss Gottorf, northern Germany: New data
Heather Gill-Robinson*

Kung
The sterile crescent due to venereal disease
1975 syphilis
eruption rather than formation
pubis dif. since Pliocene
Overcoming Biases in the Paleodemographic Record: Estimating Mortality, Age Structure, and Annual Growth, with an Example from Northern Ohio, 9th to 11th Centuries AD.
Richard Meindl et al. discard pubis, favor auricular
assume high intrinsic growth

The Taphonomy and Re-Individualization of Human Foot Bones from La Garma C, a Cantabrian Cave Site
Corrine Marceau*

Patterns of Violent Trauma at the Adoratorio Temple, Tucume, Peru

J. Marla Toyne* and Bernarda Delgado Elias

Biodemography of the Ancient Pueblo Using Agent-Based Simulation to Estimate Population Histories

Alan Swedlund et al. Artificial Anasazi/Sugarscape (?)

17:00 Business Meeting

Salons

19:00 Student Reception

Elephant & Castle

Friday, October 29

08:30–10:00

Session 5: Primatology

Salons

Session Chair: Ian C. Colquhoun

Can Predator Pressure Explain Cathemeral Activity Patterns in Lemurid and Ceboid Primates?

Ian C. Colquhoun

The Population Status of *Colobus vellerosus* at the Boabeng-Fiema Monkey Sanctuary and Surrounding Forest Fragments, Ghana

Sarah Wong* and Pascale Sicotte

The Effects of Forest Fragmentation on the Feeding Ecology of the Diademed Sifaka (*Propithecus diadema*): The Importance of Parasitic Mistletoes

Mitchell T. Irwin*

Sharp Spines and Toxic Stings: How *Cebus capucinus* Overcomes the Defense Mechanisms of Insects in Costa Rica

Hilary C. Young and Linda M. Fedigan

Nutritional Composition and Variation of the Capuchin Diet

Grainne M. McCabe* and Linda M. Fedigan

A Preliminary Report on the Diet and Activity Budget of Lowe's Guenon (*Cercopithecus campbelli lowei*) in Central Ghana

Nicolette Porter and Pascale Sicotte

10:00–10:15

Coffee & Tea Break

10:15–11:30

Session 5 continued

Intragroup Spacing in the Central American Black Howler (*Alouatta pigra*)

Lisa C. Corewyn* and M. S. M. Pavelka

The Orientation of the Mid-Lumbar Transverse Processes and its Relationship to Locomotion in Anthropoids

Danielle F. Royer*

Sex and Age Determination in Vervet Monkeys (*Cercopithecus aethiops*): How Effective are the Available Methods?

Cynthia Kwok*

Are Limestone Hills a Refuge or Essential Habitat for White-headed Langurs in Fusui, China?

Zhaoyuan Li*

Prevalence of Select Simian Retroviruses in Street Performance Monkeys in Jakarta, Indonesia
Michael A. Schillaci *et al.*

11:30–12:15 Session 6: Fossil Hominids
Session Chair: Michael A. Schillaci

Miocene Community Ecology and the Origins of Great Ape Intelligence
M.C. Nargolwalla* and D.R. Begun

Interpreting Positional Behaviour and Locomotion from Fragmentary Fossil Hominoid Phalanges: An Application of the High Resolution Polynomial Curve Fitting (HR-PCF) Method
A.S. Deane* and D.R. Begun

Functional Anatomy of the Elbow of Early Hominins
Michelle Drapeau

12:15–13:45 Lunch

13:45–15:00 Session 7: Chemical Applications in Anthropological Research
Symposium Chairs: Allyson Brady and Jay Maxwell

Oxygen-Isotope Variability in Nilotic Nubian Mummies: Food, Physiology or Foreigners?
Christine White *et al.*

Postclassic Maya Socio-Economic Complexity and Ideology at Chau Hiix, Belize
Jessica Z. Metcalfe*

Stable Isotopic Evidence of Diet in a Greek Colonial Population from the Black Sea
Anne Keenleyside *et al.*

Stable Carbon Isotope Signature of Ancient Maize Agriculture in the Soils of Motul de San Jose, Guatemala
Elizabeth A. Webb *et al.*

The Effects of Microbial Diagenesis on the Stable Carbon and Oxygen Isotopic Signal of Skeletal Material using Laser Ablation
Allyson Brady* *et al.*

15:00–15:15 Coffee & Tea Break

15:15–16:30 **Session 7 continued**

Strontium and Neodymium Isotope Ratios as Tracers of Human Migration in Iceland

Henry Schwarcz *et al.*

On Using Zinc to Reconstruct Nutrition and Health in Past Populations: Insights from Analyses of a Contemporary Dental Sample

Alexis E. Dolphin*

Trace Element Analysis of Dentin: A Test of the Application of Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS) to the Assessment of Childhood Dietary Pattern from Adult Human Teeth

Barbara R. Hewitt*

The Detection of Lead by Micro-Xray Fluorescence of Cementum in Human Teeth Derived from Archaeological Contexts – What Might we Learn?

Steven Naftel *et al.*

Evening

Banquet

Gunnery Ballroom

Keynote Speaker: **Jerry Conlogue**, Quinnipiac University, Hamden CT

Mummies I Have Known: Reflections on Friends Met on the Mummy Road Show.

Jerry Conlogue is the Director of Diagnostic Imaging in the School of Health Sciences at Quinnipiac University in Hamden, Connecticut and the co-director of the Bioanthropology Research Institute at Quinnipiac. For more than 30 years he has developed innovative radiographic techniques for “non-traditional” applications - everything from looking for underpainting on works of art, to aging seals by looking at the formation of bones in their flippers, to examining the structure of humming bird beaks, to x-raying bones and mummies from archaeological contexts. Most recently he co-starred with colleague Ron Beckett on the television production “The Mummy Road Show” (EB Media Productions for National Geographic Cable Channel). Over the course of three seasons, Jerry traveled to such places as Seattle, Thailand, Peru, Turkey and exotic Chatham, Ontario, in search of little known mummies, seeking to “tell their stories”.

Tonight, as befits a lecture on the eve of Halloween, Jerry will share stories of some of the more than 500 mummies he has known, particularly as part of the Mummy Road Show series. These stories reflect on these emissaries from the past and on how they are perceived by academics and the popular media. This lecture will illuminate this fascinating subject, helping us see through the wrappings to the core of the matter.

Saturday, October 30

Poster sessions will run all morning in the Officers Club

08:25–09:30 Session 8: Forensic Anthropology: Field, Lab, and Court
Symposium Chair: Tracy Rogers

Introduction

Field

Taphonomic Alterations to Blunt Force Trauma
Stephanie Calce*

**Guidelines for the Recognition of Pioneer Cemeteries and
Associated Skeletal Remains in a Forensic Context**
Kate Paterson

Forensic Anthropological Excavation
Christian Crowder

Looking Out Through Looking In
Travis Allard* and Brian Barth

09:30–09:45 Coffee & Tea Break Sponsored by Thompson Nelson

09:45–11:15 Session 8 continued

Lab

**Personal Identification of Unknown Skeletal Remains from the
Thoracic Vertebrae**
Lelia Watamaniuk*

Identification of Chop Wounds in an Historical Murder Victim
Carolann Wood

Identifying and Researching Genocide in Forensic Anthropology
Hope Kron*

Sex Determination Using the Clavicle: The Grant Collection
Jennifer Sharman

Court

Crime Scene Evidence and Jury Perception
Brenda Williams*

Forensic Visualization for Expert Testimony
Tracy Rogers and Meaghan Brierley

11:15–12:45 Lunch

12:45–14:30

Session 9: Paleopathology and Paleoradiology

Session Chair: Rethy Chhem

Prediction of Age-at-Death from 3D Changes in Cortical Porosity at the Anterior Femoral Midshaft

D.M.L. Cooper *et al.*

Early Literature on Paleoradiology

Rethy Chhem *et al.*

Did Ramesses II Really Have Ankylosing Spondylitis? A Reappraisal

Rethy Chhem *et al.*

Exceptionally High Levels of Spondyloarthropathy in Two Coastal Maya Populations

Jay Maxwell*

Osseotype Approach to Disease Recognition

Bruce Rothschild

Health Status and Origins of Pastoralism

Deborah Merritt

Dental Pathology and the Reconstruction and Diet in Two Postclassic Maya Skeletal Populations

Julianna Matthews*

14:30–14:45

Coffee & Tea Break Sponsored by McGraw-Hill Ryerson

14:45–17:00

Session 10: The Bioarchaeology of Human Remains Associated with the Village of Kellis, the Dakhleh Oasis, Egypt

Symposium Chair: J.E. Molto

Bioarchaeological Research at Kellis: An Overview

J.E. Molto

The Chronology of Kellis 2: The AMS Radio-Carbon Dating Evidence

J.D. Stewart *et al.*

Mortuary Mixtures: Evidence of Body Treatment in a Roman/Early Christian Cemetery

Lana Williams* and Tosha Dupras

Fractured Childhood: Evidence of Possible Child Abuse from the Dakhleh Oasis, Egypt

Sandra M. Wheeler* and J.E. Molto

Hip Fractures in burials from Kellis 2 Dakhleh Oasis

Peter Sheldrick

Molecular Paleopathology of Dakhleh Oasis, Infections of *Mycobacterium tuberculosis*, *Mycobacterium leprae* and Events of Co-Infection

C.D. Matheson *et al.*

"Hair Today, DNA Tomorrow": A Preliminary Study: Ancient DNA Extraction from Ancient Egyptian Hair Shafts

Carolyn Murray

All Bent Out of Shape: A Potential Case of Osteogenesis Imperfecta from the Dakhleh Oasis, Egypt

Tosha Dupras *et al.*

A Test of the Mortality Bias Using Stable Isotope Analysis of Juvenile Dentition

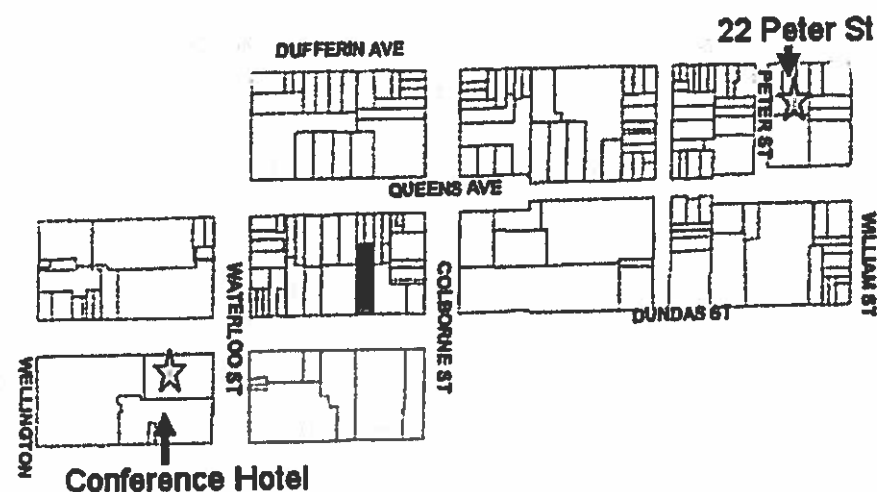
Tosha Dupras and Matthew Tocheri

17:00

Closing Remarks

17:30-20:00

Soirée finale chez les Nelson - conference closing reception and Halloween party – 22 Peter Street



Saturday, October 30

Poster Session: Morning

Officers Club

A New Portable Scanning System for the Acquisition of Data from Three-Dimensional Objects

Jodi Blumenfeld* *et al.*

The First Year of a Late Victorian Era Toronto Hospital: A Biocultural Assessment

Mary D. Denvir

Examining Osteopenia in Prehistoric and Historic Human Samples: The Importance and Advantages of Employing Both Macroscopic and Microscopic Techniques

Lindsay Foreman*

Transmission of migration propensity increases genetic divergence between populations

Alain Gagnon *et al.*

A Re-analysis of Trauma Patterns Among Neandertals

Janet Gardner*

Are National Guard Soldiers Just Civilians in Uniform? Body Size in the United States Army

Todd Garlie and Claire Gordon

Decomposition Stages as a Comparative Baseline for Scavenging Activity

Yvonne Kjorlien* *et al.*

Primary and Secondary Burial in Coastal Ecuador: Olla Rescue and Recovery of Physical Remains

Jenny Laurence

Examining an Epidemic of Scarlet Fever in the Late 19th Century, Cape Breton Island, Nova Scotia

J.M. Parish

Skull Lesion Diagnostics Reconsidered

Katie Whitaker*

Lady Hudson and Mummy Studies at UWO

The UWO Mummy Project Team

The UWO Mummy Project: The Students' Perspective on Multidisciplinary Approaches to Applied Research

Alan Cross* *et al.*



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Podium Abstracts

***AHERN C.** *Students' beliefs about contagion and implications for antibacterial soap use.* The use of antimicrobials, including over-the-counter antibacterial soaps, is an important measure limiting the spread of infectious disease. Yet there is evidence to suggest that their widespread use is actually decreasing their efficacy. As a way to understand why people choose to use antimicrobials, this study investigated McMaster undergraduates' beliefs about health and contagion. Interviews with 30 participants were conducted, and the transcripts coded and analysed for emergent themes using the NVivo software. In this study, students' explanatory model of health proved to have several key components that inform their health-seeking decisions, including whether or not to use antibacterial soap. Generally they understand health in terms of having energy, being disease free, and as something to be achieved through healthy lifestyle. There were gender differences in emphasis within the explanatory model. Men in this study tended to have a more internally focussed explanatory model of health, while women tended to have a more external focus. This seems to explain why the women were significantly more likely to use antibacterial soap than the men ($p=0.027$). The explanatory model and consequent use of antibacterial soap are best understood as a means of expressing social values, including social boundaries and morality.

***ALLARD T and Barth B.** *Reaching out through Looking In: Interactive Burial Series.* The objective of this interactive burial series is to provide a holistic, realistic, and practical perspective of anthropology to a general audience. Links to information about archaeology, cultural and physical anthropology provide the tools necessary for understanding the application of anthropological theory and method. The recent popularization of forensic

anthropology has contributed to a distorted understanding of the work of anthropologists and the types of information that can be obtained from human remains. The series allows the user to actively participate in a simulated forensic case study. This provides for a unique and engaging learning experience, which first arms the user with information, and then challenges their understanding through specific case examples. Misconceptions are clarified and a deeper understanding of the importance and limitations of forensic anthropology is achieved.

BARTA JL. *Going to the dogs: What can ancient dogs tell us about past human activity patterns in the New World?* Domesticated dogs (*Canis familiaris*) have been excavated in association with human activity from late Paleolithic sites onward and their remains may now provide unique opportunities to examine human migration and interaction. The close cultural context of dogs and humans raises the question of whether dogs may serve as proxies of human activity patterns in the past at a molecular level thus bypassing the destructive analysis of spiritually sensitive human remains and presenting a novel method for answering old questions. This paper focuses on ancient DNA analyses of the archaeological remains of indigenous dogs excavated from the Northwest Coast of North America and their potential as proxies of human migration and interaction patterns across space and time.

BATHURST R. *Reconstructing an epidemiology of parasite infection on the Northwest Coast.* Microscopic eggs from intestinal parasites as much as 5500 years old have been recovered from shell middens along the central Pacific coast of British Columbia, Canada. An epidemiological reconstruction of the complicated life cycles of the recovered parasites provides a detailed glimpse of the health, environment and behaviours of the

parasitized human populations. This paper will reconstruct the paleoepidemiology of two of the recovered parasite genera; *Diphylobothrium* spp. (fish tapeworm) and *Ascaris lumbricoides* (giant human roundworm) and demonstrate the wealth of information that can be derived from such microscopic evidence.

*BRADY A, White C, Longstaffe F, Southam G. *The effects of microbial diagenesis on the stable carbon and oxygen isotopic signal of skeletal material using laser ablation.* Post-depositional alteration of skeletal material is a problem that has long plagued isotopic analysis of archaeological material. Diagenesis, the term used to describe the post-depositional alteration, may be physical, chemical or biological in nature. Microbial diagenesis has the potential impact of altering isotopic signatures in skeletal material through decomposition by soil microorganisms. This paper focuses on the microbial diagenesis of hydroxyapatite occurring in a soil environment and its effects on the carbon and oxygen isotopic signals. Modern bone and tooth samples were subjected to microbial degradation in a natural soil environment and the extent of bacterial colonization of differing skeletal tissue layers was identified using scanning electron microscopy. Areas recognized as potentially having undergone microbial diagenesis based upon observed evidence of colonization were targeted for isotopic analysis using a CO₂ laser ablation system; ideal for spot analysis on rare or small specimens. Archaeological samples were also analyzed in an attempt to identify patterns in the colonization or offsets in isotopic values over time. Variation in both the degree of colonization of differing areas of the bone and also in the isotopic values obtained from altered versus unaltered areas were observed. Identification of microbial alteration of isotopic values on a micro-scale has significant implications for microsampling of archaeological material. These results further our knowledge of the process of biodegradation and allow for more accurate isotopic analysis of archaeological material at the microscopic level.

BURKE SDA, Sawchuk LA. *Nutrition and infectious disease: The significance of body mass index among tuberculosis sanatorium patients.* Recognized as a wasting disease, individuals suffering from active tuberculosis were once described as 'consumptives,' the flesh of their bodies literally consumed by the disease. This research examines issues of

nutrition and body mass index (weight loss or weight gain) among patients at the Muskoka Free Hospital for Consumptives. Case histories were extracted for 581 patients who were admitted to the sanatorium between 1910-1912. Height and weight measurements at admission and discharge allowed for the calculation of body mass index among these patients; the current standard of 18.5 defines clinically 'underweight' cases. Overall, some 30% of patients were classified as 'underweight' at the time of their admission. Considerable sex differences underlie this average since significantly more women (44%) than men (21%) were observed to be 'underweight'. Consideration of body mass index is important since being 'underweight' was viewed both as a risk for tuberculosis disease or as an indication of heightened tuberculosis disease activity. Interestingly, it was men (not women) who were more likely to enter the sanatorium with more advanced disease, suggesting that other social factors may have led to women's greater likelihood of being 'underweight'. In this paper, we explore the extent of weight gain and loss in the sanatorium with respect to disease activity and assess the social and biological significance of these gains and losses within and outside of the sanatorium. Special attention is paid to the role of the sanatorium diet and the importance placed on protein intake while treating this disease.

*CALCE S. *Taphonomic alterations to blunt force trauma.* The purpose of this research is to determine the degree to which taphonomic processes can conceal blunt force trauma through an experimental pilot study using pig (*Sus scrofa*) heads. Blunt force trauma was inflicted on ten pig skulls with a hammer. The skulls were subsequently exposed to environmental stress for a period of 12 months. The skulls were collected and cleaned to ensure proper visualization of the bone. A dissecting microscope, calipers, photographs, and independent observers were used to evaluate the effects of seven taphonomic processes on the impact point and its associated fractures. Of primary concern was the potential for the following taphonomic factors to disguise antemortem trauma: (1) the freeze-thaw cycle of Southern Ontario; (2) rodent gnawing; (3) carnivore scavenging; (4) presence/weight of soil; (5) presence/weight of rain and snow; (6) movement/displacement of the bones; and (7) bleaching and grass staining. Taphonomic effects varied between cancellous, compact,

fresh and de-greased bone. Freezing and thawing, exposure to rain and snow, and movement of the skulls showed a potentially significant impact in disguising pre-existing trauma. Rodent and carnivore scavenging did not obliterate traces of radiating, concentric or hinge fractures resulting in minimal modification of fractures at the impact sites. Patterns suggested by this research will provide investigators with guidelines for examining blunt force trauma on remains affected by taphonomic processes in order to recognize, determine or rule out circumstances of cause and manner of death.

*CARDOSO HFV. *Impact of environmental insults on dental versus skeletal development: preliminary data from a study of a modern documented subadult skeletal sample.* A basic assumption in human osteological research is that dental development is less sensitive to environmental insults and thus considered the best indicator of chronological age while skeletal development is considered more affected and thus provides a measure of growth faltering. The purpose of this study is to assess the differential impact of environmental conditions on dental and skeletal development and contribute to a better understanding of the influence of environmental factors in these two biological systems. Data on femur diaphyseal length and stages of tooth formation was collected from the subadult sample of the Luis Lopes Identified Skeletal Collection housed at the Bocage Museum (National Museum of Natural History, Lisbon, Portugal). Sex, age at death, cause of death, address at the time of time and other documentary information is available for all subadult individuals. In order to detect differential environmental impacts on femur growth and tooth formation the data was compared to reference standards. Femur length was converted into z-scores and tooth formation data was converted into discrepancies between true and estimated age. The results show that both dental and skeletal systems are affected by environmental factors but the greatest impact is on skeletal growth. A more detailed analysis of the documentary evidence associated with the individuals that showed the largest femur growth deficit and the largest discrepancy between true and estimated age shows that they represent the lowest socio-economic segment of the sample.

CHHEM R, Boeni T, Ruhli F. *Early literature on paleoradiology.* Soon after the discovery of X-

rays and even before the establishment of Radiology as a medical specialty and profession, radiological examinations were performed for the study of mummies and other archaeological finds outside the field of clinical medicine. This emerging technology was the result of many interdisciplinary scientific works that were carried out by physicists, radiologists, Egyptologists, geologists, paleontologists and physical anthropologists. The purpose of this talk is to review the early papers on X-rays of mummies and hominid fossils published in the literature during the 25 years following the discovery of X-rays. Those articles were written predominantly in German, but also in English and French. The long narrative form used in those articles reflects the style of scientific writing in the late 19th and early 20th centuries.

CHHEM R, Schmit P, Faure C. Did ramesses II really have ankylosing spondylitis? A reappraisal. The purpose of this presentation is to challenge the diagnosis of ankylosing spondylitis in the mummy of Ramesses II that was suggested 30 years ago and to propose a differential diagnosis for the changes that were detected in the mummy's spine and pelvis. A re-interpretation of published and unpublished radiographs of the mummy was done. The radiological findings and historical evidence suggest the diagnosis of diffuse idiopathic skeletal hyperostosis (DISH) was more probable than that of ankylosing spondylitis. It was not possible to exclude completely a diagnosis of spondylosis deformans.

COLQUHOUN IC. Can predator pressure explain cathemeral activity patterns in lemurid and ceboid primates? Unstructured, 24-hour activity cycles were first reported in lemurid primates in the 1970s; the term *cathemeral* was introduced in the late 1980s to describe such patterns of activity. Presently, two views on the evolution of cathemerality predominate in the literature: i) that it is the outcome of proximate causes (such as selectional release due to the extinction or absence of other species); ii) that it is an evolutionary stable strategy (ESS), perhaps representing the ancestral activity pattern of genus *Eulemur*. Predators factor into both explanatory models. A decrease in, or lack of, predation pressure could be a proximate factor that leads to cathemerality. Predatory species, however, may also be cathemeral; thus, cathemerality could represent an ESS. Comparing lemurid and ceboid cathemerality, the impact of predatory species does not appear

to provide a unitary explanation for cathemerality. In the cases of the New World genera *Alouatta* (howler monkeys) and *Aotus* (owl monkeys), birds of prey may be implicated, but differently – their presence vis-a-vis *Alouatta* cathemerality, and their absence vis-à-vis *Aotus* cathemerality. For *Aotus*, thermoregulatory stress may also be a factor. Birds of prey also exert predator pressure on lemurs, but more important is the threat posed by Madagascar's largest carnivore, the cathemeral fossa (*Cryptoprocta ferox*). Thus, lemurid cathemerality may be more parsimoniously explained as an ESS. In addition to predation, a comprehensive explanation of the evolution of cathemerality should also incorporate the combined effects of seasonality of climate and forest ecology.

*COOPER DML, Clement JG, Thomas DL, Hallgrímsson B. *Prediction of age-at-death from 3D changes in cortical porosity at the anterior femoral midshaft*. Cortical bone porosity consists of an interconnected network of canals that play an integral role in the remodeling process. Therefore, we hypothesized that the 3D structure of the canal network demonstrates age-related changes which may prove useful for age-at-death estimation. This hypothesis was tested on a modern autopsy collection of 84 anterior femoral midshaft specimens of known age and sex (30 females, 54 males), ranging in age from 18 to 92 years. The specimens were micro-CT scanned at 7 μ m isotropic resolution and cylindrical volumes of interest, 3 mm in diameter and 3 mm long, adjacent to the periosteal surface, were isolated for analysis. Percent porosity, mean canal diameter, mean canal separation, canal surface area to volume ratio, and canal density, were measured using model-independent 3D stereological methods. All of these parameters demonstrated significant ($p < 0.01$) correlations with age for females, males, and pooled sexes. The best coefficients of determination (r^2) using stepwise linear regression were 0.763, 0.470, and 0.541, for females, males and pooled sexes, respectively. The corresponding standard errors (SE) of the estimate were 12.0, 15.2, and 14.7 years, respectively. These results revealed age prediction based upon 3D structure of the canal network was better for females than males. However, the relatively high SE values indicated a considerable degree of 3D microstructural variation for both sexes. This suggests that aging techniques based upon cortical remodeling of the femur (2D and 3D) will be

limited to producing imprecise estimates with large confidence intervals.

*COREWYN LC, Pavelka MSM. *Intragroup spacing in the Central American black howler (Alouatta pigra)*. The Central American black howler (*Alouatta pigra*) is largely folivorous, and like other folivorous primates exhibits low levels overt social interaction, such as grooming or intragroup aggression. Therefore, proximity between individuals may represent one of the few observable expressions of their underlying social relationships. I studied intragroup proximity in three groups of *A. pigra* in Monkey River, Belize for six continuous months in 2003. Using focal animal sampling I recorded all behaviors of adults and juveniles, and noted the identity and number of neighbors in any of four proximity categories at the beginning and end of each sample. If feeding, I recorded the plant part consumed. Potential sources of variation analyzed included age-sex class, activity, and diet. Results revealed that adult females associated more frequently with adult males than other adult females, meeting the general prediction of cross-sex affiliation in dispersal-egalitarian species as a reflection of the need for male protection. As expected, adult females also maintained close proximity (within two metres) with at least one individual more frequently than adult males, who were observed without neighbors more frequently than other age-sex classes. This was also found when adult females were feeding and resting. Analyses of diet revealed that females (both adult and juvenile) were more frequently in close proximity to at least one individual when feeding on both leaves and fruit than adult males. The analyses of activity and diet appear to support the prediction of *A. pigra* as scramble-type competitors.

CROWDER C. *Death scene reconstruction involving clandestine graves*. Forensic anthropologists perform the controlled collection and excavation of human remains from clandestine graves utilizing yet altering traditional archaeological methods. While historical archaeologists are experts at reconstructing past events through methodical and meticulous excavations, those without extensive forensic training may not be prepared for the complexities of a crime scene or be versed in procedures for evidence handling and collection. This presentation will demonstrate traditional and non-traditional archaeological methods that are required to adequately

reconstruct a crime scene with buried human remains. The goal of the forensic anthropologist is to not only recover the body for laboratory analysis, but to uncover information about the perpetrator(s) by reconstructing the activities associated with the crime scene. Therefore it is important to not treat the body as the primary piece of evidence. The grave walls, backfill, backfill halo, surrounding vegetation, and the landscape around the grave will provide valuable clues to reconstruct the crime scene. The use of archaeologists and physical anthropologists without specialized training and experience in forensic investigations will result in an incomplete analysis of the crime scene.

CYBULSKI JS, Harry H, McMillan A, Cousins S. *The China Lake and Big Bar Projects: Community based research in physical anthropology and mortuary archaeology.* Community based research is more likely to be conducted by social and medical anthropologists than by those concerned with the study of ancient human remains and burial practices. For the latter, however, it can be a way to resolve ethical dilemmas arising from the repatriation movement while maintaining scientific principles and procedures for the accumulation and development of historical knowledge and theory building. Two connected projects in the Interior of British Columbia provide examples of mortuary and osteological research in community settings, involving community members in their design, implementation, and ongoing management. The China Lake project developed from problem oriented research on a museum collection. The Big Bar project was an evolutionary outgrowth based on the concerns of the Canoe Creek and High Bar First Nations to preserve their heritage. All told, 5000 years of aboriginal history are involved.

*DEANE AS, Begun DR. *Interpreting positional behaviour and locomotion from fragmentary fossil hominoid phalanges: An application of the high resolution polynomial curve fitting (HR-PCF) method.* Given the strong correlation between arboreal locomotion and increased phalangeal curvature, the latter is a well accepted indicator of hominoid positional behaviour. Several techniques have been developed to model phalangeal curvature as an arc-length on the perimeter of a circle (e.g. *included angle, normalized curvature moment arm*), although these require complete elements and are poorly suited to a fragmentary fossil record. *High Resolution Polynomial Curve Fitting*

(HR-PCF) is an alternative to established methods that is size and length independent and does not assume curvature circularity. Instead, HR-PCF models curvature as a 2nd order polynomial which better represents curvature discontinuity and asymmetry. Also, HR-PCF does not rely on a limited set of fixed landmarks and can fit a polynomial function to the preserved portion of a fragmentary phalangeal shaft. A fragmentary phalangeal sample representing 12 hominoid and hominid taxa (N=91) was compared to a similar sample of extant hominoids (N=246) using HR-PCF. The results of this study are identical to similar analyses of exclusively extant taxa using *Included Angle* and *NCMA* (Stern *et al.*, 1995). Curvature values for fossil taxa identify a range of locomotory types and are generally consistent with published interpretations of positional behaviour in based on additional post-cranial elements and palaeoecological data. Subsequent analyses were completed to determine the minimum percentage of a fragmentary specimen required for accurate curve fitting as well as the degree to which curvature varies across rays. Results of these studies indicate that there is little variation in curvature between rays and that the minimum phalangeal length required is specific to locomotory type.

*DOLPHIN AE. *On using zinc to reconstruct nutrition and health in past populations: Insights from analyses of a contemporary dental sample.* The assessment and interpretation of zinc (Zn) concentrations derived from chemical analyses of biological hard tissues has been troubled by the complexities inherent in working with an essential trace element implicated in several important biological processes. Because Zn is subject to some homeostatic control by the body and does not undergo a clear trophic level separation several researchers have suggested its utility for paleodietary reconstruction is severely limited. Using Zn concentration values collected from the teeth of contemporary Mexican children I will, however, argue that with an understanding of the nature of Zn physiology, nutrient interactions and local factors affecting bioavailability it is possible to build meaningful hypotheses regarding diet and health. I will discuss how Zn concentrations from this sample correlate with an extensive database of longitudinal data collected for each donor mother-child dyad from the second trimester through to early childhood. Specifically, variables related to growth and development,

morbidity and cognitive/behavioural development – all of which are well-known to become impaired with even mild Zn deficiency – will be discussed. By taking the complexities of Zn bioavailability into account it is possible to extend the utility of chemical analyses of human remains to identifying individuals/groups suffering from nutritional deficiency and its resultant functional impairments, many of which directly influence social interaction and community health.

DRAPEAU MSM. *Functional anatomy of the elbow of early hominins.* Although it is agreed by most that *Australopithecus afarensis* was bipedal when on the ground, it is still debated whether the species was completely committed to terrestrial locomotion or if it was also habitually arboreal. Disagreement about the importance given to primitive traits in the interpretation of the functional anatomy of the fossils is at the source of the debate. This issue can be avoided by studying epigenetic traits, i.e. morphological traits that can be modified by the actual behavior of individuals, such as joint shape and orientation. On the ulna, trochlear notches of arboreal species are expected to be more keeled in order to better resist eccentric loading of the joint generated by the strong upper-limb muscles that cross the elbow, while species that are not arboreal are expected to have trochlear notches that are less keeled. A 3D analysis of the whole joint reveals that extant hominoid species can be discriminated from one another. *A. afarensis* is more similar to humans than to other hominoids. Surprisingly, 2D analysis of the proximal and distal keeling of the notch does not discriminate species very well. Direct angular measurements of the keeling show that modern humans have trochlear notches that are less keeled than other hominoid species. *A. afarensis* has a low keel similar to that of humans. These results suggest that *A. afarensis* had upper-limb muscles that were less robust than what is seen in other extant hominoids, possibly suggesting that one of our earliest ancestors was already a fully committed biped.

DUDAR JC. *What significance do bones have? A personal perspective on repatriation.* The repatriation movement is a global issue, and has often been characterized as a clash of polarized worldviews with the minority belief system of native groups largely subordinate to Western scientific values. The differential treatment of indigenous burials and bones were seen as

powerful symbols of oppression, and thus became a centerpiece in the struggle for self-determination and control over cultural heritage in some countries. Thus the process of repatriation, as well as directly and indirectly the anthropologists involved, now in some way play a role in the shaping of past, present, and future identities of skeletal remains and contemporary indigenous peoples. While repatriation is not a new topic of discussion at CAPA, this presentation will take a more critical perspective on the issues and the role of physical anthropologists. Repatriation in one form or another is here to stay, and it is up to the players on both sides to decide what form it will take; a bitter adversarial contest as epitomized by the Kennewick Man affair, or a more cooperative and collaborative effort.

DUPRAS T, Tocheri M. *A test of the mortality bias using stable isotope analysis of juvenile dentition.* Studies of infant weaning in past populations have commonly relied on cross-sectional analysis of stable isotopes from infant remains to make longitudinal statements. A major problem with using infant samples in this manner is that these individuals did not survive past infancy. It is impossible to determine if the isotopic signals of these individuals reflects the ideology of that society concerning infant feeding. One potential way to examine this question is to analyze the dentition of individuals who survived infancy. Teeth are static tissues, capturing isotopic signals during development, affording a "snap-shot" of diet. This study examines the dental isotope signatures from 22 juveniles (4 to 9 years old) with mixed dentition from the Kellis 2 cemetery, Dakhleh Oasis, Egypt to reconstruct weaning history. Both deciduous and permanent teeth were sampled, with a total of 7 to 12 teeth per individual. An enamel sample was isolated from each tooth and prepared for stable carbon and oxygen isotope analysis. Dentin was also sampled from the same teeth and prepared for nitrogen isotope analysis. From this data we are able to detect longitudinal changes in diet during early childhood most likely associated with weaning events.

DUPRAS T, Sheldrick P, Molto E. *All bent out of shape: A potential case of osteogenesis imperfecta from the Dakhleh Oasis, Egypt.* In 2003 a perinatal skeleton with unusual skeletal curvature was excavated from the Kellis 2 cemetery. The Kellis 2 cemetery, located in the Dakhleh Oasis, is thought to be a late

Roman/early Christian cemetery (circa 100 to 350 AD). The cemetery is being excavated as part of the Dakhleh Oasis Project's mandate to understand human adaptation to such a harsh environment. The skeleton was recovered from a shallow grave located outside the walls of a tomb structure. Skeletal development indicates the individual was approximately 40 weeks gestation. The individual has distinctive curvature of the femora, tibiae, radii, humeri, ribs, and clavicles. In this paper we discuss the use of differential diagnosis to understand this pathology, with the use of morphological and radiological assessment, including consideration of taphonomical processes. The abnormal morphology of this skeleton is suggestive of osteogenesis imperfecta.

FARMER T. *Putting health in its place*. This paper provides an overview of the self perceived health status and health priorities of a diverse group of women living in the highly industrialized and stigmatized North End neighbourhood of Hamilton, Ontario. Through the use of qualitative methods such as in-depth interviewing, focus group discussion, and participant observation, this medical anthropology research locates the health of the study participants within their neighbourhood, explores their experiences in this environment, and examines their understanding of the relationships between those experiences and their health. The North End women in this study understand health as a multidimensional concept and articulate the ways in which their overall health and well-being is enhanced and/or compromised by a variety of place-based characteristics. Because health experiences are embedded in everyday life, I assert that women's own perspectives, experiences and priorities must be incorporated into place-based health research and integrated into program and policy development. Women provide an invaluable and rich form of experiential knowledge about their health and their environment that differs from the "objective facts" put forth by outside individuals with no vested interest in the neighbourhood. Place is an important determinant of health that warrants serious attention by medical anthropologists who thus far have tended to view it merely as a backdrop for their research.

FITZGERALD C, Saunders S. *Dental histology for dummies—Demystifying the techniques*. In the last few years in anthropology, techniques that interpret the microstructural growth markers of enamel have been used to attach very exact

chronologies to events in developing enamel. The number of published papers is too long to list, but these have ranged from forensic applications like assigning ages at death to unknown sub-adults, bioarchaeological and palaeoepidemiological applications that have utilised either the macroscopic (hypoplasias) or microscopic (Wilson bands) defects of enamel as proxies to determine a past population's general health status, to palaeoanthropological applications that have compared patterns of tooth development among hominid palaeospecies. And yet, researchers continue to use much less accurate and often more methodologically tedious approaches to, for example, estimate ages of LEH (linear enamel hypoplasia) development in archaeological samples. And journals continue to publish such articles, despite the fact, as is the case for the 'conventional' techniques for estimating ages of LEH, that many of the assumptions underlying such techniques are known to be downright wrong. We can only conclude that the proliferation of the use of dental histological techniques is hampered in anthropology by the notion that these techniques are arcane, technically challenging, open only to the initiated, and/or expensive.

*GALLOWAY T. *Results of anthropometry in a sample of rural Ontario schoolchildren*. This paper reports initial findings from a study of child nutrition in south-central Ontario. The sample consists of 506 elementary schoolchildren (n=253 males, n=251 females) ages 7-13 years from six rural and small-town communities in Grey and Bruce Counties. The results of anthropometric measures indicate a mean z score for body mass index (BMI) significantly higher than that of the 2001 CDC reference. Analysis by gender indicates that the majority of difference in body size between the sample and the reference population occurs in boys. Sample boys' height-for-age, weight-for-age, and BMI z scores are all significantly greater than those of sample girls, and the differences are generally greatest in the younger age categories. 33% of boys in the sample are at risk for overweight and 15% are obese, according to CDC cutoffs. These rates are similar to and slightly higher than those reported by Tremblay and Willms (2000) in a nationwide survey of child health. However sample girls' risk of overweight (15%) and obesity (7%) are significantly lower than those reported by other researchers (Evers and Hooper 1995; Tremblay and Willms 2000; Willms 2003 for examples). Crooks (1999)

reports a similar finding of increased obesity prevalence in boys in a sample of rural elementary schoolchildren from Appalachian Kentucky. Initial analysis from diet and interview data sheds some light on the socioeconomic and cultural contributors to gender differences in body size in rural communities.

*GILL-ROBINSON H. *The Iron Age bog bodies of the archaeologisches landesmuseum, Schloss Gottorf, northern Germany: New data.* This paper presents the results of a recent re-examination of the Iron Age (500 BC-800 AD) bog bodies of the Archaeologisches Landesmuseum, Schloss Gottorf, Schleswig Germany. The collection includes five bog bodies plus one cranium with mandible and a bog skeleton. Although one of the bodies, that of the Windeby Child, had undergone anthropological investigations, the other bodies had received little or no anthropological analysis prior to this research. In Schleswig-Holstein, the Iron Age is characterized by cremation as the predominant form of burial. Although some anthropological data is available from the cremated material which has been examined to date, the bog bodies present a unique opportunity to examine entire human remains, including well preserved soft tissue in some cases. There are a number of specific issues that arise in the examination of bog bodies, including severe bone demineralization and the need for primarily non-destructive analyses. This research identified methods appropriate for the anthropological analysis of the bog bodies and addressed issues related to aging, sexing and conservation of human bodies from peat bogs. Digital X-ray and multi-slice Computed Tomography (MSCT) were used to examine the skeletal structure beneath the soft tissue. The digital images were further enhanced by the use of imaging software and rapid prototyping. This led to both the identification of previously unknown skeletal material in a severely demineralized body and permitted the interpretation of fractures previously hidden beneath soft tissue. The results of trace element analysis of the hair from one individual suggest a potential occupation.

*HEWITT BR. *Trace element analysis of dentin: A test of the application of Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS) to the assessment of childhood dietary pattern from adult human teeth.* While bone is remodelled over time, dental material is reasonably stable once formed and can

theoretically be used to assess changes in childhood health, nutritional status or dietary patterns. Given the fact that dentin should be relatively protected from diagenetic and taphonomic factors by the rather impervious nature of its enamel coating, the elemental composition of dentin ought to reflect the elements present in the local environment *intra vitam*. This study employed Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS) as a means of assessing the spatial distribution of trace elements in human dentin. The objective of this research was to create an elemental map of the trace elements within dentin as means of assessing childhood dietary patterns from adult teeth. The results suggest that this method can be used to map variations in trace element availability in human dental material with good results. How such changes reflect the bioavailability of trace elements from the environment remains speculative, and further research in this field is recommended.

*IRWIN MT. *The effects of forest fragmentation on the feeding ecology of the Diademed Sifaka (Propithecus diadema): The importance of parasitic mistletoes.* Although fragmentation is a serious threat facing forests throughout the world's tropics, little is known about the mechanisms by which it causes species extinctions. In particular, much remains to be learned about the interactions between forest fragmentation and the behavioral ecology of primate species. Here I present the results of a 12-month study of the feeding ecology of *Propithecus diadema* in eastern Madagascar, incorporating two study groups found in small (<30 ha) fragments and two groups found in nearby continuous forest. In general, continuous forest groups fed on a higher diversity of plant species throughout the year, except for the winter months (June - August) when they relied heavily on a few fallback species. The hemiparasitic mistletoe *Bakerella* is the major fallback during this lean time. In contrast, the fragment-living sifakas rely heavily on this mistletoe throughout all months of the year; the fruit-bearing tree species which sustain the continuous forest groups throughout the rainy season (November - April) are largely absent from the fragments. In some months, fragment groups devoted more than 60% of their feeding time to this one species, a level of specialization rare among primates. The main characteristic of the mistletoe which enables it to be a year-round keystone resource is its "extended phenology";

because parasitic plants are not subject to the same energetic constraints as other plants, they can reproduce year-round. This study raises the possibility that parasitic and hemiparasitic plants may be keystone resources for other primate populations, permitting survival in otherwise uninhabitable forest fragments.

KEENLEYSIDE A, Schwarcz H, Panayotova K. *Stable isotopic evidence of diet in a Greek colonial population from the Black Sea*. Archaeological and literary sources indicate that the ancient Greeks relied heavily on terrestrial resources and that their access to certain types of foods varied by sex and status. Human and faunal remains from the Greek colonial site of Apollonia (5th to 2nd centuries BC) on the Black Sea coast of Bulgaria were analyzed for stable carbon and nitrogen isotopes in order to reconstruct the diet of this population, investigate the relative importance of marine vs. terrestrial resources, and explore variations in diet with respect to age, sex, and burial type. The distribution pattern of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values is characterized by increasing $\delta^{15}\text{N}$ values without a comparable increase in $\delta^{13}\text{C}$, indicating the consumption of a diet that included a significant proportion of marine foods as well as abundant terrestrial C3 plants. Males consumed more marine resources than females, while there were no age- or status-based differences in diet. This study represents the first application of stable isotope analysis to human skeletal remains from the Black Sea, and illustrates the value of using stable isotope analysis, in conjunction with archaeological and textual evidence, to reconstruct the diet of populations in antiquity.

*KRON H. *Identifying and researching genocide in forensic anthropology*. In this paper I will address the issues related to the investigation of genocide in the field of forensic anthropology. I will discuss the definition of genocide as it is stated in academic works and according to the UN. I will also address the importance of distinguishing genocide from other mass murderers and state-sponsored violence. After establishing a definition of genocide I will discuss the possible causes of genocide and how they can be identified. I will then address the issues of investigating genocide as a forensic anthropologist, such as ethical considerations and the dangers of working in a post-genocidal situation. In conclusion, I will explain the importance for forensic anthropologists, as well as the society in

general, to be able to properly identify genocide prior to, during and after the fact. I will also address the role of forensic anthropologists in resolving the after effects of genocide and why this is important to our field and to the public.

*KWOK C. *Sex and age determination in Vervet Monkeys (*Cercopithecus aethiops*): How effective are the available methods?* A paleopathological approach is applied to the study of non-human primates using a skeletal collection (n=66) of vervet monkeys (*Cercopithecus aethiops sabaeus*) from Barbados. They were examined for pathological conditions with particular emphasis on frequency of healed fractures. Limited data was available regarding age and sex of the vervets which contrasts with most non-human primate skeletal collections. Little attention has been paid to developing a standard set of methods to determine age and sex for monkeys since the data is usually collected at time of death. The focus of this paper is to review and assess the methodologies to determine age and sex of vervets and to suggest some modifications. Bolter and Zihlman's (2003) dental eruption method for vervets was used to classify individuals as: adults (+ 3 years), juveniles (1-3 years) and infants (0-1 year). Sex was determined using Bolter and Zihlman's (2003) epiphyseal fusion sequence and King's (2002) 'canine complex' as well as body size and canine length. Overall, Bolter and Zihlman's (2003) dental eruption method was effective and most vervets could be classified into one of the three age categories. However, it was difficult to assess the sex of the specimens with certainty, even when using multiple methods. This was likely due to; 1) the methods only noted differences between males and females at certain growth stages, whereas some vervets were in between growth stages, 2) the collection consisted of mainly juveniles; 3) vervets are not as highly dimorphic as other non-human primates.

LARCOMBE LA. *Detection of a single nucleotide polymorphisms the cytokine promoter regions of nuclear DNA -- what this means for a contemporary Aboriginal population*. This presentation will outline a new technique for identifying single nucleotide polymorphisms in the DNA of ancient human remains. In the current study a method was developed to examine the G/C Single Nucleotide Polymorphism (SNP) at position -174 in the Interleukin-6 promoter and the C/T SNP at

position -819 in the Interleukin-10 promoter regions from nuclear DNA samples isolated from human skeletal remains from Manitoba dating to as early as 4000 years ago. The analysis of cytokine SNPs of ancient nuclear DNA may provide novel insights into the genetic basis of disease susceptibility/resistance to infectious agents and has implications for the observed cytokine genotype frequency of a contemporary Aboriginal population in Manitoba.

MATHESON CD, Donoghue HD, Praymak R, Vernon KK, Molto JE. *Molecular paleopathology of Dakhleh Oasis, infections of mycobacterium tuberculosis, mycobacterium leprae and events of co-infection.* Molecular Palaeopathology is a field which is advancing our understanding of diseases in the past. The study of molecular palaeopathology in conjunction with traditional methods, have been applied to screen a number of samples within Dakhleh Oasis, Egypt. The diseases studied were tuberculosis and leprosy. Tuberculosis and leprosy have long been known to occur in antiquity as they leave readily identifiable bony changes on skeletal remains. The causative organisms, the *Mycobacterium tuberculosis* complex (MTB), and *Mycobacterium leprae*, can normally be readily detected by targeting species-specific regions of DNA through the process of amplification by PCR. The results here confirm the morphological determination of the presence of both tuberculosis and leprosy within the individuals buried in the Kellis 2 cemetery at Dakhleh Oasis. Furthermore it identifies the existence of co-infection between these two pathogens within the same individual.

*MATTHEWS J. *Dental pathology and the reconstruction and diet in two Postclassic Maya skeletal populations.* The primary goals of this research were to contribute to the growing body of evidence for the vitality of Postclassic Maya culture and to consider the impact of trade on the diet of coastal settlements through the analysis of dental pathology. Analysis of caries, antemortem tooth loss, periodontal disease, calculus, and wear for the Postclassic period settlements of Marco Gonzalez and San Pedro has uncovered dietary similarities that are suggestive of both a shared approach to exploiting their natural environment and a common need for food items not found therein. During a time of increased commercialism and reduced social distinctions, Marco Gonzalez and San Pedro used trade to acquire the ideological significant and non-local resource maize.

*MAXWELL J. *Exceptionally high levels of spondyloarthropathy in two coastal Maya populations.* Spondyloarthropathy consists of a triad of related pathological joint conditions that include ankylosing spondylitis, psoriatic arthritis, and Reiter's Syndrome. Although they may have subtle differences, they cannot always be distinguished in dry bone. Regardless of the variant, all related skeletal changes are the result of a pathological autoimmune response. This response is most likely triggered by an infectious environmental stimulus, acting on genetic predisposition. In modern contexts, the majority of these infectious triggers are gastrointestinal in origin. Patterns of joint change attributable to spondyloarthropathy were documented in two small coastal Postclassic Maya populations from Belize. Although the variants of spondyloarthropathy exist in all populations at low base-line levels, the frequencies observed in the two sites under investigation were well beyond those expected. Previous bioarchaeological studies have identified the highest levels of spondyloarthropathy in 19th century urban populations where sanitation was a documented problem. Comparable levels in these Maya populations may suggest a similar explanation. As gastrointestinal problems are still a major contributor to morbidity and mortality in many modern populations, it is reasonable to assume that they were also a major selective force in the past. Examining the biocultural contexts surrounding the expression of spondyloarthropathy in these Maya groups will lead to a broader understanding of the paleoepidemiology of this condition.

*MCCABE GM, Fedigan LM. *Nutritional composition and variation of the capuchin diet.* Important aspects of primate behaviour and ecology are illuminated through the study of nutrition. For species inhabiting regenerating forests, behavioural flexibility is illustrated through their maintenance of nutritionally adequate diets. I studied the diet of white-faced capuchins (*Cebus capucinus*) at Santa Rosa National Park, Costa Rica. My subjects included adult and sub-adult individuals in two study groups, and I recorded data on feeding behaviour for each individual using focal-animal sampling. Food samples were collected and dried for nutritional analyses to identify protein, fibre, fat, carbohydrate, moisture, and energy levels. I calculated the average time spent feeding, and number of items ingested by food species. The diets of males and females, and

two groups from varied habitats were compared. Results revealed that the group in the semi-deciduous habitat consumed fruit from the canopy tree *Karwinskia caldronii* at a higher frequency than the group inhabiting the regenerating forest, whose primary food source was fruit from *Acacia collinsii*, an early successional treelet. The latter consumed more insects, perhaps to supplement their diet due to the disparity of large fruiting trees in their habitat. Fruit comprised the majority of the diet for both sexes; however, males were found to consume more on average than females. Insects were relatively high in fat and protein, essential to females for reproduction and lactation, which may explain why they consumed it with greater frequency than males. These dietary differences may be a product of sexual dimorphism in body size, reproductive state of females, or availability of foods in disparate habitats.

MEINDL R, Mensforth R, Lovejoy O. *Overcoming biases in the paleodemographic record: Estimating mortality, age structure, and annual growth, with an example from northern Ohio, 9th to 11th centuries A.D.* (1) A problem in paleodemography is that for any given prehistoric cemetery, each of a continuum of stable populations could have filled it with exactly the same age proportions. When the assumption of stationarity (i.e., $r = 0$) is imposed on an extinct population which in fact had been growing during the occupation of the site, life expectancy is underestimated, sometimes by a great margin. (2) A second problem is osteological: If traditional bony sites play a large role in skeletal aging there is a tendency to under-estimate the age of the cemetery's oldest decedents. This regression problem may result in an over-proportion of adults between ages 30 to 40 years. An analysis of the hunting-gathering-fishing population of the Libben site of Ottawa County, Ohio, is an attempt to address these two biases. Traditional methods of age estimation for children and adolescents produced the base of the cemetery age pyramid. However, to prevent the second bias adults were aged using only the auricular surface of the ilium. Ethnographic anthropology has provided surveys of the total fertility performances of non-contracepting women in populations of Africa, Australia, and especially South America. To address the first problem, these fertilities have been used to complete the paleodemographic reconstruction (age structure, mortality, and growth) of the people of Libben.

MERRETT D. *Health status and the origins of pastoralism.* This research examines the largest human skeletal sample recovered from the eastern end of the Fertile Crescent, the central Zagros Mountains that dates to ca. 7,000 bc, early in the subsistence transition from hunting and gathering to agriculture. Macroscopic assessment of health status from the skeletal remains from the early Neolithic site of Ganj Dareh provides the basis for exploration of the relationships among health, subsistence strategy and human behaviour to explore agricultural origins. The oral health of the Ganj Dareh people suggests that their diet resembled the earlier Epipalaeolithic mixture of plant and animal foods. Although they experienced episodes of stress, recovery and catch-up growth did not adversely affect adult stature relative to contemporaries from other regions of Fertile Crescent. Two classes of skeletal lesions are also relevant to evaluation of subsistence: ectocranial porotic hyperostosis and resorption of vertebral bodies at the attachment sites of *anulus fibrosis*. Their presence supports the diagnosis of human brucellosis, a caprine-associated zoonotic infection. These results corroborate the zooarchaeological and archaeological assertions that the morphologically wild goats recovered at Ganj Dareh were under extensive human control. The location of Ganj Dareh within the rocky, mountainous natural habitat of goats and the overall relatively good health of the people support the hypothesis that early pastoralism in the central Zagros Mountains developed in a situation of resource abundance well before plant cultivation was practiced in the region.

*METCALFE JZ, White CD, Longstaffe FJ. *Postclassic Maya socio-economic complexity and ideology at Chau Hiix, Belize.* Chau Hiix is an ancient Maya site in northern Belize, on a possible trade route between Guatemala and the Caribbean coast. It has also been suggested that Chau Hiix was an important pilgrimage site during the Postclassic period. This study addresses questions of diet and migration through the analysis of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values from bone collagen and $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ values from enamel carbonate. It is hypothesized that during the Classic Maya "collapse," individuals from abandoned sites in the Guatemalan heartland may have migrated to Chau Hiix and taken up residence there. A greater diversity of $\delta^{18}\text{O}$ values is thus expected from Postclassic individuals than is seen in individuals from

earlier periods. Furthermore, if the ecological model of the Classic Maya "collapse" pertains to Chau Hiix, Postclassic diet would be different from diet in earlier periods; specifically, there should be a decrease in maize consumption and an increase in marine/riverine resources. Extensive hydrological modifications were used at Chau Hiix during the Classic period (possibly to support maize agriculture) but were abandoned during the Postclassic, despite continued occupation of the site. Preliminary results are presented here to assess the socio-economic complexity of Postclassic Chau Hiix and its ideological role in Maya society.

MOLTO JE. *Bioarchaeological research at Kellis: An overview*. The village of Kellis, located in the central part of the Dakhleh Oasis, Egypt, was an important commercial, religious and political centre in the Oasis during Ptolemaic and Roman times. A number of cemeteries in around the village have been analyzed by members of the Dakhleh Oasis Project's bioarchaeological research team since the early 1990s. In particular the research has focused on a large cemetery, Kellis 2, which was used during the Roman Period. The well preserved single interred skeletons from this cemetery have been analyzed by most extant and traditional methods in bioarchaeology. This paper summarizes the nature of the research especially concerning the paleogenetic research.

MORRISON D. *Human remains repatriation and the Canadian Museum of Civilization*. Canada's national human history museum – the Canadian Museum of Civilization (CMC) – has been actively involved in the repatriation of human remains to First Nations for the past dozen years. Our policies and practices are based on the *Task Force Report on First Nations and Museums* (1992), but have continued to evolve as circumstances and requests change. This paper briefly describes the history of CMC's human remains collections, and examines some of the issues which continue to vex both aboriginal communities and scholars. Through its Repatriation Policy, the Canadian Museum of Civilization has attempted to balance the needs of scholarship with the concerns of First Nations. The results to date have been a partial success at best.

MURRAY C. *"Hair Today, DNA Tomorrow" A preliminary study: Ancient DNA extraction from ancient Egyptian hair shafts*. In conjunction with morphological data, molecular data is being

used to address the paleogenetics at Kellis 2, in the Dakhleh Oasis, Egypt. Due to the extreme aridity of this region, preservation conditions for human remains are excellent. Bones appear macroscopically well preserved. Hair is both macroscopically and microscopically extremely well preserved. Approximately 72% of Kellis 2 burials have hair present. Mitochondrial DNA (mtDNA) yields from skeletal material at Kellis 2 have been limited. It is hypothesized that hair may be an excellent alternative archive of ancient DNA because unlike bone, it is not exposed to postmortem autolytic enzymes and has a resilient hydrophobic structure. In a previous study, mtDNA was successfully extracted from the skeletal material of several individuals buried at Kellis 2. In this study, hair shafts present within each of these burials are being analyzed for the presence of ancient DNA. This study will validate the previous data and as well compare DNA yields from two different tissue types within the same individual. To date, low levels of DNA within the Kellis 2 hair shafts have been observed. However, the identity and degree of fragmentation of the DNA remains unknown and is further being investigated.

NAFTEL S, Feilen A, Nelson AJ, Martin RR, Kempson I, Skinner W, Watts E, Gordon R. *The detection of lead by micro-xray fluorescence of cementum in human teeth derived from archaeological contexts - what might we learn?* The cementum rings on the roots of teeth have the potential to provide a continuous record of exposure to metals. Unfortunately they are narrow and thus present an analytical challenge. Synchrotron Micro X-ray Fluorescence provides a convenient non-destructive means of studying the metals in cementum rings. In this work we present the X-ray Fluorescence of lead in the cementum rings of selected teeth that show differences in the lead concentration and distribution in the teeth. Of particular interest is the presence of lead in teeth of individuals from Precolumbian times who are likely to have had very limited exposure to this element. While no estimate has yet been made of the absolute lead concentrations (in the absence of suitable standards at the time these measurements were taken) the results clearly show that lead is a common contaminant of the cementum. In addition the width of the portion of the cementum showing lead contamination and evidence for banding in some instances indicates variable exposure to lead, probably by contact with fluids in the oral cavity. We suggest that lead has not been detected in cementum

before, both because the concentration is very low and because the cementum represents such a small fraction of the total tooth volume that it is diluted below the detection limits of conventional bulk analytical methods during sample work-up. These considerations are extremely important for the correct interpretation of the analytical results.

*NARGOLWALLA MC, Begun DR. *Miocene community ecology and the origins of great ape intelligence*. Current hypotheses surrounding the origins of great ape intelligence during the Miocene focus on the environmental changes occurring during this epoch. One such recent hypothesis, the "fruit-habitat hypothesis" focuses on depleting resources as a stimulus for selection for increased intelligence in Miocene hominids. Specifically, this hypothesis postulates that foraging during times of food scarcity as a result of environmental flux requires a degree of cognitive and behavioural enhancement, likely present in the ancestors of modern great apes. This paper presents a complimentary but alternative hypothesis for the selection for increased intelligence during the middle and late Miocene. We examine the community ecology at fossil hominid localities across Eurasia to determine what attributes, if any, cause these localities to be different from non-hominid localities. Previous studies indicate that hominid localities tend to have significantly higher proportions of carnivore taxa than non-hominid localities. At the same time, carnivores as a whole tend to decrease in abundance as the Miocene progresses, while increasing in body size. This study combines fossil evidence with modern analogues to suggest that any hypothesis for the selection for increased intelligence during the Miocene should include predation as a significant causative agent, rather than limiting the focus to foraging pressures alone.

ODJICK B. *Repatriation – Resisting assimilation: Kitigan Zibi's journey from honouring our past to protecting our future – Part 2*. The purpose of our mission is to repatriate ancestral human remains and burial artifacts that are currently under lock and key at the Canadian Museum of Civilization in Gatineau, Quebec, and to rebury them in our most sacred Mother Earth. This is an insight to Kitigan Zibi's journey in its mission to repatriate ancestral human remains and burial artifacts found on Algonquin ancestral territory, as this journey shall trace our history, and describe our struggles in our efforts in the

repatriation process. The media, and the different levels of government have their own set of values. Kitigan Zibi, like all other First Nation across Canada, in our relationship with the federal government has been, and still is, impacted by a hierarchy of institutional racism. A collective approach was taken, to solicit through community dialogue, additional input, stories and recommendations from the ten Algonquin-Anishinabe communities. Meanwhile, facing the media, hierarchical bodies and its protocols certainly challenged reciprocity in our repatriation efforts. With the voices of our Elders and support from the Algonquin-Anishinabe Chiefs, the outcome has been undeniably clear that the repatriation process be done immediately and without further delay. What has been brought to the earth, stays in the earth. These are our teachings. To have to negotiate for repatriation is considered racism because it is a foreign concept that goes against our natural laws. Despite media communication and hierarchical differences, a recommendation was forwarded to a governing body for the return of ancestral bones and artifacts for reburial. Kitigan Zibi presently awaits the final outcome of the decision from the Canadian Museum of Civilization Board of Trustees.

PATERSON K. *Guidelines for the recognition of pioneer cemeteries and associated skeletal remains in a forensic context*. Guidelines for the recognition of 19th Century pioneer farmstead burial plots are outlined to assist forensic investigators involved in the recovery and analysis of human remains. These guidelines are drawn from analysis of both historical accounts of pioneer death and burial customs, and data obtained through recent analysis of homestead burials. As farms are increasingly developed, it is important for forensic investigators to be able to identify the context, artifacts and remains associated with both complete and disturbed homestead burials. Key elements for the recognition of 19th Century pioneer burials include their location on knolls or in the corner of a field; presence of soil depressions or patches of overgrowth on otherwise worked fields; evidence for the use of coffins, tombstones, and fences; and the condition and position of the remains.

POINAR D, Poinar H. *The origins of AIDS: From archive to DNA sequence*. In this talk we plan to discuss our current attempts to uncover the origins of HIV. This entails a detailed archival approach to obtain ancient samples combined

with the molecular elucidation of the ancient genes from these archival samples. We hope this will shed light on the natural or iatrogenic origin of AIDS.

PORTER N, Sicotte P. *A preliminary report on the diet and activity budget of Lowe's Guenon (Cercopithecus campbelli lowei) in Central Ghana.* The guenons represent the largest and most diverse group of African primates, yet few species have been studied intensively. Consequently, we lack the ecological and behavioral data requisite to conservation efforts. A species' needs must be understood to identify conservation priorities and to develop viable initiatives. *Cercopithecus campbelli*, a little known guenon, ranges in the Upper Guinea Forest, an area identified as a conservation hotspot. From June-August 2003, we documented the ecological niche of one *C. campbelli* group at the Boabeng-Fiema Monkey Sanctuary (BFMS), including activity budget and diet. During all-day follows NP scanned the group every 15-minutes, recording the activity of up to five individuals. When feeding occurred, the plant or invertebrate species eaten was recorded. *C. campbelli* spent 43% of time inactive, 15% feeding/foraging, 35% traveling, and 7% socializing. Studies of *C. campbelli* in the Taï Forest (Côte d'Ivoire) reported notably different values; 20% inactive, 70% feeding/foraging, 7% traveling, and 3% socializing. *C. campbelli* diet at BFMS included invertebrates (63%), fruit (6%), other plant matter (9%), and cultivated foods (20%). Plant foods came from 29 species. Taï studies reported different values; 15-49% invertebrates, 37-78% fruit, and 6-11% other plant matter. The lower fruit and higher invertebrate proportions at BFMS may be due to food availability differences at Taï vs. BFMS. The presence of high-quality cultivated foods in the BFMS diet may also affect food type proportions and impact the activity budget. Clearly, site-specific knowledge of a species needs may be required when developing conservation initiatives for individual areas.

ROGERS T, Brierley M. *Forensic Visualization for Expert Testimony.* Expert witnesses called to the stand to provide scientific testimony in court typically begin by educating the jury about the relevant aspects of the discipline, to provide the jurors with a basis for understanding the significance of the scientific evidence, e.g., the histology of human versus animal bone, or fracture mechanics. The presentation of this

type of information does not involve analysis or opinion - it is strictly an explanation of existing phenomena. The purpose of such demonstrative evidence is to assist the trier of fact in evaluating and understanding substantive evidence. Both the educational (demonstrative evidence) and probative (substantive evidence) components of the expert's testimony may be augmented by visual aids. In the past, these have consisted largely of photographs, diagrams, charts, and other static representations. With the advent of advanced computer technologies, it is now possible to present such evidence in a dynamic manner capable of visually demonstrating: (1) concrete phenomena, e.g., the location of frontal sinuses; (2) processes, e.g., how frontal sinus patterns can be used to establish positive identification of unknown skeletal remains; and (3) abstract concepts, e.g., determining the mathematical probability of a putative identification in order to confirm positive identification. This paper discusses the admissibility of computer-generated evidence, and provides an example of forensic anthropological evidence presented at a homicide trial, contrasted with the same probative evidence re-worked into an interactive computer presentation, through collaboration between the Forensic Anthropologist and Instructional Media Designer.

ROTHSCHILD B. *Osseotype approach to disease recognition.* Tropism is a term traditionally applied to biological responses to such stimuli as sun and gravity. Analogous application of the term tropism (as osseotropism) seems reasonable to describe skeletal distribution of disease. In addition to osseotropism or distribution of disease is its very character. The latter might be referred to as osseotype. It offers a window on disease complementary to that provided by clinical, radiologic and laboratory evaluation. Differential impact of disease provides opportunity to confidently distinguish among bone-impacting diseases, especially when distribution as a population phenomenon is considered. The combination of osseotype and osseotropism will often provide unequivocal evidence of ancient (and modern) disease, across species lines.

*ROYER DF. *The orientation of mid-lumbar transverse processes and its relationship to locomotion in Anthropoids.* The goals of this study are to quantify the dorsoventral orientation (DVO) of mid-lumbar transverse processes, assess the variation of DVO in an anthropoid

sample, and determine how DVO reflects specializations in locomotor behaviours among these primates. This study describes a new method of measuring DVO from digital photographs using SigmaScan Pro 5.0. DVO is here quantified as the ventral angle formed by the main axis of the transverse process and a line bisecting the vertebral body. DVO is measured on mid-lumbar vertebrae from a diverse sample of anthropoids, with a focus on hominoids, atelines and quadrupedal taxa. An ANOVA plus LSD post hoc test are performed on the rank transformed DVO data to determine significant differences between taxa. The results of this study demonstrate that hominoids + atelines (excluding *Alouatta*) form a group characterized by high DVO, while the more quadrupedal taxa (including *Alouatta*) group together and are characterized by low DVO; these groupings are significantly different ($p < 0.05$). This may reflect the different demands of dorsostable (i.e., suspensory) versus dorsomobile (i.e., quadrupedal) modes of locomotion. The results also provide further evidence of similarities in the trunk morphology of hominoids (especially *Hylobates*) and atelines (especially *Ateles*), as demonstrated by Larson (1998 *Evol. Anthro.* 6: 87-99) and Young (2003 *J. Hum. Evol.* 45: 441-464).

SCHILLACI MA, Jones-Engel L, Grant R, Paramas Y. *Prevalence of select simian retroviruses in street performance monkeys in Jakarta, Indonesia.* Recent epidemics of zoonotic diseases such as HIV, SARS, and avian flu, illustrate the importance of animal reservoirs as sources of emerging infectious diseases that could potentially threaten human populations globally. There are myriad contexts of animal/human contact that can lead to zoonotic exposure. Some of these contexts, such as those associated with animal husbandry, shifting habitat preferences, zoos, laboratory research involving captive animals, and the bushmeat trade are well recognized. The exposure risk encountered with other contexts of animal/human contact such as those associated with tourism, however, are just now being explored. In Asia, tourism brings frequently both foreign and domestic tourists into close contact with primates, particularly macaques, at Hindu and Buddhist temples, exotic pet markets, and street performances. The purpose of the present research is to investigate the prevalence of five simian retroviruses known to infect humans: simian immunodeficiency virus (SIV), simian retrovirus

(SRV), simian foamy virus (SFV), simian T-cell lymphotropic virus (STLV), and Herpesvirus B (CeHV-1) in a sample of street performance monkeys from Jakarta. Identifying the prevalence of these simian retroviruses is the first step in estimating the potential exposure risk associated with performance monkeys to tourists in Asia. Of the 20 animals included in the study, 55% exhibited either serological evidence of exposure to either SRV or STLV, or were PCR positive for the presence SFV DNA. The majority of the animals tested for SFV were positive (52.9%). All of the SIV serological results were negative. One animal was ELISA positive for CeHV-1.

SCHWARCZ HP, Walker P. *Strontium and neodymium isotope ratios as tracers of human migration in Iceland.* The ratio of strontium isotopes ($^{87}\text{Sr}/^{86}\text{Sr}$) in the teeth of burials from the Hrisbrú graveyard provide a basis for determining whether these early settlers were born in Iceland or on the Scandinavian mainland. Iceland is made of Mid Ocean Ridge basalts whose $^{87}\text{Sr}/^{86}\text{Sr}$ differs markedly from Scandinavian bedrocks. These isotopic values would have been transferred to the calcified tissues of people living in each area. Dental enamel of three people buried give an average $^{87}\text{Sr}/^{86}\text{Sr}$ value of 0.70724 that contrasts with samples from a medieval Norwegian cemetery, and suggests that the Hrisbrú people were natives of Iceland. The Sr isotope ratios are intermediate between values for Icelandic rocks and seawater. This confirms independent carbon isotopic evidence that these people consumed significant quantities of marine foods (fish). Neodymium isotopes ($^{143}\text{Nd}/^{144}\text{Nd}$) on some of the Iceland samples show even more convincingly they originated in Iceland and not in Europe. Neodymium is not present in seawater, and consumption of fish does not affect its isotope ratio.

SCHWARCZ HP, White CD, Fayek M. *Isotopic analysis of seasonality from single osteons, Wadi Halfa, Sudan.* Wadi Halfa is a site on the upper Nile, below Khartoum. The ancient population subsisted on crops of wheat and barley (C_3 plants) cultivated in the winter, and sorghum and millet (C_4) grown through the summer. Schwarcz and White (*J. Archaeol. Sci.* 31: 753-762, 2004) detected a seasonal cycle in the $^{13}\text{C}/^{12}\text{C}$ ratio in scalp hair. Also, $^{18}\text{O}/^{16}\text{O}$ ratios of drinking water (Nile R.) are expected to experience a seasonal cycle of c. 8 ‰ due to a shift in water source from low ^{18}O summer rains

from Ethiopia vs evaporative L. Victoria water in winter. Both isotopic cycles should be detectable in continuously deposited tissues such as single osteons. Using a surface ionization mass spectrometer (SIMS, Cameca Model 4f) at the Oak Ridge National Laboratory, Oak Ridge TN, we detected variations in $^{13}\text{C}/^{12}\text{C}$ and $^{18}\text{O}/^{16}\text{O}$ within single osteons of individuals from Wadi Halfa. In sections normal to the osteon axis, $\delta^{13}\text{C}$ varies by up to 8 ‰, $\delta^{18}\text{O}$ by 7 ‰. As expected, ^{18}O and ^{13}C cycles were out of phase. Along the axes of single osteons, we see $\delta^{13}\text{C}$ variations of up to 17 ‰, and 7 ‰ in $\delta^{18}\text{O}$, again with opposite phase. Thus, it appears to be possible to observe seasonality of diet within single osteons using the SIMS. This will allow us to determine rates of osteons advance (remodeling).

SHARMAN J. In forensic cases, the more traditionally used elements for sex determination, such as the cranium and the pelvis, are often damaged, so it is important to research the use of other bones for sex allocation. The purpose of this study is to find a metric method of sex determination using the clavicle. Four measurements were taken from each appropriate clavicle, using specimens from the Grant Collection: maximum length, mid-shaft circumference, vertical diameter, and horizontal diameter. Logistic regression was performed on the data with SPSS 10.0, to find the best measurement or combination of measurements for the greatest accuracy of sex determination. It was found that the multivariate approach produced the best accuracy. For right clavicles, maximum length and mid-shaft circumference gave an accurate sex determination of 94.74% for females, and 89.47% for males, with an overall accuracy of 92.11%. For left clavicles, maximum length and horizontal diameter produced the best results, at 94.44% for females, 94.74% for males, and an overall accuracy of 94.59%.

SHELDRIK P. *Hip fractures in burials from Kellis 2 Dakhleh Oasis*. The Kellis 2 Cemetery in the Dakhleh Oasis of the Western Desert of Egypt has produced a very large collection of exceptionally well-preserved skeletons that are ideal for palaeopathological study. One lesion that was common then as it is now is fracture of the hip (proximal femur). Types of fractures are reviewed and several examples are presented, along with comorbidities. Natural history and prognosis of the injury are reviewed and, when considered with the facts of the skeletons

studied, they make for interesting reconstructions of the life and death of these individuals. Incidence rate for this population is compared with modern statistics, and societal implications are discussed.

*SLONIM K. *The 1919 – 1919 influenza pandemic at Norway House and Fisher River, Manitoba*. This paper discusses the impact of the 1918 influenza pandemic at Norway House and Fisher River, Manitoba. Despite sharing similar overall mortality rates during the pandemic, the two communities showed substantial differences when the distribution of deaths were examined at the family level. Reconstituted family data show that deaths were more tightly clustered within a small number of families at Norway House, while at Fisher River they were distributed amongst more families. Adults perished more often at Norway House than Fisher River. Historical documentation suggests, moreover, that the day-to-day functioning of Norway House was more severely disrupted than was the case for Fisher River. I argue that the differences in the family distribution of mortality at the two communities is linked to differences in social organization and, specifically, to the presence or absence of the Hudson's Bay Company.

STEWART JD, Molto E, Reimer P. *The chronology of Kellis 2: The AMS radio-carbon dating evidence*. The village of Kellis, centrally located in Egypt's Dakhleh Oasis, was occupied for several centuries traversing the Ptolemaic and Roman Periods. Archaeological evidence suggests that the primary burial area for the pre-Christian occupants of Kellis was in a cemetery, located slightly Northwest of the village, designated Kellis 1 (K1). This cemetery is composed of numerous familial tombs that were cut into the gebel. Following Christian influences circa 280 A.D. the people of Kellis started burying their dead in a new cemetery, Kellis 2, located directly east of K1. The remains at Kellis 2 were invariably interred in the classic extended Christian burial position with head to the west. Unlike K1, the artifactual associations with K2 burials were pause, thus the chronology of K2 has primarily rested on the historical inferences of the burial pattern. In addition, archaeological (coin) evidence suggests that of the village Kellis, was abandoned late in the 4th century A.D. Recently a large number (N>30) of AMS radiocarbon dates on K2 human bone has been obtained. A statistical analysis of these data suggest that K2 was used a least a century

before the impact of Christianity and that the village may have been abandoned later. These data suggest that the early impact of Christianity was considerable in the outlier areas of Egypt. The implications of these of data for Egyptological bioarchaeological research are discussed.

SWEDLUND A, Gumerman G, Dean J, Voss J, Epstein J. *Biodemography of the ancient Pueblo using agent-based simulation to estimate population histories*. Long House Valley, located in the Black Mesa area of northeastern Arizona (USA), was inhabited by the Kayenta Anasazi from circa 1800 B.C. to circa A.D. 1300. These people were prehistoric precursors of the modern Pueblo cultures of the Colorado Plateau. A rich paleoenvironmental record, based on alluvial geomorphology, palynology, and dendroclimatology, permits the accurate quantitative reconstruction of annual fluctuations in potential agricultural production (kg maize/hectare). The archaeological record of Anasazi farming groups from A.D. 200 to 1300 provides information on a millennium of sociocultural stasis, variability, change, and adaptation. We report on a multi-agent computational model of this society that closely reproduces the main features of its actual history, including population ebb and flow, changing spatial settlement patterns, and eventual rapid decline. The agents in the model are mono-agriculturalists, who decide both where to situate their fields and where to locate their settlements. We report here on the demographic simulations and recent explorations of incorporating disease and social structure.

*TOYNE JM, Elias BD. *Patterns of violent trauma at the Adoratorio Temple, Túcume, Peru*. This study presents the analysis of the sample of human skeletal remains excavated in 1992 from a staging area in front of the temple structure known as the Adoratorio at the prehistoric site of Túcume, Peru. The archaeologists believed that the "burials" represented human sacrifices based on the uniform distribution of individuals with a face down body position, their orientation East to West, and their proximity to the altars of the temple. Additionally, the archaeologists found three crania in small pits with only the first cervical vertebrae present. Osteological analysis conducted this summer set out to test this hypothesis of ritual human sacrifice. Results show that seven of the individuals demonstrated

clear evidence of cut marks placed horizontally across the neck region, exhibiting numerous lacerations across the same bone or across various bones of the same individual including the cervical vertebra, 1st rib, clavicle and manubrium. Some cutmarks appear to represent decapitation and in one case, a possible trophy head. The demography of the sample includes both sexes, and subadult and adult individuals. However, later intrusive burials of both humans and llamas complicate assessing the total number of individuals present. The analysis of this sample adds to a growing picture of ritual human sacrifice on the North Coast of Peru. While there is substantial evidence of such activities by the Moche peoples, this evidence from the site of Túcume demonstrates that the subsequent Lambayeque peoples continued the practice, but perhaps in different ways. Future excavations will undoubtedly provide additional clues as to possible origins of the victims and why they may have been selected for this end.

VON HUNNIUS TE, Roberts CA, Boylston A, Saunders SR. *Histological identification of syphilis in Pre-Columbian England*. The occurrence and patterning of abnormal bone alterations in skeletal material from archaeological sites allow paleopathologists to identify disease in the past. However, similar manifestations can mimic several diseases, such as syphilis and tuberculosis. When uncertainty arises in the diagnosis it is recommended that a microscopic approach may be used to consider differential diagnoses of disease processes. In fact, microscopic analyses served to complement the macroscopic identification of venereal syphilis in four pre-Columbian skeletons from the site Hull Magistrates Court in England. Diagnosis was based on parameters presented by Schultz (1994, 2001 and 2003), which characterize venereal syphilis at the histological level. Observation of the micro-architecture for several of the samples allowed for a more comprehensive approach regarding the identification of disease (processes) in ancient human remains. In most samples Polsters and Grenzstreifen, or remnants of such structures, could be identified suggesting the presence of a chronic, inflammatory disease such as venereal syphilis. Sinous lacunae were also observed in all histological samples pointing to lytic activity (osteitis). The combination of both proliferative and destructive processes is pathognomonic for syphilis and the histological analyses provide a more accurate diagnosis of this infectious

disease within these four individuals. As a result, the histological evidence suggests it was present in England prior to 1492. This secondary form of evidence helps support the macroscopic identification of venereal syphilis and shows the power of a multi-methodological approach to the identification of disease in the past.

***WATAMANIUK L.** *Personal Identification of Unknown Skeletal Remains from the Thoracic Vertebrae.* Researchers in forensic anthropology must strictly adhere to the Daubert (USA) and Mohan (Canada) criteria for the admissibility of evidence in a court of law. To date, attempts at positive personal identification of unknown human remains based on the comparison of thoracic skeleton to antemortem radiographic records have been largely *ad hoc* and have relied on the presence of rare pathological markers rather than on normal skeletal variation. In light of this problem, a technique based on the frequency of occurrence of non-pathological morphological traits of thoracic vertebrae has been developed. Chest x-rays from a sample of healthy adult male individuals were examined. For each visible thoracic vertebra, seven margins of vertebral body were scored categorically based on morphology. The frequency of each morphological category was established for the sample and tested by repeating the procedure on an independent sample of healthy adult male radiographs. The independence of occurrence of individual morphological categories was determined between vertebrae and between margins of a single vertebra to establish which trait frequencies along which vertebral body margins could be combined statistically to establish positive identity. Using this method, it was possible to positively identify 21 of 24 "unknown" individuals in a sample of 100 known radiographs. Though ultimately limited by the availability of antemortem medical records, this method is relatively easy to apply and adheres to Daubert and Mohan criteria, making it a highly useful tool in positive personal identification.

WEBB EA, Schwarcz HP, Jensen CT, Terry RE, Moriarty MD, Emery KF. *Stable carbon isotope signature of ancient maize agriculture in the soils of Motul de San José, Guatemala.* As maize (*Zea mays*) is considered to be one of the staples of the ancient Maya diet, the ability to quantify the area that was used for ancient maize agricultural fields surrounding Maya centres will aid in determining the agricultural capacity of the ancient population and influence

population density estimates. Soil profiles collected from a 2.5-km transect radiating from the Maya centre of Motul de San José, were analysed for the stable carbon-isotope composition of their soil organic matter. The residues of maize, the only C₄ plant known to have been cultivated in this area by the ancient Maya, impart a carbon-isotope signature to the underlying soil organic matter reservoir that is distinct from that produced by the native C₃ forest vegetation. The varying turnover rates of the humic acid and humin fractions of the soil organic matter allowed us to distinguish between the presence of modern and ancient maize residues in these soils, and delineate the lateral extent of maize cultivation at this ancient Maya site. The strongest isotopic evidence of maize residues is preserved in the soils surrounding the peripheral settlement of Chakokot and at one locality within the urban centre of Motul de San José, with very little evidence of the former presence of maize on the sparsely settled land between these two sites.

***WHEELER S, Molto EJ.** *Fractured childhood: Evidence of possible child abuse from the Dakhleh Oasis, Egypt.* In 2003, a young child was excavated from the Kellis 2 cemetery that exhibited skeletal fracture patterns consistent with that of an abused child. The Kellis 2 cemetery, located in the Dakhleh Oasis, is thought to be a late Roman/early Christian cemetery (circa 100 to 350 AD). The cemetery is being excavated as part of the Dakhleh Oasis Project's mandate to understand human adaptation in a desert oasis environment. This young individual exhibits complete bilateral fractures of the proximal humeri with indications of pseudoarthrosis on the left humerus as well as a complete fracture of the medial aspect of the right clavicle. The remains of this child were brought to the Hospital for Sick Children in Toronto for medical imaging of the fractures. In this paper we discuss the multidisciplinary approaches to understanding these fracture patterns and the social implications for child abuse during the Roman Period in the Kellis community.

WHITE CD, Longstaffe FJ, Law KR. *Oxygen-isotope variability in Nilotic Nubian mummies: Food, physiology or foreigners?* The potential effects of diet, environment, and physiology on the oxygen-isotope ratios of bone and tooth phosphate ($\delta^{18}\text{O}_p$) are examined using Nilotic Nubian mummies dating from the X-Group (A.D. 350 to 550) to Christian (A.D. 500 to 1400)

periods. The $\delta^{18}\text{O}_p$ values indicate that the Nile was the main source of drinking water for these populations. A drop in the level of the Nile and the associated dietary shift to C_4 plant consumption during the X-Group period is reflected in both $\delta^{13}\text{C}$ values of bone collagen and $\delta^{18}\text{O}_p$ values. Metabolic changes associated with iron deficiency do not affect $\delta^{18}\text{O}_p$ values significantly, but females with osteopenia, and females in general, have slightly lower $\delta^{18}\text{O}_p$ values than males. The weaning process is evident in both bones and teeth, but there is variability in how it is expressed. Several hypotheses are presented to explain this variability. The data suggest that the more complex dietary and cultural behaviour of humans may limit our ability to adopt animal models in the interpretation of $\delta^{18}\text{O}_p$ values.

WHITEDUCK G. *Resisting Assimilation: Kitigan Zibi's Journey From Honouring Our Past to Protecting Our Future – Part 1*. The purpose of our mission is to repatriate ancestral human remains and burial artifacts that are currently under lock and key at the Canadian Museum of Civilization in Gatineau, Quebec, and to rebury them in our most sacred Mother Earth. This is an insight to Kitigan Zibi's journey in its mission to repatriate ancestral human remains and burial artifacts found on Algonquin ancestral territory, as this journey shall trace our history, and describe our struggles in our efforts in the repatriation process. The media, and the different levels of government have their own set of values. Kitigan Zibi, like all other First Nation across Canada, in our relationship with the federal government has been, and still is, impacted by a hierarchy of institutional racism. A collective approach was taken, to solicit through community dialogue, additional input, stories and recommendations from the ten Algonquin-Anishinabe communities. Meanwhile, facing the media, hierarchical bodies and its protocols certainly challenged reciprocity in our repatriation efforts. With the voices of our Elders and support from the Algonquin-Anishinabe Chiefs, the outcome has been undeniably clear that the repatriation process be done immediately and without further delay. What has been brought to the earth, stays in the earth. These are our teachings. To have to negotiate for repatriation is considered racism because it is a foreign concept that goes against our natural laws. Despite media communication and hierarchical differences, a recommendation was forwarded to a governing body for the return of

ancestral bones and artifacts for reburial. Kitigan Zibi presently awaits the final outcome of the decision from the Canadian Museum of Civilization Board of Trustees.

*WILLIAMS B. *Crime scene evidence and jury perception*. Traditional mapping methods of outdoor crime scenes by law enforcement have typically involved the creation of static, 2D maps. Advances in technology and computer mapping software now permit the user to create dynamic 3D site reconstructions. The purpose of this study is (1) to assess the potential value of two 3D mapping software programs with traditional mapping methods employed by law enforcement at crime scenes; and (2) to assess which 3D mapping software program is the most effective on jury perception and comprehension in relaying information pertaining to the scene. The data for this analysis was obtained from an actual case of found human remains located in Port Coquitlam, British Columbia. Three dimensional reconstructions of the site were made using ArcView v. 3.3 and ArcGIS 3D Analyst software extension and Surfer v 7.0 3D mapping software. The maps and associated materials were qualitatively evaluated according to several criteria relating to juror perception and comprehension. The results indicate that 3D mapping is a more effective means of communicating evidence relating to outdoor scenes to the jury. The ArcView v. 3.3 and Surfer v 7.0 site reconstructions are comparable in several respects and both are more successful than 2D mapping in terms of enhancing jury perception and comprehension. Overall, 3D maps produced in ArcView v. 3.3 in conjunction with ArcGIS 3D Analyst software extension produce superior results by providing the user with greater flexibility to manipulate and communicate information pertaining to the scene. Juror perception and comprehension of the relationship(s) between the evidence and the scene, and the overall impact that such technology can have on the outcome of a trial should be the guiding principle that determines whether or not new mapping technology is adopted by law enforcement agencies and forensic experts.

*WILLIAMS L, Dupras T. *Mortuary mixtures: Evidence of body treatment in a Roman/Early Christian cemetery*. In 2003, nine burials were recovered from the Kellis 2 cemetery that appeared to have some form of mortuary body treatment associated with the linen wrappings used on the individuals. The Kellis 2 cemetery,

located in the Dakhleh Oasis, Western Desert of Egypt, is thought to be a late Roman/early Christian cemetery (c. 100 to 350 AD). Evidence of body treatment had not previously been found within the Kellis 2 cemetery and burials were thought to be consistent with early Christian mortuary practices. Body treatment substances from three of the burials were analyzed using Raman spectroscopy to determine the nature of the organic materials. Embalming materials used within the wrappings consisted primarily of a balm/resin and clay mixture. Additional materials were recovered from the exterior of the wrappings and consisted of decayed plant matter and ammonium salt and clay mixture. These findings place into question the specific characterization of early Christian mortuary practices being used in the Kellis 2 cemetery and point to a possible mixing of cultural practices involving body treatment and preparation during burial.

*WONG S. *The population status of Colobus vellerosus at the Boabeng-Fiema monkey sanctuary and surrounding forest fragments, Ghana.* The Boabeng-Fiema Monkey Sanctuary (BFMS) is inhabited by a growing population of *Colobus vellerosus*, a species whose numbers are declining throughout its range in West Africa. Smaller, degraded forest fragments connected to BFMS also contain *C. vellerosus* and may provide important habitat for the monkeys. Our objective was to determine the current population status of *C. vellerosus* at BFMS and the surrounding fragments, and compare results to previous censuses. The census was a 'complete count' of colobus and was conducted over one month in July 2003. The same route was walked for 13 days, in seven locations by trained research assistants and myself. The 2003 population estimate of *C. vellerosus* at BFMS was 217-241 (15 groups); a slight increase from 2000. Numbers in the fragments (58-62; 6 groups) have remained stable from 1997, although distribution among the fragments has changed. Mean group size did not differ significantly between the fragments and BFMS. Larger fragments tended to have larger numbers of colobus and monkeys can apparently travel between fragments. By comparing these population estimates with current habitat quality, we can evaluate whether these fragments can sustain current numbers and if corridor development would be useful in maintaining a viable population.

WOOD C. *Identification of chop wounds in an historical murder victim.* Often identification of the murder weapon can be ascertained through examination of the pattern of toolmarks on bone and careful correlation of such injuries with weapons or trauma mechanisms. Chopping fractures of the skull, resulting from blows struck by heavy, thick-bladed weapons have been identified in an archaeological context primarily in situations of battle. This case represents an historical homicide victim with a significant wound on the squamous portion of the occipital bone clearly illustrating the characteristics of both hacking trauma and an injury inflicted by an axe. Differences in chop wounds found in archaeological versus recent remains is discussed. The nature of the wounds, location/position, dimensions of the injury and the amount of force required to inflict it suggests it was in fact the murderer's intention to decapitate his victim.

*YOUNG C, Ann HD. *A syndemic perspective on whooping cough epidemics at York factory.* A syndemic refers to two or more epidemics that interact synergistically at the biological level. Syndemics are developed and sustained in a community/population because of deleterious social conditions. They are interlinked biological expressions of social circumstances. In this paper we examine how whooping cough epidemics at York Factory in the 1920s were enhanced biologically through their interaction with influenza and tuberculosis. We consider morbidity and mortality at the community level, and examine through reconstituted families the clustering of these diseases within families and other social networks. We link these syndemics to a process of socio-economic desertification that led to poverty and malnutrition at York Factory and, in turn, fuelled interactions between epidemics of respiratory disease.

YOUNG HC, Fedigan LM. *Sharp spines and toxic stings: How Cebus capucinus overcomes the defense mechanisms of insects in Costa Rica.* Capuchin monkeys are renowned for specializing their foraging efforts on foods that "fight back"; that is, plants, small vertebrates and insects with elaborate defense systems. Little is known about the insect component of the capuchins' diet, including which insects are eaten and how often. Furthermore, no study has yet focused on *how* capuchin monkeys succeed in overcoming the defenses of their prey. I investigated the foraging activities of *Cebus capucinus* on insects in Costa Rica. In particular,

I examined how they successfully forage on the swollen, larvae-filled thorns of acacia trees (*Acacia collinsii*). These trees are protected by ants (*Pseudomyrmex* spp.) that act to defend the trees against predators. I also collected general information on insect foraging, including which species the monkeys target and how they extract, handle and process them. These data will add to our understanding of the factors that influence the extractive foraging behaviour of *Cebus capucinus*, and in turn, the cognitive decisions that underlie their behaviour. Behavioural sampling of the capuchins was conducted via ten-minute focal follows. Samples of the insects on which the capuchins foraged were collected and identified. When capuchins foraged on acacia trees, the ant species present and the ant colonies' activity levels were assessed, along with eight other acacia-related variables. Finally, a general insect survey was conducted. This included tree beating, leaf litter sifting and twig sampling. Insect-eating comprised 45% of all capuchin feeding records. Caterpillars were eaten most frequently, followed by unknown insects, ants, cockroaches and stink bugs. Analysis of acacia-eating is forthcoming.

*ZHAOYUAN L. *Are limestone hills a refuge or essential habitat for white-headed langurs in Fusui, China?* White-headed langurs (*Trachypithecus leucocephalus*) are found on limestone hills in SW Guangxi, China. I studied the ecology of the langurs in Fuisui Precious Animal Reserve in 1997/1998. I carried out surveys on the population of langurs in the reserve in 1996-1997 and 2003. Data were collected on vegetation fragments and the activities of white-headed langurs at different levels on the limestone hills. The data showed that white-headed langurs selected less fragmented habitats with less human disturbance. They spent some 60% of the day at lower levels of the hills for carrying out their maintenance activities, including feeding. When humans were absent, the langurs even came to the ground. Analyses suggested that the hills themselves were used as a refuge from human disturbance but were not otherwise essential habitat. The langurs might prefer lowland habitats, but they have now lost the habitats to humans for agricultural use. Results of this study have implications for improving conservation management for the langurs.



CAPA/ACAP Conference 2004

The University of Western Ontario

Poster Abstracts

*BLUMENFELD J, Leigh SR, Spencer-Smith J, Weber DE. *A New Portable Scanning System for the Acquisition of Data from Three-Dimensional Objects*. This analysis introduces a new digital photographic method for collecting three-dimensional coordinate data, applied to a study of variation in hominin browridge morphology. This area of the skull has played a crucial role in studies of taxonomy, function, and sexual dimorphism, but studies of variation in browridge morphology have been constrained due to the subtlety and limited number of discrete osteological landmarks present in this region of the skull. In this study, we use the ShapeCam system by Eyetronics, in order to capture the 3D geometry of a small sample of hominin frontal bones in order to assess the capabilities of this technique for measuring subtle anatomical details. The ShapeCam system consists of a calibrated digital camera and a specially designed flash device, both affixed to a lightweight frame. Using the ShapeCam, high-resolution digital images were taken of each sample specimen. During image acquisition, the flash device projected a 300x300 grid onto the surface of each skull. Deformations in the appearance of the calibrated grid lines were used to calculate the 3D structure of each skull from the 2D digital images. The projected grid was also used to extract 3D coordinate data from the supraorbital region of each specimen. This process enabled us to produce fast and accurate 3D digital models that recreate the original shape, colours and textures of each specimen. We utilize a variety of analytical approaches with ShapeCam data, including bivariate, multivariate, and geometric morphometric techniques. The advantages and disadvantages of using this method of data collection will also be discussed.

*CROSS A, Wheeler SM, Williams LJ, Beauchesne P, Marciano LD, Pawlowski A,

Metcalf JZ. *The UWO Mummy Project: The students' perspective on multidisciplinary approaches to applied research*. The University of Western Ontario Mummy Project, in association with the Department of Anthropology at UWO, promotes research, stewardship of archaeological resources, public and professional education, and community outreach programs. To serve the public interest, the UWO Mummy Project seeks to explore ways in which bioarchaeology and other disciplines might work together to improve the quality of teaching and research by advancing knowledge and enhancing awareness of the past both within and beyond academia. In 2003 a Roman Period Egyptian Mummy (colloquially known as Lady Hudson) was donated to UWO and a graduate seminar was developed to expand the understanding and appreciation of humanity's past as achieved through systematic, interdisciplinary investigation of mummified remains. The seminar emphasized the relevance of 'hands on' work outside of the classroom and advocated an applied learning approach to education in a way that empowered and motivated students, while assisting them in developing key skills and knowledge required for further instruction, future employment, and active participation in their communities. Some of the research projects initiated by graduate students participating in the 2003 seminar are presented here. The focus on applied learning resulted in students shifting out of the traditional classroom and into working environments where they were required to learn new skills and effectively put them into practice to solve research problems. Many of these projects are ongoing and will be used in the further development of community outreach programs and as a database for use in future seminars.

DENVIR MD. *The first year of a late Victorian era Toronto Hospital: A biocultural assessment*.

St. Michael's Hospital, Toronto opened its doors on July 1, 1892. A preliminary examination of the patient registry for the first year provides important insight into the health of the city's lower classes and confirms the influence of prevalent social factors. A total of 610 admissions, 566 discharges, and 44 deaths are listed; diagnosis and available social history are included. Infectious diseases, both acute and chronic, predominate, with tuberculosis, STD's, and typhoid among them. Despite knowledge of germ theory, patients were not isolated but rather admitted as beds were made available. Surgical intervention and effective medical treatment prior to antibiotics was limited, as the mortality rate suggests. The prevalence of gonorrhea and syphilis are consistent with contemporary estimates in the general population of Canada, and reveals a large percentage of women mostly employed as domestics, who are infected. Inclusion of diseases that are accepted today as the result of an initial gonorrheal infection significantly increases the total number of cases. Chlorosis, once considered to have 'disappeared' in the early twentieth century, was present in 16 young females; patient profiles strongly support a diagnosis of iron-deficiency anemia. Lifestyle and dynamics of a late Victorian household, sexual attitudes, and the status of women are critical to an accurate health assessment, and make it all the more poignant.

*FOREMAN L. *Examining osteopenia in prehistoric and historic human samples: The importance and advantages of employing both macroscopic and microscopic techniques.* This poster will outline the results of the application of a combination of macroscopic and microscopic analytical techniques in the examination of osteopenia in two prehistoric and two historic human samples. Osteopenia is defined as a reduction in bone mass per unit volume that is characterized by increased porosity and trabecularization of the cortical bone and a reduction in the connectivity and number of trabeculae in trabecular bone. Five different element types, each with a different cortical and trabecular bone composition, were examined in this study: the second metacarpal, the radius, the innominate, the femur, and the lumbar vertebrae. Five analytical techniques were combined in the analyses of these elements: gross morphology, radiography, radiogrammetry, measurement of the bone mineral density (BMD) and bone mineral content (BMC) using dual-energy X-ray absorptiometry

(DXA), and histology. The results of this study emphasize the importance of examining a number of skeletal sites and of applying a battery of analytical techniques in the examination of osteopenia in prehistoric and historic human samples. Changes in bone density or bone cell activity are detected earlier at certain skeletal sites (i.e. the lumbar vertebrae) than others. When combined, the data obtained from each of the five analytical techniques provide more information about the bone status of an individual than any single technique or combination of two or three techniques. Lastly, radiography and histology are useful in identifying samples that have undergone diagenetic alteration, and can thus be used to screen prospective samples.

GAGNON A, Toupance B, Tremblay M Beise J, Heyer E. *Transmission of migration propensity increases genetic divergence between populations.* The advent of molecular genetics has brought invaluable information, which is now routinely used by anthropologists in their attempt to reconstruct our demographic past. Since the mitochondrial DNA loci are much more similar between populations than are the Y chromosome loci, it has been suggested that women had a much higher migration rate than men throughout history. Based on an examination of intergenerational migration patterns in three large demographic databases, we bring this inference into question. In some early Canadian settlements (St. Lawrence Valley and Saguenay), and in the past Krummhörn region of Northwest Germany, men whose father was a migrant were more likely to migrate, while the migration probability of women was largely independent of that of their mothers. As a result, men's movements were less effective in preventing genetic differentiation between populations than women's movements. If it is largely prevalent among human societies, this male-specific transmission of migration propensity could partly explain the geographical clustering of Y chromosome distributions. In order to account for its impact, we propose a slight modification of Wright's Island model. We also address the relevance of this model with respect to previously reported measures of population differentiation and we discuss the supporting historical and anthropological literature. We conclude that the widespread patrilineal rules of post-marital residence have generated both a higher female migration rate and a patrilineal dependency in the propensity to migrate.

*GARDNER J. *A reanalysis of the patterns of trauma among Neandertals*. The anatomical distribution pattern of trauma lesions among Neandertals and other populations was analyzed using a methodology previously used to analysis trauma patterns in Neandertals. Results of this previous study suggested that Neandertals and rodeo performers have similar patterns of trauma because of shared behavior patterns, that being coming into close contact with large ungulates. In this analysis a different occupation-specific group of modern humans, agricultural workers, was compared to Neandertals. Agricultural workers come into close contact with large animals when engaging in the day-to-day routines of farm operation and animal management. It is argued that data from this population shows patterns and types of injuries caused by large livestock in conditions that more closely resemble those of close-proximity hunting. The null hypothesis for this study was that Neandertals and agricultural workers were expected to have similar patterns of trauma based on the assumption that members of both groups frequently came into contact with large animals (ungulates). This hypothesis was tested and rejected based on the statistically significant differences between Neandertals and a sample population with traumatic injuries that were specifically caused by livestock. The rejection of the null hypothesis led to the development of alternative explanations for the observed patterns of trauma in Neandertals including interpersonal violence, natural events (rock falls) and other accidents resulting in injuries, particularly falls.

GARLIE TN, Gordon CC. *Are National Guard soldiers just civilians in Uniform? Body size in the United States Army*. Anthropometry, the study of measuring human body dimensions, proportions and ratios is critical for the fit of protective clothing and equipment in military, and other civilian first responder applications (i.e. police work and firefighting). Correctly fitted clothing and equipment ensures the best protection and enables these individuals to perform at their peak levels while reducing their risk to injury. Many factors, including changes in the age, sex, and population composition, secular trends in body size, and changing fitness and body fat regulations influence the body size distributions of these occupational groups (Gordon and Friedl, 1994). Since the early 1990s, the US Army has intentionally downsized its Active Duty Forces and has increasingly relied on Reserve and National Guard

components whose demographic compositions are significantly different from those of the Active Duty Forces (DMDC, 2003), and whose body size distributions may also be different than those of the Active Duty. Because combat clothing and equipment used in Iraq was designed, sized and procured using anthropometric data from the Active Duty forces (Gordon et al., 1989), it is possible that shortages of larger size categories during the 2003 Iraq deployment were caused by the need to outfit Army National Guard Soldiers whose body sizes may be larger on average than those of Active Duty soldiers (Gordon, 2003). Results from a recent study found that White males from this ARNG group were, on average, shorter and heavier with a larger Body Mass Index than their Active Duty counterparts (Garlie and Gordon, 2004). This paper reports a test of the null hypothesis that body size distributions of Army National guardsmen are not significantly different than their Civilian counterparts when demographic distributions are matched. Two recent large-scale civilian sizing surveys, SizeUSA (2004) and The Civilian American and European Surface Anthropometry Resource (CAESAR)(2002) are used for comparison and may provide a proxy for modeling Army National Guard body size and shape distributions, information that is currently absent from the literature. Preliminary results suggest that the ARNG personnel are generally shorter than both the SizeUSA and CAESAR samples. Weight and BMI however are similar across the three samples among the three oldest age groups.

*KJORLIEN Y, Beattie O, Peterson A. *Decomposition stages as a comparative baseline for scavenging activity*. Time since death (TSD) is traditionally used as a baseline to which taphonomic events and their markers, such as decay and scavenging activity, are compared. During May 2002, research was done to discover potential patterns in scavenging activity. Time since death was used as a baseline to chronologically organize the occurrence of scavenging activity. No patterns were seen using this method, however, patterns were discovered when scavenging activity was organized by decomposition stage. Decomposition markers described in the scientific literature (i.e. skin sloughing and adipocere formation) could not be applied to this study so, study-specific criteria were used to create a qualitative decomposition sequence. It was found that the majority (75%) of scavenging activity began on carcasses that were in the

Mummified stage of decomposition. It was concluded that decomposition stage may be a better predictor of potential scavenging activity than TSD. Since decomposition stage did not correlate well to TSD in this environment, future research may explore the correlation between TSD, decomposition stages and scavenging activity in other environments.

UWO LADY HUDSON PROJECT TEAM. *Lady Hudson and mummy Studies at UWO*. The oldest member of the Department of Anthropology at The University of Western Ontario is "Lady Hudson", a Roman Period Egyptian Mummy. Lady Hudson came into our care in May of 2003, as part of an ongoing multidisciplinary research project that emerged out of Chris White's work on Nubian mummies (White 1993) and Andrew Nelson's work on the Sulman Mummy (Gardner *et al.* 2004). The proximate goal of this project is to learn about life and death in Ancient Egypt by means of the detailed bioarchaeological analysis of these mummies, and the ultimate goal is to promote and develop interdisciplinary research among the humanities, engineering and the biomedical and social sciences, as focused on the study of ancient human remains. An important component of this project is the dissemination of research results through academic channels as well as through the media and public education programs. Lady Hudson came to us after a long and winding journey from Egypt, through Belgium, Ottawa, Macon, Grand Rapids, Calgary and Toronto. In fall 2003, she was featured as the focus of a graduate student course that inaugurated the Archaeological Sciences PhD program at UWO (see Cross *et al.* 2004). Since coming to London, she has been the object of attention of students and scientists from across the university and among many external institutions. This poster will present an overview of "her story", and the directions for future research.

LAURENCE J. *Primary and secondary burial in coastal Ecuador: Olla rescue and recovery of physical remains*. Introduction: Primary and secondary burials of Coastal Ecuador: An olla rescue and recovery of physical remains. Materials and Methods: Excavation methods and madness. Recovery process and what we found by accident. We excavated with the intention of only removing the olla but found three primary burials with in close proximity. Unfortunately we only had time to recover one primary burial, and the olla.

Results: Primary and secondary burials. The Primary is a child aged four years \pm 12 months. The secondary burial contains one infant and one adult. The current discovery indicates that the burials are from an earlier period and a different class. Manteño burials tend to be buried under house structures and no evidence of such a structure has been found close enough. Since little is known about this time period further research needs to be done regarding burial patterns.

PARISH JM, Williams EG. *Examining an epidemic of scarlet fever in the late 19th century, Cape Breton Island, Nova Scotia*. The biological factors of disease spread are often the focus of epidemiological studies. However, the socio-cultural factors involved are essential to include in any such analysis. In this poster, we demonstrate the importance of various socio-cultural factors in producing an epidemic state. The study uses both computer-aided mathematical modeling, using the STELLA software package, and traditional demographic means to explore the likely factors that resulted in the deaths of tens of thousands of children worldwide. Our research area is focused on Cape Breton Island, Nova Scotia during the latter part of the 19th century when a world pandemic of scarlet fever was beginning to wane. Several communities were hit hard by the pandemic killing off as much as 5% of the juvenile population while others were not affected at all. We emphasize the need to take into account interrelated socio-cultural factors such as occupation, daily community interaction, trade, contact rate and gender roles, together with biological factors of age, immunity and virulence of the pathogen. This combined analysis is not only essential for understanding the context of disease in the historic record, but also for understanding it in contemporary society. As the world's attention turns to outbreaks of diseases such as SARS and mad cow disease, it will be essential for multidisciplinary studies of disease spread and epidemic modeling to increase in number.

ROKSANDIC M. *Mesolithic violence in southern Europe*. Mesolithic has been signaled out as a period in which organized violence and warfare appear in the past. Here we examine and compare available bioarchaeological evidence from Serbia, Romania (Iron Gates Gorge), Portugal (Muge and Sado shell middens) and Ukraine to counter the notion that warfare and violence were endemic in Mesolithic Europe.

WHITAKER K. *Skull lesion diagnostics reconsidered. The establishment of an osteobiography is often hindered by the limitations of available evidence. Within the last couple of years, there have been reservations about automatically associating the symptoms of porotic hyperostosis and cribra orbitalia with anemia. The problem stems from the overlapping diagnostic criteria of anemia, scurvy and even healed blunt trauma, which could all be characterized by lesions resembling porotic hyperostosis and cribra orbitalia. The evidence of scurvy, characterized by hemorrhagic processes in the skull, is "porous hypertrophic lesions in several places on the skull vault" (Ortner 2002:387). Even in healed blunt trauma, localized information may resemble thick porous bone. The implications of misdiagnosis are wide reaching. For example, the ancient and colonial Maya have been reported for multiple sites as having high incidence of anemia. Models have been created to suggest that parasites or diet or a combination of these were to blame, but in looking at the vast environmental, dietary and temporal differences, and the evidence presented here, there is a large possibility that there have been misdiagnoses. The results of this could change our perception of the epidemiology of disease in past cultures. With the arrival of NAGPRA and similar programs there is less chance to view and examine remains in follow-up studies, so precision becomes essential. There needs to be collaboration between researchers from the medical profession and paleopathologists to gain an accurate assessment of the diseases and create a stricter, clearer protocol for diagnosing cranial lesions, and therefore anemia and scurvy.