AMERICAN JOURNAL OF HUMAN BIOLOGY 25:235–290 (2013)

## 38th Annual Meeting

# HUMAN BIOLOGY ASSOCIATION

**Program**
**of the**
**38th Annual Meeting**
**to be held in**
**Knoxville, TN**
**Hilton Knoxville and Knoxville Convention Center**
**April 10–11, 2013**

**Program Committee:**
**L. Christie Rockwell, Chair**
**Abigail Bigham**
**Craig Hadley**
**Claudia Valeggia**
**Hannah Wilson**

**Local Arrangements:**
**Andrew Kramer**
**With Special Thanks to Susan Antón**


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# CURRENT HBA OFFICERS AND MEMBERS OF STANDING COMMITTEES

**President** **Deborah L. Crooks (2012–14)**

**Secretary-Treasurer** **Virginia J. Vitzthum (2012–16)**

**Executive Committee**

**International: Hilton da Silva (2009–2013)**
**Membership: Ivy Pike (2010–2014)**
**Program: L. Christie Rockwell (2011–2015)**
**Public Relations: Ellen W. Demerath (2012–16)**

**Nominations and Elections Committee**

**Susan Tanner, Chair (2011–13)**
**Stephen McGarvey (2011–13)**
**Crystal Patil (2012–14)**
**Amanda Thompson (2012–14)**

**Publications Committee**

**Linda Gerber, Chair (2011–2015)**
**Barbara Piperata (2011–2015)**
**Josh Snodgrass (2009–2013)**
**Sharon Williams (2011–2013)**
**Peter Ellison (Editor, AJHB; ex officio)**

**AAAS Representative** **Cynthia Beall**

## GREETINGS FROM HBA PROGRAM COMMITTEE CHAIR

The 38th Annual Meeting of the Human Biology Association will be held at the Knoxville Convention Center, with lodging accommodations at the Hilton Knoxville hotel, on Wednesday and Thursday, April 10 and 11, 2013. Non-members who register for the meeting are welcome to attend. Registration is less costly on-line (www.humbio.org) before April 5, 2013 but is also available at the meeting. Registration will be in the Concession, Level 3 (near Skybridge), on Tuesday 4/09/13 (5:00 – 8:00 p.m.). On Wednesday 4/10/12 (8:00 a.m. to 5:00 p.m.) registration will be on the Park Concourse South, Level 2. On Thursday, 4/11/12 from 8:00 to 11:30 a.m. registration will be in the Concession, Level 3 (near Skybridge).

A detailed schedule of presentations and events, abstracts of the presentations, and an index of the author's names and presentation slot follow this summary (also see www. humbio.org). Wednesday morning's Poster session will be held on the Park Concourse South, Level 2. Wednesday afternoon's Plenary session and the Pearl Memorial Lecture by Sir Peter Gluckman will be in room 301 D-E, Level 3. The members' dinner reception on Wednesday evening as well as the Awards luncheon on Thursday will be held in room 300 A-C, Level 3. The four Podium sessions on Thursday will be held in room 301 A-C, Level 3. Following the last Thursday Podium session we remain in 301 A-C, Level 3 for the Annual Business Meeting. The HBA student reception will be held in room 300 A-B, Level 3. Please note that events take place on multiple levels in the Knoxville Convention Center space; maps of the first, second and third floor levels are included in the program. The convention center connects to the Hilton hotel via a pedestrian Skybridge on Level 3, west side of the building.

The opening poster session begins at 8:00 a.m. (set up is at 7:30 a.m.) Wednesday, April 10, 2013. It consists of 63 presentations clustered into several poster groups: Biology and Behavior, Growth and Development, Health around the World, and Nutrition. The poster session affords a unique opportunity to discuss the presented research one-on-one with individual investigators. Authors of odd-numbered posters will be present from 8:00 to 9:30 a.m. for discussion of their work. Authors of even numbered posters will be present from 9:30 to 11:00 for discussion of their work. Posters will remain up until 4:30 p.m. for viewing. Following the morning poster session, two concomitant Breakout Sessions are available over the lunchtime break. These are "brown-bag" activities; Break out Session 1, "*Early Career Mentoring*", will take place in 300 B, Level 3, and Breakout Session 2, "*HBA student-member roundtable discussion: The Future of Human Biology*", will be held in 300 C, Level 3.

The Plenary session, "*Broader Impacts? Translating Human Biology for Public Good*" has been organized by Alexandra Brewis Slade. HBA President Deborah L. Crooks will welcome speakers and attendees to open the session at 1:00 p.m. on Wednesday, April 10, 2013. At 5:00 p.m. the Pearl Memorial Speaker, Sir Peter Gluckman, will discuss "*The post-normal science-policy nexus: lessons for policy development from studies of human growth.*" The day concludes with our evening dinner reception. Please plan to join the festivities!

The Scientific Program on Thursday April 11, 2013, consists of 24 presentations organized into four podium sessions: "*Mother and Child*" and "*Growth and Development in Transition*" during the morning, and "*Health around the World*" and "*Genes, Genomes, and Phenotypes*" during the afternoon.

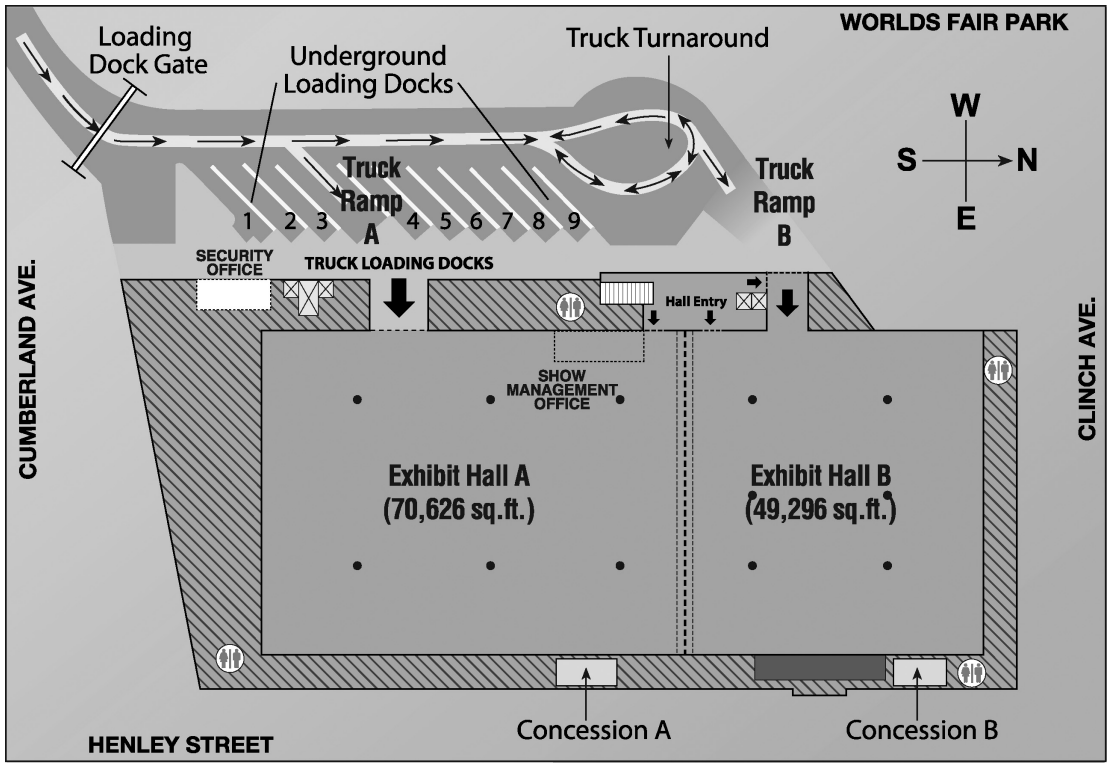
The Annual Awards Luncheon will begin at noon on Thursday, April 11, 2013, in room 300 A-B, Level 3. We urge you to purchase your luncheon tickets well in advance! The recipients of the Edward E. Hunt, Jr. Student prizes for outstanding research presentations will be announced, and the HBA Executive Committee will have the pleasure of presenting the inaugural Michael A. Little Early Career Award.

We encourage you to participate in the HBA Annual Business Meeting, which will follow the final podium session. It will be held in room 301 A-C, Level 3, on Thursday, April 11, 2013 from 5:00 to 6:30 p.m. Thursday evening's student reception (300 A-B, Level 3, 7:00 to 9:30 p.m.) is open to all students registered for the HBA Annual Meeting. The event features light fare to facilitate round table discussions with invited senior scholars on topics selected by the Student Organizing Committee.

The HBA meeting overlaps with those of several sister organizations including the American Association of Physical Anthropologists (AAPA, Wednesday evening through Saturday, April 10 - 13, 2013). The AAPA/HBA Jointly Sponsored Symposium, "*The high price of success: costs of reproductive effort in male primates and humans*." has been organized by Alexander V. Georgiev and Melissa Emery Thompson and is scheduled for Friday morning, April 12, 2013, beginning at 8:00 a.m. in Ballroom A, Level 3. The AAPA program offers several other sessions of interest to human biologists. Please see http://physanth.org/ for the entire AAPA program.

On behalf of the 2013 HBA Program Committee, welcome to the meetings and enjoy your time in Knoxville!

*L. Christie Rockwell*
*HBA Program Committee Chair*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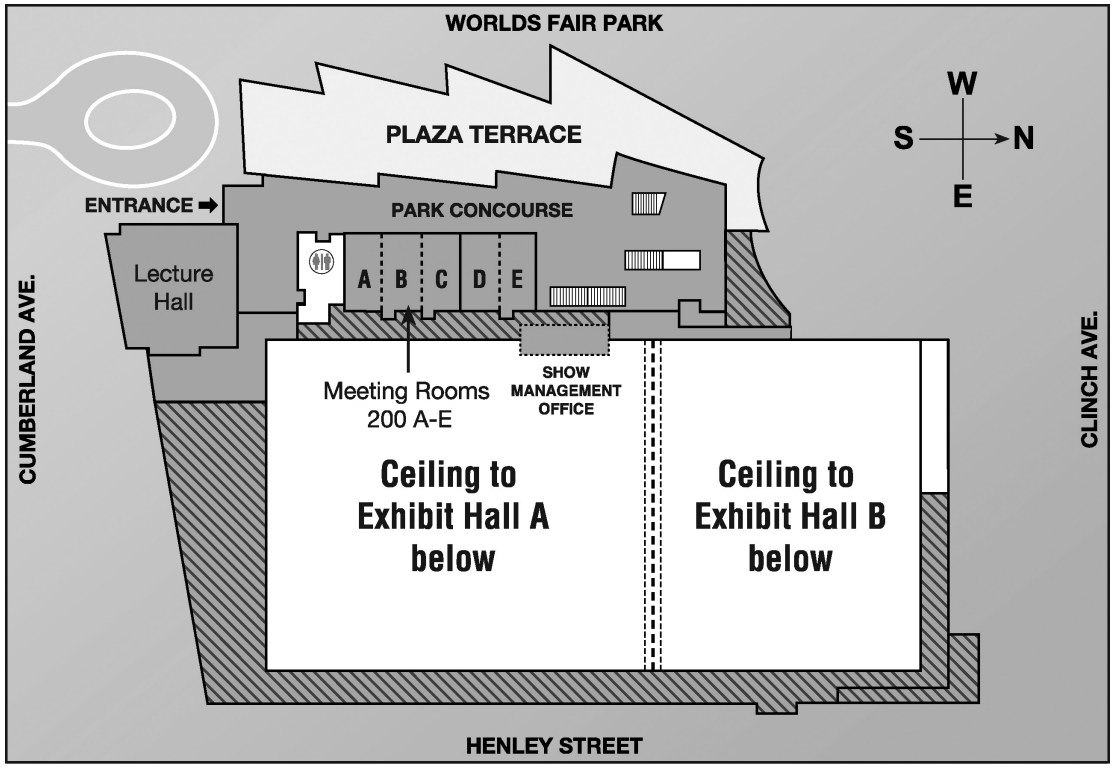
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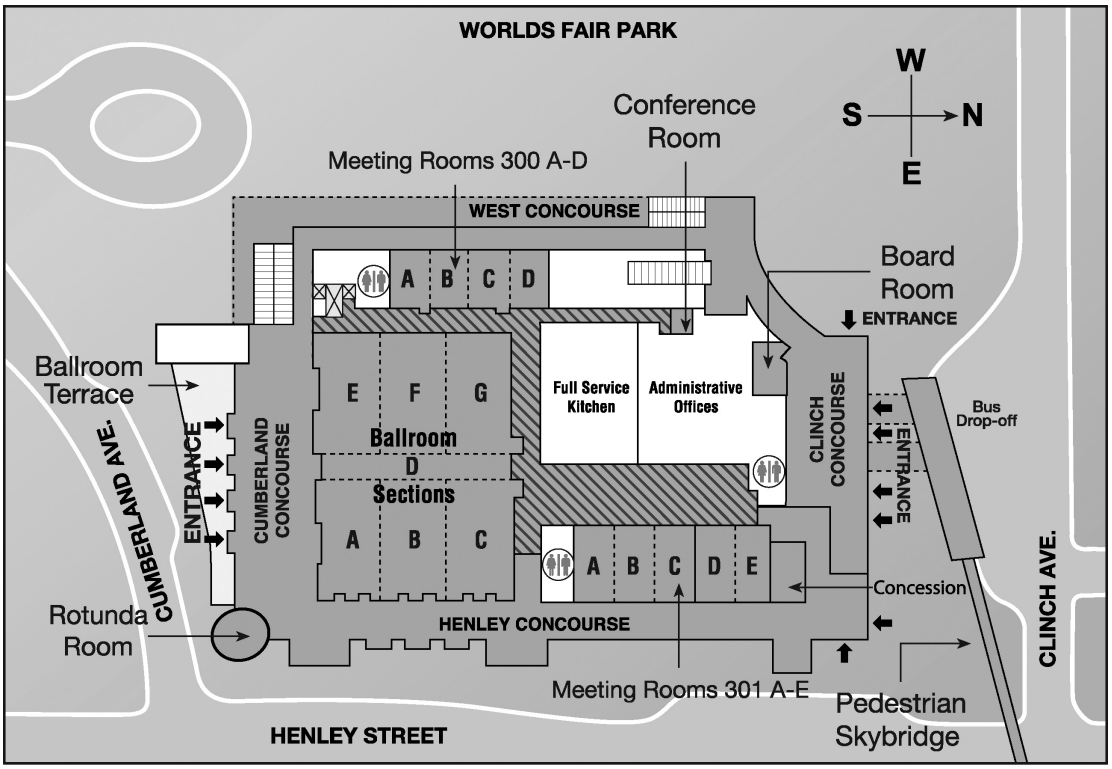
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Rotunda Room
HENLEY CONCOURSE
Meeting Rooms 301 A-E
Pedestrian Skybridge
HENLEY STREET

# 38th Annual Meeting
# HUMAN BIOLOGY ASSOCIATION
# PROGRAM SUMMARY
# Knoxville, Tennessee

## TUESDAY, APRIL 9, 2013

5:00 p.m. to 8:00 p.m. **REGISTRATION**
*Concession, Level 3 (near Skybridge)*

6:00 p.m. to 10:00 p.m. **EXECUTIVE COMMITTEE MEETING**
*Board Room, Level 3*

## WEDNESDAY, APRIL 10, 2013

7:30 a.m. to 9:00 a.m. **AJHB EDITORIAL BOARD MEETING AND BREAKFAST**
*300A, Level 3*

8:00 a.m. to 5:00 p.m. **REGISTRATION**
*Park Concourse South, Level 2*

8:00 a.m. to 11:00 a.m. **POSTER SESSION**
Chair: L. Christie Rockwell
*Park Concourse South, Level 2*

11:30 a.m. to 12:30 p.m. **BREAKOUT SESSION 1**: "*Early Career Mentoring.*"
*300 B, Level 3*

**AND**

11:30 a.m. to 12:30 p.m. **BREAKOUT SESSION 2**: "*HBA student-member roundtable discussion: The Future of Human Biology.*"
*300 C, Level 3*

**AND**

11:30 a.m. to 1:00 p.m. **LUNCH BREAK**

1:00 p.m. **OPENING WELCOME TO PLENARY SESSION**
Deborah Crooks, President of the Human Biology Association
*301 D-E, Level 3*

**INTRODUCTION TO THE PLENARY SESSION**
*Alexandra Brewis Slade, Organizer and Chair*
*301 D-E, Level 3*

1:00 p.m. to 4:45 p.m. **PLENARY SESSION**
*"Broader Impacts? Translating Human Biology for Public Good."*
*301 D-E, Level 3*

5:00 p.m. to 6:00 p.m. **PEARL MEMORIAL LECTURE**
"*The post-normal science-policy nexus: lessons for policy development from studies of human growth.*"

Sir Peter Gluckman
*301 D-E, Level 3*

6:00 p.m. to 9:00 p.m. **HBA DINNER RECEPTION AND CASH BAR**
*300 A-C, Level 3*

## THURSDAY, APRIL 11, 2013

8:00 a.m. to 11:30 a.m. **REGISTRATION**
*Concession, Level 3 (near Skybridge)*

8:15 a.m. to 9:45 a.m. **PODIUM SESSION A**
**Mother and Child**
Chair: Claudia Valeggia
*301 A-C, Level 3*

9:45 a.m. to 10:00 a.m. **COFFEE BREAK**

10:00 a.m. to 11:30 a.m. **PODIUM SESSION B**
**Growth and Development in Transition**
Chair: Craig Hadley
*301 A-C, Level 3*

11:45 a.m. to 1:15 p.m. **HBA ANNUAL AWARDS LUNCHEON**
*300 A-B, Level 3*

1:30 p.m. to 3:00 p.m. **PODIUM SESSION C**
**Health around the World**
Chair: Hannah Wilson
*301 A-C, Level 3*

3:00 p.m. to 3:15 p.m. **COFFEE BREAK**

3:15 p.m. to 4:45 p.m. **PODIUM SESSION D**
**Genes, Genomes, and Phenotypes**
Chair: Abigail Bigham
*301 A-C, Level 3*

5:00 p.m. to 6:30 p.m. **HBA ANNUAL BUSINESS MEETING**
*301 A-C, Level 3*

7:00 p.m. to 9:30 p.m. **HBA STUDENT RECEPTION** (students only)
*300 A-B, Level 3*

## FRIDAY, APRIL 12, 2013

8:00 a.m.to 12:00 p.m. **JOINT AAPA/HBA SYMPOSIUM**
*"The high price of success: costs of reproductive effort in male primates and humans."*
Organizers: Alexander V. Georgiev and Melissa Emery Thompson
*Ballroom A*

**38th Annual Meeting**
**HUMAN BIOLOGY ASSOCIATION**
**SCIENTIFIC PROGRAM**

## WEDNESDAY MORNING, APRIL 10, 2013

| | |
|---|---|
| 8:00 – 11:00 a.m. | **Poster Presentations**<br>Chair: Christie Rockwell<br>*Park Concourse South, Level 2* |
| 7:30 – 8:00 a.m. | Poster Set-up |
| 8:00 – 9:30 a.m. | Authors of odd-numbered posters present for discussion |
| 9:15 – 9:45 a.m. | Coffee Break |
| 9:30 – 11:00 a.m. | Authors of even-numbered posters present for discussion |
| 11:00 a.m. – 4:30 p.m. | Posters available for viewing |
| 4:30 – 5:00 p.m. | Poster Take-down |

POSTER GROUP: **BEHAVIOR AND BIOLOGY**

1. How do beliefs about anemia among Bolivian rural women influence health behavior? RM Bedwell and VJ Vitzthum
2. Project REPA (Reproduction and Ecology in Provincía Aroma): Variation in postpartum maternal sleep duration in co-sleeping mother-infant pairs indigenous to the Bolivian *altiplano*. K Britt and VJ Vitzthum
3. The Shuar Health and Life History Project: Market integration, avoidance behavior, and intestinal helminths among an indigenous lowland Ecuadorian population. TJ Cepon-Robins, TE Gildner, MA Liebert, AM Colehour, SS Urlacher, JJ Snodgrass, FC Madimenos, LS Sugiyama
4. Using local-level social data to inform models and hypotheses about infectious disease spread. JL Dimka
5. A Woman's Place: Social Roles and Sex Differences in the Stress Response. JT Dominguez
6. Big happy family? Using the SAGE dataset to explore the "demographic transition" in Ghana. AC Farbman, GH Ice, SR Williams
7. The Study on global AGEing and adult health (SAGE): The effect of self-reported sleep quality and duration on cognitive function among older adults from six middle income countries. TE Gildner, MA Liebert, P Kowal, S Chatterji, JJ Snodgrass
8. The Study on global AGEing and adult health (SAGE): Socioeconomic status, urban-rural differences, and sleep in older adults from five middle income countries. LM Hawkins, JJ Snodgrass, TE Gildner, MA Liebert, P Kowal, S Chatterji
9. The Shuar Health and Life History Project: The psychosocial stress response of children from varying degrees of market integration in an indigenous lowland Ecuadorian population. MA Liebert, JJ Snodgrass, SS Urlacher, TJ Cepon-Robins, AM Colehour, TE Gildner, LS Sugiyama
10. The psychophysiology of fireside relaxation. CD Lynn
11. Parents' perceptions of residential neighborhood, children's sedentary behaviors, and outdoor play in school children. C Padez
12. Hospital policy change and childbirth decision-making among rural Tanzanian women. CL Patil, ET Abrams, EJP Antalis, S Chibber and SR Nadimpalli
13. Young women's education as a social determinant of fertility in Vanuatu? A Pomer, CW Chan, KN Dancause, G Lee, KM Olszowy, H Silverman, C Sun, CA Weitz, SA Waldman, MM Fernandez, L Tarivonda, G Taleo, M Abong, R Regenvanu, A Kaneko, RM Garruto, JK Lum

14. The Indigenous Siberian Health and Adaptation Project: Chronic stress and its relation to lifestyle change, Epstein-Barr virus, blood pressure, and C-reactive protein among the Yakut (Sakha) of Siberia. KE Schweber, MA Liebert, WR Leonard, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, VG Krivoshapkin, JJ Snodgrass
15. Changes in mood, behavior, cortisol, and interleukin-6 in adults during immune activation: A pilot study to assess sickness behavior in humans. EC Shattuck, MP Muehlenbein, and RA Kreisle
16. Linking self-perception of stress experiences with blood pressure and salivary cortisol levels in undergraduate college students. ME Silva and KS Wiley
17. Play? Chores? Work? Unanswered questions on the nature of children's domestic activities: A review of theories and evidence with a special focus on Guyana. EI Singh
18. The human biology of 'justice': an experimental study in Papua New Guinea. DP Tracer
19. Does social status insulate against ill health in an egalitarian, small-scale society? C von Rueden, M Gurven, H Kaplan
20. Do active parents have active kids? The influence of parents on physical activity levels among elementary school children in rural Colorado. HS Williams, DL Dufour, JM Marshall
21. Statistical evaluation of South Amerindian language classifications by means of genetic variation. CEG Amorim, R Bisso-Machado, V Ramallo, MC Bortolini, SL Bonatto, FM Salzano, T Hünemeier

POSTER GROUP: **GROWTH AND DEVELOPMENT**

22. Effect of development on sub-maximal oxygen saturation in Peruvian Quechua in normobaric hypoxia. M Kiyamu, G Elias, F Leon-Velarde, M Rivera-Chira, T Brutsaert
23. Age at menarche and fecundability. MH McIntyre
24. Growth and nutritional status among Gwembe Tonga migrants in Zambia: the effects of seasonality and gender. J Neumann, DL Crooks
25. Aiding and abetting: a new perspective on life history theory $\times 10^{13}$. GM Sheets
26. Physical Growth Status of Somali Children Born in the United States to First Generation Immigrants. D Tyree, D Crews

POSTER GROUP: **HEALTH AROUND THE WORLD**

27. The Indigenous Siberian Health and Adaptation Project: Seasonal variation in autoimmune thyroid disorders among the Yakut (Sakha) of Siberia. VR Balu, SB Levy, TJ Cepon-Robins, WR Leonard, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, VG Krivoshapkin, JJ Snodgrass
28. The "extra" human metabolic organ: possible contributions of the gut microbiota to hominin evolution. DJ Coppeto
29. Assessing prevalence of tick-borne infectious agents on a university campus. T Cruz, H Keppler, J Thomas, D Kommareddy, S Hempstead, E Valentine, R Spathis, JM Darcy II, RM Garruto
30. Emergence, transmission, and risk of Lyme disease and other tick-borne infections: a community based natural experimental model. JM Darcy II, R Spathis, J Schmidt, H Keppler, S Hempstead, T Cruz, D Kommareddy, J Thomas, M Riddle, H Sayama and RM Garruto
31. Transition to a market economy and C-reactive protein concentrations among rural communities in Hainan Island, China. Y Inoue, M Umezaki, D Li, S Konishi, J Du, C Watanabe
32. Family history of hypertension affects diurnal patterns of mean arterial pressure but not pulse pressure or heart rate in women. GD James, HM Van Berge-Landry
33. Genome-wide associations for Parkinson's disease on the X chromosome. MF Keller, MA Nalls and A Singleton
34. Modeling Lyme disease risk using a biobehavioral and ecological approach. D Kommareddy, J Schmidt, JM Darcy II, RM Garruto, H Sayama

35. The Indigenous Siberian Health and Adaptation Project: Lifestyle factors and seasonal changes in metabolic health among the Yakut (Sakha) of northeastern Siberia. SB Levy, WR Leonard, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, VG Krivoshapkin, JJ Snodgrass
36. Scaling up research on human microbial ecology: methodological considerations for incorporating microbiome measures in population-level studies. KA McCabe, M.G. Hayes
37. Concordant maternal-infant immunity among the Ariaal of Kenya. EM Miller, DS McConnell, TW McDade
38. Skin color is correlated with blood pressure and socioeconomic status in New Mexicans of Spanish-speaking descent. C Mosley, M Healy, K Hunley, HJH Edgar
39. Heterogeneity identified at birth and cardiovascular risk at age 45. EK O'Neill, F Fang, TB Gage
40. Sex disparities in body composition and chronic disease risk: Health transition in Vanuatu. KM Olszowy, KN Dancause, A Pomer, CW Chan, G Lee, H Silverman, C Sun, S Waldman, MM Fernandez, L Tarivonda, G Taleo, M Abong, R Regenvanu, A Kaneko, C Weitz, JK Lum, RM Garruto
41. The San Diego model: using historic records to develop a model of an infectious disease outbreak among indigenous neophytes at Mission San Diego in the early 19$^{th}$ century. CM Orbann
42. C-reactive protein, body mass index and psychosocial stress/distress among Brazilian women in the early post-partum. AEF Rudzik
43. Preliminary analysis of the relationship between persistent organic pollutants (POPs) and indices of health and reproductive well-being among women of reproductive age. LM Schell, MV Gallo, KK Burnitz, KR Nelder
44. The characterization of hot flashes among women in Campeche, Mexico. LL Sievert, L Huicochea Gomez, DE Brown, P Ruiz Becerra
45. The Indigenous Siberian Health and Adaptation Project: Tissue hypoxia, adiponectin dysregulation, and hemoglobin levels among the Yakut (Sakha) of Siberia. EA Streeter, EC Squires, WR Leonard, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, VG Krivoshapkin, JJ Snodgrass
46. Energy expenditure and physical activity levels in employees of an organic farm in central Pennsylvania. KJ Weinstein
47. The Indigenous Siberian Health and Adaptation Project: Physical activity and markers of cardiovascular health in the Yakut (Sakha). HJ Wilson, WR Leonard, TJ Cepon-Robins, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, VG Krivoshapkin, JJ Snodgrass
48. Maternal health status does not predict infant outcomes in township neighborhoods of Cape Town, South Africa: Does absence of correlation reflect presence of life history trade-offs? CM Worthman, I Le Roux, N Ciya, ML Tomlinson, MJ Rotheram-Borus

POSTER GROUP: **NUTRITION**

49. Stable isotopes and socioeconomic differences among urban Colombian women: preliminary analysis of dietary data. RL Bender, DL Dufour, LO Valenzuela, TE Cerling, M Sponheimer, JC Reina, JR Ehleringer
50. Global food insecurity and mental health project: a research protocol. DL Crooks, C Hadley
51. Diverse diets may be prophylactic against micronutrient deficiency but not against cardiovascular disease risks: case studies in under-served rural communities in Kenya and Brazil. M Fujita, HP Silva
52. Impact of coffee intake or exercise prior to first meal on metabolic response: implications for adaptation. SL Johnston
53. Ethnic differences in infant and young child feeding practices in the United States: Evidence from NHANES 1999-2008. LG Mattern, AS Wiley
54. Study on global AGEing and adult health (SAGE): Food insecurity in relation to physical, cognitive, and emotional challenges among older adults. HH McClure, JJ Snodgrass, P Kowal

55. Estimation of protein intake by a food frequency questionnaire in Papua New Guinean highlanders. A Morita, K Natsuhara, AR Greenhill, PF Horwood, S Odani, J Baba, Y Naito, M Tadokoro, G Vengiau, E Tomitsuka, K Igai, KW Soli, Phuanukoonnon S, PM Siba, M Umezaki
56. The impact of Ramadan fasting on measurements of salivary testosterone among Gambian men. A Núñez-de la Mora, DW Lawson, G Cooper, S Moore, T Fulford and R Sear
57. Water from fruit or the river? Examining hydration strategies among Tsimane' adults in the Bolivian Amazon. AY Rosinger, SN Tanner
58. Differing ratios of the omega-3 long-chain polyunsaturated fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) may have differing triglyceride-lowering effects. AS Ryan, SS Porter, FD Sancilio
59. Celiac Disease: Symptom Relief and the Gluten Free Diet. JC Stevenson, C Maki, K Rankin-Sunter, RW Everson, MJ Mosher
60. Motivations and perceived barriers among Chicago gardeners: results from a preliminary study and future directions. SR Taylor
61. Dietary patterns of rural children living in food insecure households in the Brazilian Amazon. MB Tranter, BA Piperata
62. Assessing the influence of dietary micronutrients on ethnic differences in diurnal blood pressure among women. HM van Berge-Landry, GD James
63. School food in West Belfast: A study of the reaches and limits of improved school food environments amidst economic deprivation. JL Williams

11:30 a.m. – 12:30 p.m. **BREAKOUT SESSION 1**:
"*Early Career Mentoring.*"
*Organizers: Ivy Pike and Deborah Crooks*
*300 B, Level 3*

**AND**

11:30 a.m. – 12:30 p.m. **BREAKOUT SESSION 2**: "*HBA student-member roundtable discussion: The Future of Human Biology.*"
*Organizers: Lindsey Mattern and Jennifer Williams*
*300 C, Level 3*

**AND**

11:30 a.m. – 1:00 p.m. **LUNCH BREAK**

## Wednesday Afternoon, April 10, 2013

1:00 p.m. **OPENING WELCOME**
Deborah Crooks, President of the Human Biology Association
***301 D-E, Level 3***

**INTRODUCTION TO THE PLENARY SESSION**
Alexandra Brewis Slade
*301 D-E, Level 3*

1:00 – 4:45 p.m. **PLENARY SESSION**
"*Broader Impacts? Translating Human Biology for Public Good.*"
*Organizer: Alexandra Brewis Slade*
*301 D-E, Level 3*

The science done by human biologists is almost to a case potentially relevant to solving the major challenges facing our species in the new millennium – from disease to aging to social injustice. We certainly collectively believe what we do should have real value beyond the academy, and increasingly funding agencies are requiring that research be constructed with this explicit goal in mind. Yet, there are many and complex questions around how translation should be framed within our profession and our professional lives. How can we fully embrace translation while balancing legitimate concerns over the misunderstanding or misuse of our science? Given translation often proves a high risk, time-expensive proposition, how can one make a difference while avoiding career suicide? At what point of success or impact should the translation agenda subsume or replace the "pure" research one? Are we as a discipline translating enough and in the right domains? Is "applied human biology" what we mean, or does our agenda need to be more expansive in vision and better articulated to the core to our discipline? Basically, how well are we doing in translating human biology for the public good? This session brings together people who have worked hard to use their domain expertise in human biology to "make a difference that counts," and in a striking diversity of ways. These include shaping public dialog and challenging assumptions through popular media, directly influencing legislators or change-maker institutions, innovating traditional clinical training and practice, and forging public-private partnerships to advance technological innovation. The goal of this plenary session is to engage a critical and timely conversation in our discipline about what we should be doing for the public good, where the critical tensions, barriers, and costs lie, and identify the best pathways forward.

| | |
|---|---|
| 1:15 p.m. | Biological Variation, Applied Forensics, and Human Rights. EH Kimmerle |
| 1:45 p.m. | Broad Street Pumps of the Mind: Human biology in the advancement of global mental health. BA Kohrt |
| 2:15 p.m. | Food and nutrition policy: A biological anthropologist's experiences from an academic platform. DL Pelletier |
| 2:45 p.m. | COFFEE BREAK |
| 3:15 p.m. | What can you do to stop your chair killing you? J Levine |
| 3:45 p.m. | The *AIMS* and validity of genomic ancestry testing. JC Long and SD Niedbalski |
| 4:15 p.m. | Discussant: J McKenna |
| 5:00 p.m. | **Pearl Memorial Lecture**<br>**"The post-normal science-policy nexus: lessons for policy development from studies of human growth."**<br>Sir Peter Gluckman<br>*301 D-E, Level 3* |
| 6:00 -9:00 p.m. | **HBA DINNER RECEPTION**<br>*300 A-C, Level 3* |

## THURSDAY, APRIL 11, 2013

| | |
|---|---|
| 8:15 -9:45 a.m. | **PODIUM SESSION A: Mother and Child**<br>Chair: Claudia Valeggia<br>*301 A-C, Level 3* |
| 8:15 a.m. | To love, honor and obey: the relationship between marital status and birth outcomes in American Samoa. MH Howells, RL Bender, DL Dufour, M Sespasara, J Ah Ching, B Mua'sau, M Time, G Sipili |
| 8:30 a.m. | Intergenerational effects of maternal experience: Influence of SES on maternal and offspring stress physiology in New Zealand. ZM Thayer, CW Kuzawa |

| | |
|---|---|
| 8:45 a.m. | Pathways toward differential maternal and child well-being amidst food insecurity in Tanzanian households: the role of child age and maternal affect. JA DeCaro, W Wilson, M Manyama, B Hallgrimsson |
| 9:00 a.m. | Maternal predictors of human milk leptin levels and associations with infant size. EA Quinn and CW Kuzawa |
| 9:15 a.m. | Sex differences in human milk adipocytokine concentrations. EW Demerath, D Fields |
| 9:30 a.m. | Maternal mortality: Past and present. ET Abrams, CL Patil. |
| 9:45 a.m. | **COFFEE BREAK** |
| 10:00 –11:30 a.m. | **PODIUM SESSION B: GROWTH AND DEVELOPMENT IN TRANSITION**<br>Chair: Craig Hadley<br>*301 A-C, Level 3* |
| 10:00 a.m. | An investigation into the growth of UK schoolchildren from 1908 to present day. VJ McGowan, GR Bentley, LJ Ells, M Nelson |
| 10:15 a.m. | The Predictive Adaptive Response model fails to explain fasting-induced changes in calorie requirements. M Workman |
| 10:30 a.m. | Tall mountains, small babies: an examination of birth weight and infant growth during nutritional transition in the high altitude community of Nuñoa, Peru. MK Hoke, JM Fisher, WR Leonard, TL Leatherman |
| 10:45 a.m. | Shifting economic conditions and body dimensions in the southern Peruvian Andes. J Fisher, M Hoke, T Leatherman |
| 11:00 a.m. | The urban Mayas from Yucatan; dealing with the biological burden of the past and a degenerative present. Anthropometric and socioeconomic data of three generations. H Azcorra, MI Varela-Silva, F Dickinson |
| 11:15 a.m. | Impact of activity levels, early life events and maternal factors on the nutritional status of Maya children in Yucatan. MI Varela-Silva, H Wilson, H Azcorra, P Griffiths, B Bogin, F Dickinson |
| 11:45 –1:15 p.m. | **HUMAN BIOLOGY ASSOCIATION ANNUAL AWARDS LUNCHEON**<br>*300 A-B, Level 3* |
| 1:30 -3:00 P.M. | **PODIUM SESSION C: Health around the World**<br>Chair: Hannah Wilson<br>***301 A-C, Level 3*** |
| 1:30 p.m. | The Indigenous Siberian Health and Adaptation Project: Seasonal variation in metabolic rate among indigenous Siberians. JJ Snodgrass, WR Leonard, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, SB Levy, VG Krivoshapkin |
| 1:45 p.m. | Biological markers and late adult autoimmune form of diabetes (LADA) in European Americans of Kansas City. MH Crawford, L Novikova, KG Beaty, L Stehno-Bittel, and D Robbins |
| 2:00 p.m. | The contribution of feeding mode to obesogenic growth trajectories in American Samoan infants. NL Hawley, W Johnson, O Nu'usolia, ST McGarvey |

2:15 p.m. Pathogenic and obesogenic pathways to inflammation in Chinese children and adults. AL Thompson, S Du, B Zhang, J Li

2:30 p.m. Use of complementary and alternative medicine among midlife Arab women living in Qatar. LM Gerber, M Verjee, Y Chiu, M Murphy, R Mamtani, A Bener.

2:45 p.m. Patterns of pulmonary pathology related to modernization in Vanuatu. CA Weitz, CW Chan, KN Dancause, G Lee, KM Olszowy, A Pomer, H Silverman, C Sun, L Tarivonda, G Taleo, M Abong, R Regenvanu, A Kaneko, JK Lum, RM Garruto

3:00 p.m. **COFFEE BREAK**

3:15 –4:45 p.m. **PODIUM SESSION D: GENES, GENOMES, AND PHENOTYPES**
Chair: Abigail Bigham
*301 A-C, Level 3*

3:15 p.m. Viromes and anthropology. AT Ozga, RY Tito, A Obregon-Tito, CM Lewis Jr.

3:30 p.m. The Outer Limits: Genic and Intergenic Polymorphism Between Geographically Distinct Populations. A Van Horn, MF Keller, JZ Mao, RJ Kulathinal, LC Rockwell

3:45 p.m. The color of sickle cell anemia in Amazonia. AKLS Silva, HP Silva

4:00 p.m. The association of early life infection with shorter adult blood telomere lengths in Cebu, the Philippines. DTA Eisenberg, JB Borja, MG Hayes, CW Kuzawa

4:15 p.m. Placental DNA methylation patterns predict offspring birth weight: a pilot study from Cebu, Philippines. CW Kuzawa, JN Rutherford, V deMartelly, WE Gundling, A Weckle, N Lee, DE Wildman

4:30 p.m. Magnitude and timing of the peak in infant BMI is influenced by both environmental and genetic factors. W Johnson, AC Choh, M Lee, B Towne, SA Czerwinski, EW Demerath

5:00 –6:30 p.m. **HBA ANNUAL BUSINESS MEETING**
*301 A-C, Level 3*

7:00 –9:30 p.m. **HBA STUDENT RECEPTION** (students only)
***300 A-B, Level 3***

## FRIDAY, APRIL 12, 2013

8:00 a.m. –12:00 p.m. **JOINT AAPA/HBA SYMPOSIUM**
"*The high price of success: costs of reproductive effort in male primates and humans.*"
Organizers: Alexander V. Georgiev and Melissa Emery Thompson
***Ballroom A, Level 3***

A foundational and widely supported concept in evolutionary biology is that female reproductive success is limited by access to resources while male reproductive success is limited primarily by access to mates. Thus, research programs have emphasized the substantial costs of female reproductive effort but have tended to focus on variation in the benefits obtained by males. However, the processes necessary to achieve reproductive success may carry a high price for males, and the ability to sustain these costs may determine the success of some males and the failure of others. The nature and

extent of these costs is expected to vary by mating system and ecological context and can have far-reaching consequences for social behavior and demographic composition of populations. This symposium highlights studies on costs of male reproductive effort in a variety of primate species, including humans. Our contributors will present new research on male behavior, physiology, life history, demography and health in the context of male mating effort and competition. A key emphasis for discussion will be the theorized trade-off between reproductive effort and survival, and whether some males can maintain high reproductive effort despite the costs throughout their lifespan.

CHAIR: Alexander V. Georgiev

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| 8:00 a.m. | To commit or play the field? Costs and benefits of male mating strategies in hamadryas versus chacma baboons. S. Chowdhury, M Pines, J Saunders, L Swedell |
| 8:15 a.m. | Seasonal and social influences on androgen secretion in male geladas. D Papano, T Bergman, J Beehner |
| 8:30 a.m. | Is fatter sexier? Reproductive strategies in squirrel monkeys. *Saimiri sciureus*. AStone |
| 8:45 a.m. | Reproductive competition in male white-faced capuchins (*Cebus capucinus*): variation in testosterone, DHT, and glucocorticoid production. VAM Schoof, KM Jsck, TE Ziegler |
| 9:00 a.m. | The costs of seasonal reproductive effort in Cayo Santiago male rhesus macaques. J Higham |
| 9:15 a.m. | The energetics of mate-guarding in wild male long-tailed macaques (*Macaca fascicularis*). C Girard-Buttoz, M Heistermann, M Agil, PA Fauzan, A Engelhardt |
| 9:30 a.m | BREAK |

CHAIR: Melissa Emery Thompson

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|---|---|
| 9:45 a.m. | Physiological costs of dominance and mating effort in male chimpanzees. AV Georgiev, ME Thompson, MN Muller, RW Wrangham |
| 10:00 a.m. | Alpha male status predicts long life expectancy in wild chimpanzees. C Stanford |
| 10:15 a.m. | Cost of male mate competition in bonobos. M Surbeck, T Deschner and G Hohmann |
| 10:30 a.m. | Costs of alternative reproductive strategies in male orangutans. C Knott and ME Thompson |
| 10:45 a.m. | From tug-of-war over reproduction to conflict over group membership: A theory of conflict and conflict resolution. M Port |
| 11:00 a.m. | Reproductive steroids, immune function, and life history transitions in the Philippines. L Gettler, SS Agustin, AB Feranil, TW McDade, CW Kuzawa |
| 11:15 a.m. | Androgens and immune function in human and nonhuman primates. SP Prall and MP Muehlenbein |
| 11:30 a.m. | Discussion. Richard W. Wrangham |

*Please consult the AAPA program for abstracts from the Joint AAPA/HBA session.*

# ABSTRACTS

Abstracts are listed alphabetically by first author's last name. Each is preceded by the session [P: Poster (Wednesday 8:00 – 11:00 a.m. Park Concourse South, Level 2), Pearl Memorial Lecture (Wednesday 5:00 – 6:00 p.m., 301 D-E, Level 3), Plenary Session (Wednesday 1:00 – 4:45 p.m., 301 D-E, Level 3), PODIUM A (Thursday 8:15 – 9:45 a.m., 301 A-C, Level 3), PODIUM B (Thursday 10:00 – 11:30 a.m., 301 A-C, Level 3), PODIUM C (Thursday 1:30 – 3:00 p.m., 301 A-C, Level 3), PODIUM D (Thursday 3:15 – 4:45 p.m., 301 A-C, Level 3)] and the slot within that session (starting time for podium; board number for poster). Please consult the AAPA program for abstracts from the Joint AAPA/HBA session.

## PODIUM A, THURSDAY, 9:30 A.M.

Maternal mortality: Past and present. ET Abrams, CL Patil. Department of Anthropology, University of Illinois at Chicago, Chicago, IL.

Without intervention, human childbirth can be risky. Although the global risk of maternal mortality has fallen recently, among women with the least access to current medical care, including those in very poor nations, some foraging populations, and groups that decline medical treatment, the rate of maternal mortality is approximately 1.5%. Here, we dissect past and current trends in maternal mortality through a biocultural lens. We present a multi-level framework for the analysis of maternal mortality, including the evolutionary foundations of human vulnerability to maternal mortality and the implications of our recent work in rural Tanzania on the impact of socioeconomic inequalities on birth outcomes. We then consider post-partum hemorrhage, the leading cause of maternal mortality worldwide, as a case study for this multi-level framework.

Support: Wenner-Gren Foundation for Anthropological Research, Chicago Developmental Center for AIDS Research, and Department of Anthropology of the University of Illinois at Chicago.

## P21

Statistical evaluation of South Amerindian language classifications by means of genetic variation. CEG Amorim[1], R Bisso-Machado[1], V Ramallo[1], MC Bortolini[1], SL Bonatto[2], FM Salzano[1], T Hünemeier[1]. [1]Laboratório de Evolução Humana e Molecular, Departamento de Genética, Instituto de Biociências, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil; [2]Centro de Biologia Genômica e Molecular, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, RS, Brazil.

Concurrent evolution of genes and languages has been studied for over three decades. These studies rely on the assumption that languages, as many other cultural traits, evolve in a gene-like manner, accumulating heritable diversity through time and being subjected to evolutionary mechanisms of diversity maintenance. In the present work we use genetic data to shed light into South American linguistic classification. We compare discordant models of language classifications – Loukotka's, Greenberg's, and Campbell's – to the current Native American genetic variation using realistic demographic models based on the Coalescent and analyzed under the Approximate Bayesian Computation framework. Data on 381 STRs widespread along the autosomes were gathered from the literature for populations representing five South Amerindian linguistic groups: Andean, Arawakan, Chibchan-Paezan, Macro-Jê, and Tupí. The results indicate a higher posterior probability for the demographic model constructed based on Greenberg's 1987 classification. Posterior probabilities of this model parameters make possible to date a few important facts in Amerindian history, such as the time of South America's initial settlement (10.9 to 14.0 kya), Amerindian effective population size (912 individuals), Tupí-Arawakan divergence (2.8 kya), and the time to the most recent common ancestor of the five groups under analysis (3.1 kya). In general, our results are in accordance to previous studies based on both genetic and language data, although in comparison to the latter our estimates – which are based solely on genetic variation – are slightly more recent, suggesting that after population fission, languages may take the fast lane rather than genes.

Support: Conselho Nacional de Desenvolvimento Científico e Tecnológico; Coordenação para Aperfeiçoamento de Pessoal de Nível Superior; Fundação de Amparo à Pesquisa do Estado do Rio Grande do Sul (Programa de Apoio a Núcleos de Excelência).

## PODIUM B, THURSDAY, 11:00 A.M.

The urban Mayas from Yucatan; dealing with the biological burden of the past and a degenerative present. Anthropometric and socioeconomic data of three generations. H Azcorra[1], MI Varela-Silva[1], F Dickinson[2]. [1]Centre for Global Health and Human Development, School of Sports, Exercise and Health Sciences, Loughborough University, UK; [2]Laboratory of Somatology, Human Ecology Department, Research and Advanced Studies Center of the National Polytechnic Institute of Mexico.

Pre-Columbian and post-conquest history of the Maya from Yucatan has been characterized by continued oppression and over-exploitation (Montejo 1999). Currently, rural-to-urban migration, economic deprivation and cultural change have been modifying the lifestyle of Maya. Nowadays, the prevalence of nutritional dual burden (NBD) (stunting + overweight/obesity) among the Maya is high

(Varela-Silva et al. 2012). This paper aims to describe nutritional status, NDB prevalence and intergenerational effects in a three generations sample of urban Maya from Merida city, in Mexico. From Sep-2011 to Jul-2012 we gathered anthropometric and socioeconomic data of 109 grandmother-mother-child triads. Stunting ( $< 5^{th}$ percentile of height-for-age) was determined using the comprehensive database organized by Frisancho (2008) (NHANES III). Childhood overweight/obesity (OW/OB) and thinness were classified using Cole et al. (2000) centile curves. Abdominal obesity (AO) was determined in adult women (waist circumference >88cm). Preliminary results show 11% of stunting and 36% of overweight (24% OW, 12% OB) in children. Even when mothers were taller than grandmothers ($p < 0.001$), both groups showed very low heights (average z-scores of - 2.01 for mothers and – 2.64 for grandmothers). Prevalence of AO was 55% in mothers and 83% in grandmothers. Prevalence of individual NDB was 1% in children (stunting + OW/OB), 36% in mothers and 72% in grandmothers (stunting + AO). Household nutritional dual-burden is at mother/child level is 6%. Overweight/obesity in mothers and grandmothers associated with child stunting is 6%.

In this presentation we will discuss these results and will point out major health issues that derive from NDB among three generations.

National Council of Science and Technology of Mexico funded our research project (Conacyt, 168047) and provided a Ph.D. scholarship for Hugo Azcorra (HA); School of Sport, Exercise and Health Sciences of Loughborough University, UK, provided travel expenses for HA.

## P27

The Indigenous Siberian Health and Adaptation Project: Seasonal variation in autoimmune thyroid disorders among the Yakut (Sakha) of Siberia.

VR Balu[1], SB Levy[2], TJ Cepon-Robins[1], WR Leonard[2], LA Tarskaia[3,4], TM Klimova[5], VI Fedorova[5], ME Baltakhinova[5], VG Krivoshapkin[5], JJ Snodgrass[1]. [1]Department of Anthropology, University of Oregon, Eugene, OR; [2]Department of Anthropology, Northwestern University, Evanston, IL; [3]Department of Anthropology, University of Kansas, Lawrence, KS; [4]Institute for Molecular Genetics, Russian Academy of Sciences, Moscow, Russia; [5]Research Institute of Health, MK Ammasov North-Eastern Federal University, Republic of Sakha/Yakutia, Yakutsk, Russia.

Northern populations have an array of physiological adaptations, including upregulated basal metabolic rate, that enhance survival in the extreme cold. The thyroid appears central to this adaptation, as thyroid hormones regulate metabolic responses to chronic cold among indigenous Arctic populations. However, it is unclear whether this metabolic adaptation among circumpolar groups predisposes them to autoimmune thyroid disorders (AITDs). This study addresses this question by examining the correlates of seasonal variation in anti-thyroid peroxidase antibody (TPOAb) concentrations among the Yakut of Siberia. Anthropometric and biomarker data were obtained on two occasions (July/August 2009 and January 2011) on a sample of Yakut men ($n = 52$) and women ($n = 88$) ($\geq$18 years old). TPOAb levels are higher in summer than winter in both men ($P < 0.01$) and women ($P < 0.05$). Women have significantly higher TPOAb levels (summer-winter average) than men ($P = 0.05$), and are more likely to have an AITD (28% of women versus 4% of men; TPOAb >30 IU/mL). Changes in TPOAb concentrations are associated with changes in several anthropometric dimensions among men (negative trends with weight [$P = 0.08$] and body mass index [BMI; $P = 0.07$]) but not women. Finally, changes in TPOAb showed a positive trend association with change in thyroid stimulating hormone (TSH; $P = 0.06$) among men, but among women change in TPOAb was negatively associated with change in HDL cholesterol and showed a positive trend with change in triglycerides ($P = 0.1$) and hemoglobin ($P = 0.08$). This study documented important sex differences in AITD risk among the Yakut, and an unexpected drop in TPOAb levels between summer and winter.

Support: NSF ARC-0802390; Northwestern University; University of Oregon; FSRI Institute of Health.

## P1

How do beliefs about anemia among Bolivian rural women influence health behavior?

RM Bedwell[1] and VJ Vitzthum[1,2]. [1]The Kinsey Institute for Research in Sex, Gender, and Reproduction; [2]Department of Anthropology, Indiana University, Bloomington.

Anemia, or the low concentration of hemoglobin in the blood, is one of the most common health deficiencies around the world, especially in underdeveloped countries, where nutritional and health care needs often are not met. Studies have been conducted to understand and define the biological aspects of anemia, but little research has been done in order to understand people's conceptualizations of anemia and how that might influence health behavior. As part of a community–based research project on health in Bolivian *altiplano* communities, women were tested for anemia using the Hemocue device (Quest Diagnostics). Women with anemia were given relatively easy access to ferrous sulfate pills, available from the nearest health post. In order to test the hypotheses that different conceptualizations of anemia and/or perceived seriousness of the condition influence the probability that women with anemia will purchase and take ferrous sulfate pills, follow-up surveys were conducted, recording the women's beliefs about anemia and whether or not the pills were taken. This project is a unique opportunity to study the relationship between people's knowledge of anemia and how that informs their health behavior. A better understanding of this dynamic will hopefully contribute to improving preventative medicine around the world.

## P49

Stable isotopes and socioeconomic differences among urban Colombian women: preliminary analysis of dietary data.

RL Bender[1], DL Dufour[1], LO Valenzuela[2], TE Cerling[2], M Sponheimer[1], JC Reina[3], JR Ehleringer[2]. [1]Department of Anthropology, University of Colorado, Boulder; [2]Department of Biology, University of Utah, Salt Lake City; [3]Department of Pediatrics, Universidad del Valle and Centro Medico Imbanaco, Cali, Colombia.

The stable isotope composition of mammalian tissues, such as hair, can indicate the composition and/or geospatial origin of the diet. Previously, we reported that $\delta^{13}C$ and $\delta^{15}N$ values from hair tracked socioeconomic status (SES) differences among urban Colombian women, and that $\delta^{13}C$, $\delta^{15}N$, and $\delta^{34}S$ values were all more variable in lower SES women. Here, we present 24-hour dietary recall data from the same sample of 38 women from lower SES (n = 19) and higher SES (n = 19) groups. There were no between-group differences in mean intake of carbohydrates, fat, or total calories, but the higher SES group derived a greater percentage of total calories from protein (14.4 ± 3.6%) compared to the lower SES group (11.9 ± 2.7%; *t*-test, $p = 0.027$). Also, there were no between-group differences in consumption of animal-source protein or fat. Contrary to expectations, proportionally greater intake of animal-source protein was only weakly associated with higher $\delta^{15}N$ values ($r = 0.30$, $p = 0.070$), the variability in $\delta^{13}C$ values was not readily explicable through differential contributions of C3 plants (e.g., wheat, rice, potatoes) and C4 plants (e.g., maize, sugarcane) to the diet, and the variability in $\delta^{34}S$ values was not linked to the consumption of marine-source foods. Instead, $\delta^{34}S$ values tracked with the consumption of alcoholic beverages and plantains, possibly reflecting a different geospatial origin of these food items. Although limited by small sample size, this preliminary analysis underscores the complexity of the relationship between the highly variable diets of living human populations and the stable isotope composition of their hair.

Supported by the University of Colorado Innovative Grant Program, NSF SGER # BCS 0742959, and NIH # 5-R22-DK39734.

## P2

Project REPA (Reproduction and Ecology in Provincía Aroma): Variation in postpartum maternal sleep duration in co-sleeping mother-infant pairs indigenous to the Bolivian *altiplano*. K Britt and VJ Vitzthum, Department of Anthropology and The Kinsey Institute for Research in Sex, Gender, and Reproduction, Indiana University, Bloomington.

Mothers in the United States and other industrialized nations commonly report postpartum fatigue. In an effort to discover the factors that influence sleep deprivation in new mothers and to evaluate the impacts this deprivation may have, numerous studies have examined the sleep patterns of these women. However, sleeping routines of postpartum mothers in non- industrialized populations have received far less attention. Unlike U.S. mothers, women in many of these populations commonly co-sleep with their infants, an arrangement that is likely to have been the norm throughout human evolutionary history and that may mitigate post-partum fatigue (McKenna et al., 2007; Worthman 2007). To test several hypotheses regarding the determinants of variation in post-partum maternal sleep duration, we drew on data from Project REPA, a longitudinal study of reproduction and health in 30 rural Bolivian *altiplano* communities. On multiple occasions over the course of a single year, breastfeeding participants provided data on the prior night's sleep. The analytical sample totaled more than 900 observation periods from nearly 200 women. The median maternal sleep duration of these postpartum breastfeeding Bolivian mothers was approximately 8.75 hours. Initial univariate analyses found that sleep duration decreased with maternal age but was *not* correlated with infant age or with number of breastfeeds per night. These results have important implications for the way mothers in industrialized nations choose to care for their infants and themselves during the postpartum period, notably in the manner in which they approach breastfeeding, co-sleeping, and ways to minimize their fatigue.

Supported by the U.S. National Science Foundation (SBR 9506107), University of California, Riverside; Binghamton University (SUNY); Indiana University, Bloomington.

## P3

The Shuar Health and Life History Project: Market integration, avoidance behavior, and intestinal helminths among an indigenous lowland Ecuadorian population. TJ Cepon-Robins[1,2], TE Gildner[1], MA Liebert[1,2], AM Colehour[1], SS Urlacher[3], JJ Snodgrass[1,2], FC Madimenos[1,2], LS Sugiyama[1,2]. [1]Department of Anthropology, [2]Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, OR; [3]Department of Human Evolutionary Biology, Harvard University, Cambridge, MA.

Market integration (MI) alters parasite exposure due to changes in diet and behavior. Avoidance behaviors, specifically sanitation practices and disgust responses, likely structure infectious disease risk yet this topic has not been well studied. The present study compares intestinal helminth infection rates, avoidance behaviors, and lifestyle factors between two Shuar villages at different levels of MI: 1) a moderately integrated village in the Upano River Valley (UV) of Ecuador; and 2) a more traditional village east of the Cutucu Mountain range (cross-Cutucu [CC]). Stool samples and household interviews were collected from 89 UV participants (ages 1-90; 52 females, 37 males) and 83 CC participants (ages 1-86; 44 females, 39 males). Kato-Katz thick smears made from fresh stool samples were analyzed for standardized counts of helminth eggs per gram (EPG). Questionnaires assessing level of disgust associated with pathogen vectors were administered to 70 UV and 72 CC participants; disgust scores (D-scores) were then calculated. 56% of UV participants (43.8% of females; 38.5% of males) and 65% of CC participants (61% of females; 69% of males) were infected with at least one type of intestinal helminth. Lifestyle factors, including animal ownership for women ($P < 0.05$), and household size for men ($P < 0.05$), were significantly correlated with EPG among UV participants. Unexpectedly, D-scores were positively correlated with EPG in both UV men ($P < 0.05$) and women ($P < 0.05$), suggesting that disgust responses are associated with increased exposure. Further analysis and comparison with CC participants will highlight the role of MI in shaping avoidance behaviors and parasite exposure.

Support: Wenner-Gren Foundation, Ryoichi Sasakawa Young Leaders Fellowship Fund; Institute of Cognitive and Decision Sciences, University of Oregon; Department

of Anthropology, University of Oregon; NSF Graduate Research Fellowship # 2011109300.

## P28

The "extra" human metabolic organ: possible contributions of the gut microbiota to hominin evolution. DJ Coppeto. Department of Anthropology, Emory University, Atlanta, GA.

Patterns of human energy extraction and allocation offer insight into adaptations involved in supporting hominin anatomical and functional evolution. Among these energetic adaptations, the potentially potent coevolutionary adaptive role of microbiota, or "gut flora", remains relatively unexplored. The expanding literature has established that the microbiota make major immunological, structural, and metabolic contributions to the body. The massive collective genome of the microbiota (microbiome) contains metabolic genes that the host did not have to evolve on its own, a majority of which enable digestion of otherwise inaccessible complex carbohydrates. This has led many to refer to the microbiota as a human "metabolic organ". This paper argues that the microbiota have played a key role in the evolution of human energetics. The ability to digest inaccessible foods, access micronutrients, and stimulate the production of cheap energy storage (particularly white adipose tissue) makes the microbiota a strong locus for selection. This metabolic organ not only enabled hominins to exploit novel food sources, but also helped compensate for the growing energetic costs of the body. Thus, this mutualism suggests both strong coevolution and flexibility between hominins and their gut flora. An examination of human development suggests how human young are primed to receive the microbiota and yet also how the adult composition is influenced by the local diet. The microbiota therefore present not only a site of energetic adaptation, but also a provocative extension of Life History Theory to include the role of mutualists in shaping the body's interactions with its finite energy resources.

# PODIUM C, THURSDAY, 1:45 P.M.

Biological markers and late adult autoimmune form of diabetes (LADA) in European Americans of Kansas City. MH Crawford[1], L Novikova[2], KG Beaty[1], L Stehno-Bittel[2], and D Robbins[2]. [1]Laboratory of Biological Anthropology, University of Kansas; [2]Cray Diabetes Center, University of Kansas Medical Center.

Late adult autoimmune form of diabetes (LADA) is normally diagnosed by (1) adult age of onset; (2) high titers of Glutamic acid decarboxylase (GAD-65) antibodies; (3) absence of obesity, in contrast to Type 2 form of diabetes (T2DM). Because of the late onset of elevated blood glucose, LADA patients are often misdiagnosed as T2DM. This is a pilot study of a European-American sample of clinically diagnosed T2DM patients at the University of Kansas Medical Center. A total of 101 T2DM patients volunteered to participate in this pilot study of the relationship between biomarkers and LADA. Human plasma samples were analyzed using GAD Elisa kits (ALPCO immunoassays). In addition, a series of biomarkers: Hb A1c, blood glucose, sGPT, sGOT, alkaline phosphatase, UrUA1, body dimensions (weight, height, BMI) and physiological parameters (blood pressure—systolic and diastolic) were measured. An assortment of environmental measures were elicited. No statistical relationship was observed between BMI and LADA; 7 of the 101 serum samples tested for GAD-65 antibodies exhibited high titers (1.050 GAD Ab, U/ml) characteristic of LADA and early onset autoimmune form of diabetes. Samples with borderline GAD-65 antibody titers were retested. While high titers of GAD-65 antibodies have been described in T2DM patients, varying from 5% to 15% in different ethnic groups, 7% of the sample with European ancestry exhibited elevated antibody levels. Identifying LADA patients among diabetics diagnosed with T2DM is critical because therapies for T2DM differs from LADA.

Pilot study was supported by a KU GRF grant and the Cray Diabetes Center.

## P50

Global food insecurity and mental health project: a research protocol. DL Crooks[1], C Hadley[2]. [1]Department of Anthropology, University of Kentucky, Lexington KY; [2]Department of Anthropology, Emory University, Atlanta GA.

Global food crises and economic recessions have recently brought to the fore issues of food insecurity and mental health. Communities are undergoing rapid and profound economic, climate and social change that pose new challenges to well-being; however the mechanisms and pathways that link food insecurity and mental health are not yet clear. We propose that multi-sited, multi-method biocultural research is an appropriate approach to identifying these pathways. This type of research is especially challenging in that conceptual frameworks and research models must lead to the provision of data that are comparable across research sites, while simultaneously accommodating the contextual variation within and among them. In this poster, we present the results of a three day NSF sponsored workshop, attended by 25 participants. The objectives of the workshop were to develop (1) a conceptual framework and underlying model to guide future research; (2) a research protocol, including instruments for data collection, that provides the flexibility needed to accommodate variation in the pathways between the two constructs of interest, but also allows rigorous, empirical testing of the relationship between food insecurity and mental health across sites; and (3) a plan for locating, sharing and compiling research results in a way that facilitates fair and ethical sharing of data among researchers. The ultimate goal of the project is to provide cross cultural-research results in an appropriate framework for use by program planners and policymakers.

Sponsors: National Science Foundation, Award #1029058; College of Arts and Sciences, University of Kentucky.

## P29

Assessing prevalence of tick-borne infectious agents on a university campus. T Cruz[1,3], H Keppler[1,4], J Thomas[1,4], D Kommareddy[1,4], S Hempstead[1,2], E Valentine[1], R Spathis[1,2], JM Darcy II[1,2], RM Garruto[1,2,4]. [1]Laboratory of

Biomedical Anthropology and Neurosciences; [2]Department of Anthropology; [3]Department of Environmental Studies; [4]Department of Biological Sciences, Binghamton University, State University of New York, Binghamton, NY.

Research on Lyme disease, the most prevalent tick-borne infection in the United States, has made significant ecological advances over the past two decades. Yet an understanding of the specific biobehavioral factors involved in the transmission and risk of human infection have been more elusive. We are currently using the Binghamton University campus as a natural experimental model to study the factors involved in Lyme disease transmission in a small geographically defined area. The infection is caused by the spirochete *Borrelia burgdorferi*, whose natural reservoir is the white-footed mouse (*Peromyscus leucopus*). Because of similar symptomology and possibility of co-infection, ticks are also being screened for other human infectious agents including *Anaplasma phagocytophilum* and *Babesia microti*. Ticks were collected from various microecologies on campus using a corduroy cloth to drag the leaf litter and lower vegetation. Thus far we have collected and tested 411 ticks from the local region, including 310 on the Binghamton University campus of which 210 are larvae that have not yet taken a blood meal and thus not expected to harbor any mouse-borne infectious agents. Total DNA was extracted and the presence of *B.burgdorferi*, *A. phagocytophilum* and *B. microti* was determined by PCR amplification. Preliminary results from the nymphs and adults collected on campus indicate a 20.4% prevalence of *B.burgdorferi*, and a 11.8% prevalence of *A. phagocytophilum*. Demography, human traffic patterns, the built environment and human behaviors are currently being assessed to determine exposure and risk that will lead to subsequent public health strategies and interventions.

Support: This work was supported in part by a grant to the State University of New York at Binghamton from the Howard Hughes Medical Institute through the Precollege and Undergraduate Science Education Program and by Undergraduate Awards for Research and Creative Work sponsored by Harpur College and the Binghamton Foundation

## P30

Emergence, transmission, and risk of Lyme disease and other tick-borne infections: a community based natural experimental model. JM Darcy II[1,2], R Spathis[1,2], J Schmidt[6], H Keppler[1,3], S Hempstead[1,2], T Cruz[1,4], D Kommareddy[1,5], J Thomas[1,3], M Riddle[1,2], H Sayama[7] and RM Garruto[1,2,3]. [1]Laboratory of Biomedical Anthropology and Neurosciences, [2]Department of Anthropology, [3]Department of Biological Sciences, [4]Department of Environmental Studies, [5]Department of Biochemistry, [6]Department of System Sciences and Industrial Engineering, [7]Department of Bioengineering, Binghamton University, State University of New York, Binghamton, NY.

Acute Lyme disease is a vector driven emerging infectious disease that causes flu-like symptoms, rash and joint pain. It is the most prevalent vector-borne infection in the United States (36,000 cases annually). We are investigating the biological, ecological, geographical and social factors involved in this emerging infection at the community level in Binghamton NY and on the Binghamton University campus. Lyme disease is caused by the gram-negative spirochete, *Borrelia burgdorferi* whose primary host is *Peromyscus leucopus* (white footed mouse). The bacterium is transmitted to humans from mice and other mammals (including squirrels, chipmunks, voles, coyotes, migratory birds and deer) via the bite of the deer tick, *Ixodes scapularis*. Transmission requires a variety of intersecting biological, ecological, social and geographical factors to produce disease in humans. The Binghamton University campus and surrounding community serve as a natural experimental model for this disease emergence. *I. scapularis* can also harbor other infectious agents, *Anaplasma phagocytophilum* and *Babesia microti*, associated with the human diseases Anaplasmosis and Babesiosis. Fieldwork has produced preliminary data that suggests the distribution of the infectious ticks relative to human habitation, recreation and travel is uneven and poses differential "in-community risk" to the emergence of Lyme disease, Anaplasmosis and Babesiosis. Our group has developed an interdisciplinary approach utilizing laboratory, observation, mapping, modeling and interview techniques to analyze these variables for significance that can be translated into predictive and public health solutions at the community level.

Support: This work was supported in part by a grant to the State University of New York at Binghamton from the Howard Hughes Medical Institute through the Precollege and Undergraduate Science Education Program and by Undergraduate Awards for Research and Creative Work sponsored by Harpur College and the Binghamton Foundation.

# PODIUM A, THURSDAY, 8:45 A.M.

Pathways toward differential maternal and child well-being amidst food insecurity in Tanzanian households: the role of child age and maternal affect. JA DeCaro[1], W Wilson[2,3], M Manyama[4,5], B Hallgrimsson[4]. [1]Department of Anthropology, The University of Alabama, Tuscaloosa, AL; [2]Department of Archaeology, [3]Department of Community Health Sciences, [4]Department of Cell Biology & Anatomy, University of Calgary, Calgary, Alberta, Canada; [5]Department of Anatomy, Bugando University College of Health Sciences, Mwanza, Tanzania.

Food insecurity is not only a nutritional challenge, but also a threat to psychosocial well-being. Associations between food insecurity and child health are complex and not fully consistent across studies. Yet in developing countries, strong linkages often emerge among child health (including growth), food insecurity, and maternal depression. Pathways toward differential child outcomes thus likely involve household psychosocial dynamics and child-care practices that extend beyond nutritional availability, possibly mediated or moderated by caretaker affect (see, e.g., Weaver and Hadley 2009; Hadley et al. 2012). In a cross-sectional study of 150 households with children ages 0-60 months in Mwanza, Tanzania, primary caretakers were surveyed regarding food insecurity (FI), subjective

social status (SSS), household wealth (HW), and depression and anxiety symptoms. Dried blood spots and anthropometric measurements were collected for the caretakers and focal children. Among infants under 12 months of age, FI and SSS but not HW were associated with higher C-reactive protein, an inflammation marker, but not with HAz, BMIz, or WAz. This association was partially mediated, not moderated, by maternal depression. Among older children, none of these outcomes were predicted by FI, SSS, HW or depression. Yet regardless of child age, FI, SSS, and HW were associated with lower maternal BMI, suggesting household-level differences in energy balance grounded in material resources from which children were partially buffered. We discuss the role of caretakers in buffering children from the growth effects of food insecurity, even while biomarkers may unveil subtler developmental effects mediated by the psychosocial burden of adversity.

Support: University of Alabama College of Arts & Sciences Academy for Research, Scholarship, and Creative Activity.

## PODIUM A, THURSDAY, 9:15 A.M.

Sex differences in human milk adipocytokine concentrations. EW Demerath[1], D Fields[2]. [1]Division of Epidemiology and Community Health, University of Minnesota School of Public Health. [2]Department of Pediatrics, University of Oklahoma Health Sciences Center and Harold Hamm Diabetes Center.

Previous studies in human and non-human primates suggest that mothers produce milk with higher energy density for male offspring than for female offspring. Breast milk also varies in adipocytokine concentrations; the purpose of the present study was to examine, for the first time, sex differences in the concentration of leptin, insulin, glucose, IL-6, and TNF-$\alpha$ in maternal breast-milk at 1-month of age. Milk was collected from 35 exclusively breast-feeding mothers of healthy term infants (20 boys and 15 girls), using one full breast expression between 8:00 and 10:00 am. The milk was mixed, aliquoted, stored at -80°C and then centrifuged to remove the milk fat prior to immunoassay; milk analytes were natural log transformed if necessary prior to performing t-tests. In infant girls, breast milk had significantly higher concentrations of log-insulin (6.67 pg/ml in girls, 6.10 pg/ml in boys, $p = 0.036$) and log TNF-alpha (1.72 pg/ml in girls, 0.98 pg/ml in boys, $p = 0.017$, both of which factors we have found to be associated with lower infant weight and lean mass. In contrast, milk glucose concentration, which is associated with greater infant body size, was higher in infant boys (27.9 mg/dl vs 22.0 mg/dl, $p = 0.054$). Breast milk volume from the single feed was also somewhat higher in boys (2.7 oz. vs 2.1 oz., $p = 0.13$). There were no sex differences in milk leptin or IL-6. These differences may reflect sex-specific maternal investment in offspring growth and development, as has been previously found for milk energy content.

## P4

Using local-level social data to inform models and hypotheses about infectious disease spread. JL Dimka. Department of Anthropology, University of Missouri Columbia

During the 1918 influenza pandemic, worldwide mortality rates averaged 2.5-5% but varied between virtually no mortality in some communities up to approximately 90% in others. While worldwide spread and the timing of introduction to certain areas require consideration of the larger international context, epidemic outcomes in specific areas were likely due to local features such as cultural and demographic characteristics of the population. Detailed information on local life, gathered from archival records, ethnographic data and other sources, can be used to identify potentially important factors in local disease spread. This process will be illustrated by the case of Greenspond, Newfoundland and Labrador, and surrounding communities, where at least 400 residents became ill and 11 residents died during the pandemic. Greenspond was an important economic and administrative center, but the region also included multiple small communities engaged in traditional kin-based fishing. These circumstances allow for consideration of both local factors and regional through international political and economic concerns on disease spread. Identified factors include typical daily activities of residents, seasonal absences due to participation in fishery expeditions or seal hunts, and community emphasis on church and school attendance. This information, along with genealogical records and documented personal accounts, has been used to construct plausible social networks. This poster will thus demonstrate how such contextual data can inform models of diseases likely to spread along the links of a social network, and be used to develop hypotheses about the relative importance of local factors on the transmission and impact of epidemics.

## P5

A Woman's Place: Social Roles and Sex Differences in the Stress Response. JT Dominguez. Department of Anthropology, University of Alabama, Tuscaloosa, AL.

Most people understand the stress response in terms of "fight or flight," which prepares the body for major expenditure of energy by delivering energy to parts of the body that need it and halting nonessential physiological processes. However, recent studies have shown that another type of stress response may be "tend and befriend." "Tending," or responding to stress by caring for offspring and blending into the environment, may have evolved because fighting and fleeing would have been difficult and dangerous for a pregnant female or a female with immature offspring. "Befriending," or creating networks of associations, may have evolved in order to maximize resources and increase the number of people who would protect the offspring and female during danger. While both sexes have the capability of responding in either way, men and women may have a proclivity for one or the other as a result of different sex strategies. However, sociocultural definitions and roles of gender may have an equal effect on the way the sexes respond to stress. Gender identity is the degree to which a person sees themselves as performing certain personality characteristics and behaviors associated with biological sexes. Since this is determined by cultural models, a change in a person's

attitudes and values can lead to a change in physiological factors. Drawing on the Adaptive Calibration model (Del Guidice at al., 2010), it can be expected that future cross-cultural data will reveal that differing gender roles also lead to sex differences in the stress response.

## PODIUM D, THURSDAY 4:00 P.M.

The association of early life infection with shorter adult blood telomere lengths in Cebu, the Philippines. DTA Eisenberg[1,2], JB Borja[3], MG Hayes[4,5,6], CW Kuzawa[6,7]. [1]Department of Anthropology, University of Washington; [2]Center for Studies in Demography and Ecology, University of Washington; [3]Office of Population Studies Foundation, University of San Carlos, Cebu City, Philippines; [4]Division of Endocrinology, Metabolism and Molecular Medicine, Department of Medicine, Northwestern University Medical School; [5]Center for Genetic Medicine, Northwestern University; [6]Department of Anthropology, Northwestern University; [7]Cells 2 Society: the Center for Social Disparities and Health, Institute for Policy Research, Northwestern University.

Telomeres are repetitive DNA at the ends of chromosomes. Telomere lengths (TL) shorten with cell replications and age, which is thought to be a cause of senescence. Repeat activation of cellular immune responses, each involving extensive clonal expansion, is necessary to defend against rapidly reproducing and evolving pathogens. Because cellular division shortens telomeres and shortened telomeres are related to increased infections and subsequent mortality, increased immune activation might also impair later immune function. To our knowledge, no study has evaluated the effect of infectious diseases on TL within the context of a non-clinical, low-income country nor examined the influence of early life infections on TL. To test the hypothesis that increased infections early in life cause shortened TL, blood TL from young men and women from Cebu, Philippines were measured ($N = 1,639$). Consistent with expectations, increased early life diarrheal episodes were associated with shorter TL ($P = 0.04$). The association was most marked for episodes occurring during ages 8 and 12 months—a time when, probably due to weaning and increased interaction with the environment, diarrheal incidence is greatest. Mothers were asked bimonthly for the first two years of the child's life how many diarrheal episodes the child had over the past week. Having one more diarrheal episode between 8-12 months old was equivalent to approximately three years worth of decrease in TL in adulthood. These results imply that infections early in life might predispose toward later life development of senescence and chronic disease mediated via TL shortening.

This work was supported by NSF and Wenner Gren Foundation grants. DNA extracts generously provided by Karen Mohlke.

## P6

Big happy family? Using the SAGE dataset to explore the "demographic transition" in Ghana. AC Farbman[1], GH Ice[1], SR Williams[2,3]. Department of Social Medicine[1], Ohio University, Athens OH; Department of Anthropology[2], Center on Aging and the Lifecourse[3], Purdue University, West Lafayette, IN.

Adaptive explanations for the pre-demographic-transition trend toward larger families include more agricultural workers, more child-care and child-provisioning resources, economies of scale, and a greater likelihood of eventual elder care for parents who produce more children. Smaller families are correspondingly expected to be less able to provide adequate economic resources, adequate nutrition, and adequate in-family lay-health care. After a demographic transition, these large-family advantages are believed to disappear as in-family resources are replaced by social and institutional alternatives. Using the WHO's SAGE dataset, we compared rural households ($n = 3066$), rural-to-urban migrant households ($n = 263$), and long-term urban households ($n = 1695$) in Ghana, where despite several years of initiatives aimed at reducing fertility rates and family size, rural households are still significantly larger than urban. Data were collected from probability samples by extensive interviews and include health markers. We hypothesized that, controlling for income quintile, quality of life and health markers would be associated with larger households in rural settings, and that this relationship would be weaker or negative in rural-to-urban migrants and long-term urban dwellers. In fact, results were ambiguous. Limited health correlations were found, and no significant correlation was found between quality of life and household size in rural or rural-to-urban samples, but a modest correlation ($\beta = 0.53$, $p < 0.032$) was found between increased QoL and household size in long-term urban residents. This suggests that in this context the relationship between household size, health and well-being may not be simple.

## PODIUM B, THURSDAY, 10:45 A.M.

Shifting economic conditions and body dimensions in the southern Peruvian Andes. J Fisher[1], M Hoke[2], T Leatherman[1]. [1]Department of Anthropology, University of Massachusetts, Amherst; [2]Department of Anthropology, Northwestern University.

Populations in the southern Peruvian Andes have experienced a variety of social and economic changes in the last half century related to insurgency, land reform and urban development. Growth data collected in the District of Nuñoa from both the 1960s and 80s found minor secular trends in weight and stature for children and adolescents, as well as low growth velocities, small adolescent growth spurts and delayed sexual dimorphism. This paper presents the findings of a pilot study conducted in 2012 reassessing secular changes in growth since data were last collected in 1983-4. Heights, weights, upper arm circumferences and triceps skinfold thicknesses were measured in a cross-sectional sample of 230 high school children (163 from a semi-private school in the town of Nuñoa and 67 from a public school in a neighboring rural village). Increases in heights and weights were seen in nearly all measured age groups between 1984 and 2012. Corresponding increases in triceps skinfold thickness indicate increased levels of adiposity. A growth in markets and enhanced dietary diversity as well as access to new types

of non-traditional foods may contribute to this phenomenon. Yet other data from household surveys collected in the district at the same time point to persistent high levels of food insecurity. These two observations together reveal increasingly complex connections between food and health in the area.

## P51

Diverse diets may be prophylactic against micronutrient deficiency but not against cardiovascular disease risks: case studies in under-served rural communities in Kenya and Brazil. M Fujita[1], HP Silva[2]. [1]Department of Anthropology, Michigan State University, East Lansing; [2]Laboratório de Estudos Bioantropológicos em Saúde e Meio Ambiente, Programa de Pós-Graduação em Antropologia, Universidade Federal do Pará, Brazil

Objectives: Diets consisting of a variety of foods generally contribute to nutritional quality and are considered prophylactic against both micronutrient deficiencies and cardiovascular disease risks. Few studies have, however, actually tested the effect of dietary diversity on micronutrient health or cardiovascular risk status in rural populations in field settings. This presentation examines the associations between Dietary Diversity Score (DDS) and micronutrient health and cardiovascular health risk status markers using datasets from two rural communities in Kenya and Brazil as case studies. Methods: Data from Ariaal women of northern Kenya were used examine the associations between DDS and vitamin A insufficiency (serum retinol $< 1.05\mu mol/L$), and DDS and cardiovascular disease risk category (low-grade inflammation based on serum C-reactive protein $>3mg/L$). Data from Amazonian Quilombola women (Afro-Brazilian) were used to assess the association between DDS and overweight ($BMI>25Kg/m^2$). DDS was derived from 24-hour dietary recalls, counting the number food groups that contributed to dietary intake. Results: Our logistic regression models showed that after adjusting for covariates DDS was a significant predictor for 1) vitamin A insufficiency ($OR = 0.6$, $p = 0.026$, $n = 214$) but not for the cardiovascular risk category among Kenyans ($p = 0.544$, $n = 214$) or overweight among Afro-Brazilians ($p = 0.60$, $n = 44$). Conclusions: Diverse diets may provide protection from micronutrient deficiency but may not extend protection from cardiovascular disease risks. DDS from more diverse settings should be comparatively studied to clarify its possible associations with body weight and other cardiovascular risk markers from a cross-cultural, global perspective.

Funding: Conselho Nacional de Desenvolvidos Científico e Tecnológico (CNPq), Ministério da Saúde do Brasil, National Science Foundation Dissertation Improvement Grant 0622358, Wenner-Gren Foundation Research Grant 7460.

# PODIUM C, THURSDAY, 2:30 P.M.

Use of complementary and alternative medicine among midlife Arab women living in Qatar. LM Gerber[1], M Verjee[2], Y Chiu[1], M Murphy[1], R Mamtani[2], A Bener[3]. [1]Department of Public Health, Weill Cornell Medical College, NY, NY; [2]Weill Cornell Medical College in Qatar, Doha, Qatar; [3]Department of Medical Statistics and Epidemiology, Hamad Medical Corporation, Doha, Qatar.

Recent studies conducted among midlife women in the US have estimated the use of complementary and alternative medicine (CAM). Very little is known on the use of CAM among midlife women living in Qatar. This study describes CAM use among 841 Qatari and non-Qatari Arab women aged 40 to 60 living in Qatar. Interviewer-administered surveys assessed use of the following 5 types of CAM in the past 12 months: special diets or nutritional remedies such as macrobiotic or vegetarian diets, vitamins or supplements; herbs or herbal remedies such as homeopathy or Chinese herbs or teas; psychological methods such as meditation, mental imagery and relaxation techniques; physical methods such as massage, acupressure, acupuncture; and folk medicine and traditional Chinese medicine. Overall, 38% of women had used some form of CAM. Among women who used CAM, special diets were used by 49%, herbs by 42%, psychological methods by 8%, physical methods by 30%, and folk medicine by 12%. CAM usage was greater among Qataris (42.6%, 162/380) than non-Qataris (34.5%, 159/461; $p = 0.02$). Qataris more often used special diets ($p = 0.01$), physical ($p < 0.0001$), and folk medicine ($p = 0.02$) than non-Qataris. There was a trend toward higher CAM use among women reporting vasomotor ($p = 0.08$) and somatic symptoms ($p = 0.08$) compared to women not reporting those symptoms. These data suggest that CAM use is common among Arab women living in Qatar, with more frequent use among women of Qatari nationality. These patterns of CAM use among women during midlife should be considered by healthcare providers and public health practitioners.

Support: Qatar National Research Fund.

## P7

The Study on global AGEing and adult health (SAGE): The effect of self-reported sleep quality and duration on cognitive function among older adults from six middle income countries. TE Gildner[1], MA Liebert[1], P Kowal[2,3], S Chatterji[2], JJ Snodgrass[1]. [1]Department of Anthropology, University of Oregon, Eugene, OR; [2]World Health Organization, Geneva, Switzerland; [3]University of Newcastle Research Centre on Gender, Health, and Ageing, Newcastle, NSW, Australia.

Alterations in sleep duration and quality are prevalent among older adults. Previous studies have demonstrated an association between sleep duration, sleep quality, and cognitive function in older individuals. However, the effect of sleep duration on cognitive function remains controversial, and few studies have examined these trends cross-culturally. Here, we present preliminary results from the World Health Organization's Study on global AGEing and adult health (SAGE) Wave 1, a longitudinal study of nationally-representative samples of older adults ($\geq$50 years old) in China, Ghana, India, Mexico, Russian Federation, and South Africa. Self-report sleep duration ($n = 30{,}012$) and sleep quality ($n = 33{,}348$) over the previous two nights was collected by interview, and five cognitive tests were implemented to create a single summary vari-

able for cognitive functioning (n = 32,022). One-way ANOVA and chi-square tests were used to test for sex differences and correlations were performed to determine if subjective sleep quality or duration is predictive of cognitive functioning. Sleep duration is negatively correlated with cognitive function in all countries ($p < 0.05$). Conversely, sleep quality is positively correlated with cognition in all countries ($p < 0.05$). Significant differences in reported sleep quality exist between all countries except South Africa and Ghana, and all countries except Russia and China differed significantly in cognitive function. Sleep duration (sexes combined) ranged from 7.1 hours/night in India to 8.6 hours/night in South Africa. Significant sex differences were observed for all sleep variables in each country; men generally had better cognition and sleep quality, while women reported longer sleep duration.

Support: NIH NIA Interagency Agreement YA1323-08-CN-0020; NIH R01-AG034479.

## PEARL MEMORIAL LECTURE, WEDNESDAY, 5:00 – 6:00 P.M.

The post-normal science-policy nexus: lessons for policy development from studies of human growth. Sir Peter Gluckman. Centre for Human Evolution, Adaptation and Disease, Liggins Institute, University of Auckland, and Chief Science Advisor to the Prime Minister of New Zealand.

Science increasingly addresses issues where scientific and community issues conflate and science and values intersect. The rising epidemic of obesity is such an example – there remains considerable contention as to whether addressing obesity is primarily a matter of individual or community responsibility, alternatives that are heavily influenced by scientific understandings. In its simplistic formulation obesity can be seen as an evolutionary mismatch between an evolved biology and an environmentally novel nutritional environment. Some would argue that it remains a matter of individual choice as to lifestyle largely obviating the need for policy initiatives. But the explosion of biological knowledge particularly coming from the study of developmental pathways to health and disease shifts both the scientific and policy argument.

It is now clear that there is considerable inter and intra-population differences to living in an obesogenic environment. While partially explained by genomic variation, developmental factors, operating through the developmentally plastic processes of epigenetics and neurodevelopment, are major determinants of appetite, metabolic biology and related behaviours in later life. Some epigenetic factors may also operate over more than one generation. The science leading to these conclusions will be reviewed and its implications for public policy discussed.

Simply put much of the variation in obesity and its complications can no longer be considered only in terms of individual responsibility - rather the science leads to shifts in the policy perspective. A number of State and Agency actors are indeed responding and barriers that had to be overcome will be discussed. Most notably this shift is reflected in the Political Declaration on Non Communicable Diseases from the United Nations General Assembly in 2011.

## P8

The Study on global AGEing and adult health (SAGE): Socioeconomic status, urban-rural differences, and sleep in older adults from five middle income countries. LM Hawkins[1], JJ Snodgrass[1], TE Gildner[1], MA Liebert[1], P Kowal[2,3], S Chatterji[2]. [1]Department of Anthropology, University of Oregon, Eugene, OR; [2]Multi-Country Studies Unit, World Health Organization, Geneva, Switzerland; [3]University of Newcastle Research Centre on Gender, Health, and Ageing, Newcastle, NSW, Australia.

Disruptions in sleep duration and quality are associated with negative health outcomes and low socioeconomic status (SES). Older adults are especially prone to disruptions in sleep patterns and are thus of special interest in sleep research. However, most sleep research has been conducted in high income countries and limited data are available on SES and sleep patterns among older adults cross-culturally. The present research, part of the World Health Organization's Study on global AGEing and adult health (SAGE), focuses on older adults (≥50 years old) in five middle income countries (China, Ghana, India, Russian Federation, and South Africa) and uses self-report data on sleep quality (n = 33,348), sleep duration (n = 30,012), sleep-related problems (n = 33,641), degree of restedness (n = 33,619), residence location (urban/rural; n = 35,326), and SES (highest level of education completed [n = 23,053]; household income [n = 35,189]). Spearman correlations were used to examine associations between sleep and SES variables, and Mann-Whitney U-Tests were used to test between urban and rural residence. Results suggest that sleep duration is significantly negatively correlated with years of education ($p < 0.05$) except in Russia. Further, sleep duration is significantly longer in rural areas ($p < 0.05$) in all countries except Russia (significantly longer in urban areas; $p < 0.001$) and India (no significant differences). Fewer problems with sleep and feeling rested were associated with higher education in all countries ($p < 0.05$). Higher sleep quality was significantly correlated with higher household income in all countries except South Africa and Ghanaian males ($p < 0.05$). SES appears to be a key variable in explaining sleep patterns in middle income countries.

Support: NIH NIA Interagency Agreement YA1323-08-CN-0020; NIH R01-AG034479.

## PODIUM C, THURSDAY, 2:00 P.M.

The contribution of feeding mode to obesogenic growth trajectories in American Samoan infants. NL Hawley[1,2], W Johnson[3], O Nu'usolia[4], ST McGarvey[1]. [1]Department of Epidemiology, Brown University, Providence, RI; [2]Weight Control and Diabetes Research Center, The Miriam Hospital, Providence, RI; [3]Division of Epidemiology and Community Health, University of Minnesota, Minneapolis, MN; [4]Department of Health, Pago Pago, American Samoa.

Samoans are recognized for their particularly high body mass index and prevalent adult obesity. Samoan infants are understudied despite evidence that infancy is a critical period for the development of obesity. To examine the prevalence of overweight and obesity and determine the contribution of feeding mode to obesogenic growth trajectories data were extracted from the well baby records of 795 (n = 417 male) American Samoan infants aged 0-15 months. Mixed-effects growth models were used to produce individual weight and length growth curves. Further mixed-effects models were fitted with feeding mode (breastfed, formula- or mixed-fed) as a single observation at age four ($\pm 2$) months. Weight and length values were converted to Z-scores according to the CDC 2000 reference. The Samoan infants showed remarkably rapid gain in weight but not length in early infancy resulting in a prevalence of overweight and obesity far higher than has been previously reported elsewhere. At 15 months, 23.3% of boys and 16.7% of girls were obese (weight-for-length $>95^{th}$ percentile), with a further 16.1% of boys and 14.0% of girls overweight (weight-for-length $>85^{th}$ percentile). Formula-fed infants gained weight and length faster than breastfed infants. Formula-fed boys were significantly more likely to be obese at 15 months (38.6%) than breastfed boys (23.4%), $\chi^2 = 8.4$, $P < 0.01$, odds ratio = 2.05, 95% CI [1.04, 4.05]. These findings suggest that obesity in American Samoans is not confined to adults. Obesity prevention efforts should be targeted at early life and promotion of breastfeeding may be a suitable intervention target.

## PODIUM B, THURSDAY, 10:30 A.M.

Tall mountains, small babies: an examination of birth weight and infant growth during nutritional transition in the high altitude community of Nuñoa, Peru. MK Hoke[1], JM Fisher[2], WR Leonard[1], TL Leatherman[2]. [1]Department of Anthropology, Northwestern University; [2] Department of Anthropology, University of Massachusetts, Amherst.

Over the last 60 years scholars have sought to understand and quantify the impact of chronic exposure to the hypobaric hypoxia of high altitude environments on growth and development. Hypoxia appears to strongly influence growth during the prenatal period, whereas nutrition plays a more influential role during the post-natal period. Much of the earlier research on growth at high altitude was undertaken in Nuñoa, Peru (4,000 m), a small town in the south-central Andes. Since the initial research project in the 1960's, Nuñoa has experienced a major nutritional transition with increasing market integration facilitated by improved road networks and transportation as well as a burgeoning dairy industry in the lower part of the valley. This study compares the early growth of Nuñoan infants born in 2010 and 2011 (n = 169) to that of infants born in the1960's and 1980's. Mean birth weight in a sample of the contemporary Nuñoan infants is 2893 g, somewhat lower than that identified in urban high altitude populations but consistent with other rural populations. Growth velocity is also assessed in this study and compared with prior growth velocity assessments. The paper concludes with a discussion of the major social, political, economic, and nutritional changes that may be responsible for the trends observed.

This research was supported by the Buffett Center for International and Comparative Studies at Northwestern University.

## PODIUM A, THURSDAY, 8:15 A.M.

To love, honor and obey: the relationship between marital status and birth outcomes in American Samoa. MH Howells[1,2,3], RL Bender[1], DL Dufour[1], M Sespasara[2], J Ah Ching[3], B Mua'sau[3], M Time[2], G Sipili[2]. [1]Department of Anthropology, University of Colorado, Boulder; [2]Department of Health American Samoa, [3]LBJ Tropical Medical Center, American Samoa.

This study examines the relationship of legal marital status on the gestation period and pregnancy outcomes of women in American Samoa. Cross-culturally, married women are more likely to seek prenatal care, and tend to have better pregnancy outcomes. It is unclear if this pattern extends to American Samoa, where long-term relationships may provide some of the same social benefits as legal marriages, yet such relationships remain stigmatized by the local religious community. We reviewed the medical records of 966 Samoan women (563 married, 403 unmarried) who gave birth in American Samoa between October 2010 and October 2011 for pregnancy and delivery outcomes. Unmarried women included those who were in long-term partnerships not officially recognized by the church and government, those in short-term relationships, and those with no partners. We used t-tests to compare the officially married and unmarried groups and found that those who were officially married at delivery had sought prenatal care earlier ($p < 0.001$), attended more prenatal care appointments ($p < 0.001$), gestated longer ($p = 0.024$), and had heavier neonates ($p < 0.001$), and longer neonates ($p = 0.016$). These results suggest that married women have better pregnancy outcomes than unmarried women. In American Samoa, it is not uncommon for unmarried pregnant women to be publically and privately ostracized by their families, their churches, and in some cases by medical professionals. This may reduce a woman's access to prenatal care and her exposure to prenatal education, nutritional supplementation, and general healthcare while increasing her exposure to psychosocial stress.

This study was funded by National Science Foundation DDIG (BCS 1028966) and a Dissertation Fieldwork Grant from the Wenner Gren Foundation (Gr. 8371).

## P31

Transition to a market economy and C-reactive protein concentrations among rural communities in Hainan Island, China. Y Inoue[1], M Umezaki[1], D Li[2], S Konishi[1], J Du[2], C Watanabe[1]. [1]Depatment of Human Ecology, Graduate School of Medicine, the University of Tokyo; [2]Hainan Provincial Center for Disease Control and Prevention, Hainan, China.

C-reactive protein (CRP), a non-specific marker of systemic inflammation, has been shown to predict cardiovascular disease, type 2 diabetes mellitus and the metabolic

syndrome. It is now widely used as a biomarker predicting risk of the chronic diseases. The authors measured CRP concentrations in rural communities with differing levels of development in Hainan Island, China, which was designated as a Special Economic Zone (SEZ) in 1988. The rural residents have experienced significant changes in their lives, particularly in contrast to the lack of development prior to 1990. In Nov-Dec, 2010, a questionnaire survey was conducted and dried blood spot samples for the analysis of high-sensitivity CRP were collected from 2,259 participants residing in 21 communities. The median CRP concentrations were 0.78 mg/L (serum-equivalent) after excluding participants whose CRP concentration was greater than 10mg/L. The number of participants whose CRP was greater than 1 mg/L and 3mg/L were 908 and 344, respectively. Multiple logistic regression analyses revealed that age and BMI was positively associated with CRP concentration ($p < 0.001$) and male was higher in the concentration ($p < 0.001$). Weekly frequency of chicken consumption was also positively associated with CRP ($p < 0.01$), while those of beef and pork revealed no associations.

This research was supported by Grant-in-Aid for JSPS Fellows (23-2876), the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan.

## P32

Family history of hypertension affects diurnal patterns of mean arterial pressure but not pulse pressure or heart rate in women. GD James, HM Van Berge-Landry. Decker School of Nursing, and Department of Anthropology, Binghamton University.

We have previously found that normotensive women with a family history of hypertension have elevated daily epinephrine levels and cortisol variability compared to those with no history. In FH+ women, these hormones may contribute to the development of hypertension by affecting the pattern of diurnal cardiovascular variation (e.g. cardiovascular allostasis) as reflected in the variation of mean arterial pressure (MAP), pulse pressure (PP) and heart rate (HR). The purpose of this study was to compare the diurnal patterns of variation in ambulatory MAP, PP and HR between women with (FH+) ($N = 62$, age = $35.2 \pm 9.1$) and without (FH-) ($N = 72$, age = $33.8 \pm 10.0$) a family history of hypertension. The women all worked in clerical, technical, or professional positions at a major medical center in NYC. Ambulatory blood pressures and HR were measured from 9AM to 6AM the following day, and averages were calculated and compared for each hour. History group comparisons were made using ANOVA models. The results show that MAP is significantly higher most every hour until 7PM ($p < .05$); from 8PM-12PM there are no statistically significant difference between the groups, but from 1AM-6AM pressures are generally significantly higher for FH+ women ($p < .05$). In contrast, the patterns and levels of PP are mostly similar between FH+ and FH- women and there were no significant differences in HR at any time. These findings suggest that there is a tonic increase in diurnal MAP levels in FH+ women, (consistent with earlier hormonal findings), but that other aspects of cardiovascular allostasis (PP and HR) do not differ.

Supported by NIH grant HL47540.

# PODIUM D, THURSDAY 4:30 P.M.

Magnitude and timing of the peak in infant BMI is influenced by both environmental and genetic factors. W Johnson[1], AC Choh[2], M Lee[2,3], B Towne[2,3], SA Czerwinski[2], EW Demerath[1]. [1]Division of Epidemiology and Community Health, University of Minnesota; [2]Department of Community Health, Wright State University; [3]Department of Pediatrics, Wright State University.

Background: Literature exists on the relationship of prenatal exposures to infant adiposity, but longitudinal studies examining the determinants of the pattern of change in infant adiposity and the timing of peak adiposity are lacking. Methods: To address this gap, we characterize the infant BMI peak in 747 non-Hispanic white Fels Longitudinal Study participants. BMI curves from 2 weeks to 1.5 years of age were produced, from which age and BMI at peak were estimated. Regression examined relationships of birth year cohort (1929-1950, 1951-1970, 1971-2010) to age and BMI at peak to capture environmental effects, and heritabilities of age and BMI at peak were estimated to capture the genetic component. For infants born after 1983, skinfold data (triceps, biceps, subscapular, suprailiac) were examined as predictors of BMI at peak to test its association with concurrent subcutaneous adiposity. Results: Peak occurred at $\sim 9$ months of age in both sexes and was 0.4 $kg/m^2$ higher for boys than girls (p-value $< 0.001$). Infants born 1971-2010 experienced a 1.5 month earlier and a 0.35 $kg/m^2$ lower peak than infants born 1929-1950 (p-values $< 0.001$). Age and BMI at peak were significantly heritable (0.541 and 0.747, respectively) and BMI at peak was positively correlated with sum of skinfolds (0.514, p-values $< 0.001$). Conclusion: Our data demonstrate environmental and genetic influences on the timing and magnitude of the infant BMI peak and that the peak reflects subcutaneous adiposity. Research is required to assess the developmental determinants and downstream sequelae of this understudied aspect of growth.

Financial disclosure: This study was supported by National Institutes of Health grants R01-HD012252 and R01-HD053685.

## P52

Impact of coffee intake or exercise prior to first meal on metabolic response: implications for adaptation. SL Johnston. Department of Anthropology & Sociology, West Chester University, West Chester, PA

Evolutionarily derived internal clocks entrained to circadian rhythms in humans and other mammals regulate, to some extent, ingestion, nutrient utilization and metabolism. However, external cues, including meal timing, food deprivation, and caloric restriction can also entrain elements of the clock system, thus engendering a kind of feedback loop. Together with the multilevel organization of human digestive and metabolic function under complex CNS regulation, this affords some limited flexibility in timing and frequency of meals, at least in the short term. It is clear that significant nutritional and metabolic costs are associated with extreme phase shifting of the circa-

dian cycles of ingestion and glucose control; studies of single meal skipping during daylight hours when humans are ordinarily active also suggest potential for cognitive and other impairments perhaps related to glucose availability. Though the clock-driven mammalian pattern is to eat soon after waking and periodically thereafter, many humans skip the morning or later meals by choice or necessity. Some consume only coffee or tea during the first several hours after waking. The effect of coffee consumption on glucose homeostasis is mixed, with evidence for both improved and reduced glucose tolerance depending on the circumstances and beverage characteristics. Another pattern among some humans is to exercise prior to morning food intake, a behavior also with metabolic implications. This paper examines evidence relevant to the impact of coffee intake or exercise prior to first meal on metabolic responses, in order to further develop an understanding of the adaptive dimensions of human meal patterns.

## P33

Genome-wide associations for Parkinson's disease on the X chromosome. MF Keller[2], MA Nalls[2] and A Singleton[2]. [1]Department of Anthropology, Temple University, [2]Laboratory of Neurogenetics, NIH-NIA.

Nearly all genome-wide association studies (GWAS) published in the last 5 years focus on identifying novel associations within the autosomal chromosomes. Genomic regions located on the sex chromosomes are included on most current microarray platforms, yet little attention has been given to these regions in GWAS. Sex chromosome variants are often excluded from GWAS analyses because of a preference for statistical methods that test the association between phenotype and autosomal genotype. However, appropriate techniques do exist, and much can be gained from analyzing these regions. We employed imputed genotyped data from 6 European ancestry cohorts containing 9,511 control and 8,497 case individuals. We tested for genome wide associations to Parkinson's disease status on the X chromosome. Our results are currently pending validation in another study cohort, but indicate number of statistically significant, small-effect SNPs clustered throughout the X chromosome confer risk to Parkinson's disease development. In addition, our utilization of X-chromosome GWA data facilitates a more comprehensive understanding of the complex disease architecture of Parkinson's disease in a previously unexplored region of the genome. Continued development of study designs examining the sex chromosomes and disease status are necessary, and our work documents the applicability of GWA analyses to complex diseases in the X chromosome.

The authors received no specific funding for this work.

## PLENARY SESSION, WEDNESDAY, 1:15 P.M.

Biological Variation, Applied Forensics, and Human Rights. EH Kimmerle. Department of Anthropology, University of South Florida.

One way in which human biology plays a significant role in the area of human rights is through the identification of missing persons. The problem of missing, endangered, and unidentified persons is increasingly approached through a human rights model with successful outcomes. Judicial accountability is a cornerstone in emerging transitional justice initiatives and has been described as fundamental to building peace and democracy in post-conflict societies. However, establishing and proving the elements of violations to International Humanitarian Law (IHL) are complex and confounded by cultural, legal, and biological paradoxes. A clear framework for diverse contexts is needed on the degree to which populations vary and the potential causes for observed variation. For example, do populations age at different rates? If so, is that measurable difference an artifact of the statistical modeling used or sampling? If not, does the variation occur because of inherent genetic variation or environmental conditions? What measurable effects result with environmental contamination, infectious diseases and nutritional deficiencies are present? Given the potential variation that exists, what are the implications of using standard calibrations across populations in criminal trials? Cases of genocide, extra-judicial execution, torture, and homicide in which basic questions about human variation were essential to the solvability of the case are explored through examples from Nigeria, the Balkans, and the United States to help answer the question: *How can human biologists translate human biology for the public good?*

## P22

Effect of development on sub-maximal oxygen saturation in Peruvian Quechua in normobaric hypoxia. M Kiyamu[1], G Elias[2], F Leon-Velarde[2], M Rivera-Chira[2], T Brutsaert[3]. [1]Department of Anthropology, University at Albany, SUNY, NY; [2]Departamento de Ciencias Biológicas y Fisiológicas, Universidad Peruana Cayetano Heredia, Lima, Peru; [3]Department of Exercise Science, Syracuse University, NY

Numerous studies have suggested that Andean natives maintain higher arterial oxygen saturation ($SaO_2$) during exercise at hypoxia, compared to acclimatized lowlanders. In order to evaluate the developmental effect of lifelong exposure to hypoxia on sub-maximal $SaO_2$, we measured $SaO_2$ by pulse oximetry, under resting conditions and submaximal exercise in two groups: 1) BSL consisted of sea-level born and raised volunteers ($n = 34$) and 2) BHA consisted of high altitude born and raised volunteers ($n = 32$), but who migrated to sea-level as adults. Both groups identified themselves as having Quechua ancestry. Each subject was measured on a cycle ergometer in normobaric hypoxia ($FiO_2 = 12\%$, ~4,200m). There was no significant difference in resting $SaO_2$ between the two groups (BSL = 90.5±0.4, BHA = 91.6±0.5, $p = 0.08$) and $SaO_2$ decreased in both groups with increasing work output ($p < 0.001$). Overall, across all levels of exercise, the BHA group maintained higher $SaO_2$ compared to the BSL group ($p = 0.017$). A comparison between groups at each workload showed that submaximal $SaO_2$ was higher in the BHA group at 30 watts (87.4±0.6, $p = 0.001$) and 60 watts (84.5±0.6, $p = 0.007$) compared to their BSL counterparts at 30 watts (84.1±0.6) and 60 watts (82.4± 0.6), respectively, controlling for ventilation, oxygen consumption and sex. In sum, our results indicate that Quechua natives with lifelong exposure to

high altitude have a higher sub-maximal $SaO_2$ at hypoxia compared to Quechua natives born and raised at sea-level, suggesting that developmental adaptation could play a role in the $SaO_2$ phenotype during exercise.

Supported by grants from NSF BCS 0824420.

## PLENARY SESSION, WEDNESDAY, 1:45 P.M.

Broad Street Pumps of the Mind: Human biology in the advancement of global mental health. BA Kohrt. Department of Psychiatry and Behavioral Sciences, The George Washington University, Washington, DC.

Efforts to promote health around the globe have advanced greatly since John Snow's deployment of research as a tool to determine interventions in public health crises. While there is still much to be done to advance infectious disease control, promote maternal and child health, and reduce the burden of cardiovascular disease, the attention to physical health conditions dwarfs support for mental health. The majority of countries spend less than 3% of their health budgets on mental health, and low-income countries spend less than 1%. Two-fifths of the world's population lives in countries without mental health legislation. These resources are inadequate to address mental disorders that account for 13% of the global burden of disease; depression alone is the third leading cause of disability adjusted life years globally. Human biology is playing an important role in rectifying the vast gap between need and treatment in global mental health: First, the global mental health movement has used "No health without mental health" as a foundational principle linking physical and mental health outcomes. Second, biomarkers including social genomics elucidate shared social determinants pathways in physical and mental health. Third, biomarker and neuroimaging studies demonstrate the efficacy of mental health interventions. Moving forward, human biology research is for crucial for two domains: a policy level to provide validation for the legitimacy of mental disorders and their underlying social determinants, and an economic and public health level to design and measure proximate outcomes of the life-long benefits of early mental health promotion.

Support: NIMH *South Asian Hub for Advocacy, Research & Education on Mental Health (SHARE)* U19 MH095687 Supplement, Canada Grand Challenges *Mental Health Beyond Facilities (mhBeF)*, HopeLab.

## P34

Modeling Lyme disease risk using a biobehavioral and ecological approach. D Kommareddy[1], J Schmidt[2], JM Darcy II[3], RM Garruto[1,3], H Sayama[2,4]. [1]Department of Biological Sciences, [2]Department of System Sciences and Industrial Engineering, [3]Department of Anthropology; [4]Department of Bioengineering, Binghamton University, State University of New York, Binghamton, NY.

Risk-modeling of Lyme disease is an advancing part of Lyme disease epidemiology. Models relating to the structural dynamics of vector-host-environment interactions are crucial for understanding the interrelating variables involved in eventual disease transmission to humans. The vast majority of Lyme disease modeling is driven by demographic, environmental and ecological factors related to the vector, Ixodes scapularis (black legged or deer tick). However, no model includes weighted risk scores of human behaviors in vector-host interaction. Since diagnosis of Lyme disease can be elusive clinically, we are combining variables derived from existing models with epidemiological statistics and behaviors to formulate a risk scoring algorithm for clinical and public health use. Tick abundant areas in the local community are surveyed for environmental variables. Each micro-geographic zone will be converted to a multinomial risk response by tick density. Combining tick density with infectivity and environmental/behavioral variables will create a multivariable logistic regression model to express the odds of vector-host interaction given significant risk characteristics. Assigning risk scores to individual patients can help develop public health prevention strategies and determine further diagnostic/treatment protocols for those without classic Lyme disease symptoms. This study can lead to the development of an application for handheld electronic devices that can be employed in real time during patient visits. Such a tool will add to the diagnostic armamentarium in Lyme disease detection and potentially speed the diagnosis and treatment of patients falling outside the classic presentation of Lyme disease.

Support: This work was supported in part by a grant to the State University of New York at Binghamton from the Howard Hughes Medical Institute through the Precollege and Undergraduate Science Education Program and by Undergraduate Awards for Research and Creative Work sponsored by Harpur College and the Binghamton Foundation.

## PODIUM D, THURSDAY 4:15 P.M.

Placental DNA methylation patterns predict offspring birth weight: a pilot study from Cebu, Philippines. CW Kuzawa[1], JN Rutherford[2], V deMartelly[2], WE Gundling[3], A Weckle[3], N Lee[4], DE Wildman[3]. [1]Department of Anthropology and Institute for Policy Research, Northwestern University, Evanston, IL; 2Department of Women, Children, and Family Health Science, University of Illinois at Chicago, Chicago, IL; [3]Center for Molecular Medicine & Genetics, Wayne State University School of Medicine, Detroit, MI; [4]Office of Population Studies Foundation, University of San Carlos, Cebu City, Philippines.

There is growing evidence that a mother's nutrition and other environmental experiences across her lifecourse can have intergenerational effects on offspring growth, metabolism and future disease risk by influencing the transfer of nutrients, hormones and other programming influences during gestation. One promising pathway hypothesized to link maternal experience with offspring fetal development includes environmentally-induced epigenetic alterations, such as DNA methylation, which could alter placental gene expression and function. To evaluate this possibility, here we report results of a pilot study comparing genome-wide DNA methylation patterns in placentas from low and normal birth weight pregnancies in Cebu, Philip-

pines. Examining methylation at approximately 450,000 CpG dinucleotide sites distributed throughout the human genome, we determined that 1,297 of these sites were hypermethylated and 1,803 were hypomethylated in placentas from low birth weight births compared to normal weight births. These CpG sites are proximal to 1581 genes including insulin like growth factor I and its receptor, interleukin 6, and *FOXP2*. The 1581 differentially methylated genes are significantly overrepresented in multiple pathways including vascular smooth muscle contraction ($p = 0.012$), graft-versus-host disease ($p = 0.018$), type I diabetes mellitus ($p = 0.022$), and cancer ($p = 0.016$). These findings support a role for modifiable patterns of gene silencing as a candidate mechanism linking maternal experience with offspring fetal growth and metabolic programming. Evolutionary and public health implications will be discussed.

Grant support: NICHD R03HD062715; NSF 0746320.

## PLENARY SESSION, WEDNESDAY, 3:15 P.M.

What can you do to stop your chair killing you? J Levine. Mayo Clinic.

Non Exercise Activity Thermogenesis (NEAT) is the energy expenditure of all physical activities other than volitional sporting-like exercise. NEAT includes all those activities that render a person, vibrant, unique and independent. NEAT activities include: cyling to work, playing guitar, toe-tapping and dancing. Sedentariness is a state of low NEAT and associated with obesity, diabetes, hypertension, cardiovascular disease, cancer and premature death. The factors that account for the 2000 kcal/day variability of NEAT can be categorized as environmental or biological. The environmental determinants of NEAT can be view using one of two models. In the egocentric model we consider a single person as the focus e.g. "*my* job". In the geocentric model we consider the 'environment' as the focus e.g. well-lit and safe walkways. These models provide us with a theoretical framework to understand NEAT and how best to intervene to promote NEAT. As well as environmental effectors of NEAT, there are also biological regulatory mechanisms that enable us to account for three-quarters of the biological variance in susceptibility and resistance to fat gain with human over-feeding. NEAT is likely to be regulated through a central mechanism that integrates NEAT with energy intake and energy stores so that NEAT is activated with over-feeding and suppressed with underfeeding. Hence, several approaches can be used to improve NEAT; those, focused on individual sedentariness and others on sedentary environments. These are complementary approaches to reversing low NEAT and obesity, to thereby improve activity, health and longevity.

## P35

The Indigenous Siberian Health and Adaptation Project: Lifestyle factors and seasonal changes in metabolic health among the Yakut (Sakha) of northeastern Siberia. SB Levy[1], WR Leonard[1], LA Tarskaia[2,3], TM Klimova[4], VI Fedorova[4], ME Baltakhinova[4], VG Krivoshapkin[4], JJ Snodgrass[5]. [1]Department of Anthropology, Northwestern University; [2]Department of Anthropology, University of Kansas; [3]Institute for Molecular Genetics, Russian Academy of Sciences, Russia; [4]Research Institute of Health, MK Ammasov North-Eastern Federal University, Republic of Sakha/Yakutia, Yakutsk, Russia; [5]Department of Anthropology, University of Oregon.

Among indigenous circumpolar populations, extreme seasonality in temperature and day length strongly influences food availability, activity patterns, and metabolic health. These populations are also undergoing lifestyle changes that place them at increased risk for chronic metabolic diseases. This research examines the joint influence of seasonality and lifestyle factors on metabolic health among the indigenous Yakut of Siberia. Data on body composition, serum lipids and glucose, and lifestyle factors were collected on a sample of 44 men and 73 women from the village of Berdygestiakh during July/August of 2009 and January of 2011. Yakut men showed no significant seasonal changes in weight or fatness, while Yakut women showed significant winter-time increases weight (+1%; $P < 0.05$) and fat mass (+4%; $P < 0.05$). In contrast to the modest changes in body composition, both Yakut men and women showed marked winter increases in total cholesterol, HDL, triglycerides, and glucose ($P < 0.01$ in all cases). Lifestyle factors were more strongly correlated with seasonal changes in body composition and health among Yakut men than women. For men, seasonal changes in weight and body fat were negatively correlated with income, while seasonal changes in HDL were positively correlated with both income levels and days per year spent foraging. These results suggest that men with greater monetary resources and subsistence participation are more buffered from adverse seasonal changes in body composition and serum lipids. Additionally, the interactions between lifestyle and seasonal change in metabolic health appear to differ between Yakut women and men.

Support: NSF ARC-0802390; Northwestern University; University of Oregon; FSRI Institute of Health.

## P9

The Shuar Health and Life History Project: The psychosocial stress response of children from varying degrees of market integration in an indigenous lowland Ecuadorian population. MA Liebert[1,2], JJ Snodgrass[1,2], SS Urlacher[3], TJ Cepon-Robins[1,2], AM Colehour[1,2], TE Gildner[1,2], LS Sugiyama[1,2,4]. [1]Department of Anthropology, [2]Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, OR; [3]Department of Human Evolutionary Biology, Harvard University, Cambridge, MA; [4]Center for Evolutionary Psychology, University of California, Santa Barbara, CA.

Dysregulation of the stress response—specifically, altered functioning of the hypothalamic-pituitary-adrenal (HPA) axis—is an important, yet underappreciated, factor in explaining the increased chronic disease burden seen among populations undergoing market integration (MI). Unfortunately, few studies have evaluated HPA functioning in non-Western populations experiencing cultural and economic changes due to MI. In particular, there is a lack of research examining how these lifestyle transitions

influence the stress response among children. The present study was conducted among the indigenous Shuar of Amazonian Ecuador, who are currently transitioning away from an economy centered on hunting, fishing, and horticulture and towards a more market-oriented lifestyle. This study compares the diurnal cortisol rhythms of 49 Shuar children and adolescents (22 males, 27 females; aged 3-14 years) from a moderately-integrated community in the Upano Valley (UV) to 48 Shuar children and adolescents (29 males, 19 females; aged 4-15 years) from a remote community in the Cross-Cutucu (CC) region. Saliva samples were collected three times per day (waking, 30 minutes post-waking, late afternoon/evening) for three consecutive days, and measures of MI were obtained using economic, lifestyle, and household food frequency interviews. ANCOVA was used to compare the diurnal cortisol rhythms (cortisol awakening response and diurnal slope) of UV and CC Shuar children. Multiple regressions were used to test the association between children's diurnal cortisol rhythms and MI factors. This study offers important insights into the relationship between different levels of sociocultural and economic change and psychosocial stress, particularly in relation to children's health and well-being.

Support: Institute of Cognitive and Decision Sciences, University of Oregon; NSF Graduate Research Fellowship # 2011109300; Anthropology Department, University of Oregon; Ryoichi Sasakawa Young Leaders Fellowship Fund; Wenner-Gren Foundation.

## PLENARY SESSION, WEDNESDAY, 3:45 P.M.

The *AIMS* and validity of genomic ancestry testing. JC Long and SD Niedbalski. Department of Anthropology, University of New Mexico, Albuquerque.

Genome-based estimation of ancestry of individuals provides the most powerful approach to forming a worldwide characterization of human genetic variation. There are now efforts to apply this approach to purposes ranging from recreation to personalized medicine. Ancestry estimation rests on subtle assumptions about homology, time, and human population structure. These subtle assumptions potentially bias our analyses and interpretations. To judge the importance of potential biases, we must ask whether they lead us to false expectations or conclusions. There has never been a better time than now to test the consequences of our assumptions. We have incredibly precise genome-level data collected from people spanning the globe. The first goal of this paper is to examine the definition of, and evidence provided by, *ancestry informative markers* (*AIMs*). To this end, we will interpret current genomic data structured by founder effects produced during the spread of modern *Homo sapiens*. The second goal of this paper is to show that if genes of large effect contribute to health disparities among major subgroups within the United States, these genes must have many of the properties of *AIMs*. The research presented here indicates that the human genome holds fewer highly informative *AIMs* than is typically envisioned by geneticists and anthropologists. Moreover, the information about ancestry provided by *AIMs* is subtly different from popular perceptions. In this light, health scientists should look beyond genetic differences among human populations for the explanation of health disparities in the United States and elsewhere in the world. This research was supported in part by NSF 0850997.

## P10

The psychophysiology of fireside relaxation. CD Lynn. Department of Anthropology, University of Alabama, Tuscaloosa, AL.

The importance of fire in human evolutionary history is widely acknowledged but not fully explored. Fires involve flickering light, crackling sounds, warmth, and a distinctive smell. For early humans, fire may have extended the day, provided heat, helped with hunting, warded off predators and insects, illuminated dark places, and facilitated cooking. Recently scholars have proposed that campfires also provided a social nexus and relaxation effect that could have enhanced prosocial behavior (e.g., McClenon 2006; Wilson 2012; Wrangham 2009). According to this hypothesis, calmer, more socially tolerant people would have been advantaged via the necessity of fireside interactions relative to individuals less susceptible to fireside relaxation. In this study, I test the presupposition that the properties of a campfire are universally relaxing. Using a randomized crossover design, blood pressure, skin conductance, and EEG data were collected from 134 adults from Tuscaloosa, AL with respect to viewing a muted digital fire, a digital fire with sound, and a blank computer screen for 5 minutes each. Student's $t$ statistic was used for within-subject comparisons of the degree of change in blood pressure from pre- to post-test among conditions. ANOVA was used to test between-subject influences on skin conductance and alpha/theta brain wave ratios. Preliminary results indicate that simultaneously watching and listening to a fire influences the greatest relaxation response while the control condition influences the least. These findings have significant contemporary applications, as understanding the psychophysiological influences of fire may "shed light" on our species' captivation with television and other similarly multi-sensory phenomena.

## P53

Ethnic differences in infant and young child feeding practices in the United States: Evidence from NHANES 1999-2008. LG Mattern, AS Wiley. Department of Anthropology, Indiana University.

Current World Health Organization (WHO) recommendations for infant and young child feeding (IYCF) include exclusive breastfeeding for the first 180 days, continued breastfeeding for $\geq$720 days, and the introduction of appropriate complementary foods at 180 days to promote optimal infant health and growth. Previous studies found differences in IYCF practices between ethnic groups in the United States, but have not linked these to differences in growth. Data from the 1999-2008 National Health and Nutrition Examination Survey of children 0-3 years of age and caretakers who self-identified as White (non-Hispanic), Mexican-American, or Black (non-Hispanic) were

analyzed to examine these relationships. Z-scores for BMI, weight, height, mid-upper arm circumference (MUAC), triceps and subscapular skinfolds were calculated. Initiation of breastfeeding was much lower among Blacks (48%) than the Mexican-Americans (77%) or Whites (71%). The mean age at introduction of solid foods was later for Whites (97±4 days), compared with Mexican-Americans (80±3 days) and Blacks (75±3 days). Weaning was also later for Whites (178±7 days) compared with the Mexican-Americans (160±6 days) and Blacks (133±7 days). All groups had IYCF practices that were earlier than WHO recommends. In general, subscapular and tricep z-scores varied the most with ethnicity, and WAZ and MUAC-Z varied more with feeding patterns. Both ethnic group and age at introduction of solid foods independently contributed to variation in subscapular z-score, with Mexican-Americans (0.56±0.04) and Blacks (0.55±0.06) fatter than Whites (0.24±0.04), and an earlier introduction of solid foods was associated with less subscapular fat.

## BREAKOUT SESSION 2, WEDNESDAY 11:30 A.M., 300 C, LEVEL 3

HBA student member roundtable discussion: The Future of Human Biology. L Mattern[1] and J Williams[2]. [1] Department of Anthropology, Indiana University; [2] Department of Anthroplogy, University of Kentucky.

As HBA student representatives, we would like to discuss how student members view the position of human biology and the Human Biology Association in the larger subfield of physical anthropology and in the field of anthropology as a whole. The session will be set up as a round-table discussion to allow student members to exchange ideas freely. In this session, we will establish the direction in which HBA student members see the field of human biology going in the next five to ten years. We will also discuss the range of topics on which HBA students focus in their research to assess our collective interests and needs as a student body. The goal is to connect students in the HBA to one-another and to allow them to establish a stronger connection to the organization. The student representatives will take notes during this round-table discussion and submit them to the HBA executive board to present them with a summary of student goals and perspectives. We hope that this will be the first of many annual student-led break-out sessions at the HBA meetings.

## P36

Scaling up research on human microbial ecology: methodological considerations for incorporating microbiome measures in population-level studies. KA McCabe[1], M.G. Hayes[1,2]. [1]Department of Anthropology, [2]Division of Endocrinology, Metabolism, and Molecular Medicine, Feinberg School of Medicine, Northwestern University, Chicago, IL.

The microbial ecosystems inhabiting the human body are increasingly recognized as normal participants in human development and lifelong symbiotic partners in our biology. Examining the relationship between environments, microbiomes, and human biological variation presents a promising avenue of human biology research. However, high sequencing costs and extensive computing capabilities required to analyze the resultant large datasets, have limited human microbiome studies to much smaller sample sizes than those typically required by population biologists. We examined *in silico* possible avenues for increasing sample sizes without additional cost. We reanalyzed published libraries of 16S rRNA sequences from the human microbiome to determine the minimum sequencing depth per sample required to reliably observe the original results. We generated virtual sequence libraries with output characteristic of 454, Illumina, and Ion Torrent next generation sequencing platforms to explore whether the low-cost, quicker output Ion Torrent may present an alternative to the less error-prone but more costly platforms favored in microbiome studies. Virtual Ion Torrent sequence libraries based on carefully selected 16S target regions closely replicated input community structure. We observed this after culling sequences belonging to low abundance clusters at 3% distance, which raised the abundance threshold for detection. This step reduced sequence error by approximately 70% but entailed loss of 30 to 40% of sequences. We find that reducing sequencing depth is a promising means of increasing sample size. Selection of platform and experimental design must take into account sequence loss during quality control and the detection requirements for the particular study.

## P54

Study on global AGEing and adult health (SAGE): Food insecurity in relation to physical, cognitive, and emotional challenges among older adults. HH McClure[1,2], JJ Snodgrass[2], P Kowal[3,4]. [1]Center for Equity Promotion, University of Oregon, Eugene, OR; [2]Department of Anthropology, University of Oregon, Eugene, OR; [3]Multi-Country Studies Unit, World Health Organization, Geneva, Switzerland; [4]University of Newcastle Research Centre on Gender, Health, and Ageing, Newcastle, NSW, Australia.

Food insecurity research among older adults shows links to physical and mental health challenges, yet most of this work has been conducted in the U.S. and Canada. The present study, part of the World Health Organization's Study on global AGEing and adult health (SAGE) Wave 1, investigated these links among adults 60 years and older (n = 20,863) in China, Ghana, India, Mexico, South Africa, and Russia. Food insecurity was found in 15.7% of participants (all countries combined), with food insecurity lowest in China (1.3%) and highest in Ghana (41.8%). Physical mobility was measured through a timed walk variable and self-reported difficulty performing household activities, while cognitive capacity was appraised through six functional measures. Logistic regression was used to identify predictors of food insecurity controlling for key covariates (sex, age, urban/rural, education, income, depression). Mexican, Ghaniain, and Indian adults who reported more difficulty performing household activities were all 1.2 times more likely to be food insecure. We detected no significant findings related to cognitive function for any country. Depression (based on diagnosis or self-reported symptoms) emerged as a sig-

nificant predictor of food insecurity for all countries ($p < .001$ for all but China: $p < .01$). Further, greater physical limitations were significantly and positively correlated with higher depression in each country ($P < 0.001$). These results suggest that addressing the mental health of older adults may assist with depression related to physical limitations, and contribute to increased food security.

Support: NIH NIA Interagency Agreement YA1323-08-CN-0020; NIH R01-AG034479.

## PODIUM B, THURSDAY, 10:00 A.M.

An investigation into the growth of UK schoolchildren from 1908 to present day.

VJ McGowan[1], GR Bentley[1] LJ Ells[2], M Nelson[3], [1]Department of Anthropology, Durham University, UK; [2]Health and Social Care Institute, Teesside University, UK; [3]Children's Food Trust, UK.

Childhood obesity and its associated health consequences have become major concerns for the UK government. This paper analyses a series of cross-sectional data for children's heights and weight collected in the UK from 1908 to the present in order to estimate changes in malnutrition (including underweight, overweight, and obesity) for UK children. In 1906, UK government documents had already highlighted that poorer children were shorter and underweight compared to their more affluent peers. In an attempt to alleviate the poor nutritional status of many British children at that time, school meals were introduced following the 1906 Education Act and have since provided a strategy for influencing child growth and development in Britain for over one hundred years. They remain an avenue for potential nutritional intervention. Here, we address the question of whether contemporary children from low socioeconomic households are both shorter and overweight compared to their more affluent peers, and analyse the anthropometric status of poorer children during the course of the last century. We also discuss whether UK government policies on school meals have, since their introduction, had a genuine impact (either positive or negative) on observed, longitudinal changes in childhood nutrition.

This research is supported by the Economic and Social Research Council and the Children's Food Trust.

## P23

Age at menarche and fecundability.

MH McIntyre. Dept Anthropology, University of Central Florida.

Endocrinological evidence suggests that women with earlier menarche produce more ovarian hormones, but there have been mixed findings about whether women with earlier menarche also have higher fecundability. This study employed data on the length of a single birth interval from 5,533 married and parous US women whose previous child survived. Two sets of analyses were conducted - one in which duration and type of contraception used were included in a Cox regression model, and one including only the 996 intervals in which no contraception was used. Both models additionally adjusted for the woman's education, year of birth, age, and parity. In both models, gynecological age was found to better predict fecundability than birth age, and had a large effect on the estimated association with age at menarche. When modeling birth age, women with later menarche appear to have similar or greater fecundability, but this was entirely explained by their younger gynecological age. When modeling gynecological age, women with menarche at age 15 or older had a fecundability rate only 49% (95% CI in non-contracepting model: 37-65; and in the full model: 43-56) that of women with menarche at age 11 or younger. Neither model showed a significant effect of weight, and effects of height were small, curvilinear, and unrelated to effects of age at menarche. Previous mixed findings about the association between age at menarche and fecundity can be explained by the differing treatment of age (birth, gynecological, or neither) in those studies.

## P37

Concordant maternal-infant immunity among the Ariaal of Kenya.

EM Miller[1], DS McConnell[2], TW McDade[3,4]. [1]Department of Anthropology, University of South Florida; [2] Department of Epidemiology, University of Michigan; [3]Department of Anthropology, Northwestern University; [4]Cells to Society: Center on Social Disparities and Health, Northwestern University.

Postnatal exposure to maternal immunity and environmental microbes is a critical component of the development of ecologically-appropriate immune functioning in infants. This study examines the relationship between maternal and infant immunity among the Ariaal, a group of settled pastoralists in northern Kenya. Two hundred and thirty nine breastfeeding mother infant pairs between 2 weeks and 25 months postpartum participated in a questionnaire, anthropometric measurement, and saliva (both mothers and infants), human milk and dried blood spot collection (mothers only). Saliva and milk were assayed for IgA using an in-house ELISA; dried blood spots were assayed for C-reactive protein (ELISA) and a panel of 7 pro- and anti-inflammatory cytokines using electrochemiluminsecence (Meso-Scale Diagnostics). Data were analyzed in SAS 9.3. Maternal milk IgA levels were positively associated with infant IgA levels (reported previously) and maternal pro-inflammatory cytokine levels were negatively associated with infant IgA level ($p < 0.05$). However, maternal cytokine levels, maternal salivary IgA levels and maternal milk IgA levels were not significantly associated with each other, indicating some degree of independent function between peripheral and mucosal immunity within the individual. Neither maternal nor infant immune measures were associated with microbial exposure or self-reported illness. While Ariaal mothers and infants have significantly related immune profiles, it remains unclear whether this association is due to a maternal effect of milk immunity, a shared microbial environment, or a combination of both. Further research will clarify the physiological and environmental mechanisms that link mothers' and infants' immune systems.

This research was supported by NSF DDIG BCS-0750779, the Leakey Foundation, the National Science Foundation (BCS-1027687), the Network on Biological Risk (R24AG037898), the UCS/UCLA Center on Biodemography and Population Health (P30AG017265), and the CLASS Laboratory.

## P55

Estimation of protein intake by a food frequency questionnaire in Papua New Guinean highlanders. A Morita[1], K Natsuhara[2], AR Greenhill[3], PF Horwood[3], S Odani[4], J Baba[5], Y Naito[1], M Tadokoro[1], G Vengiau[3], E Tomitsuka[1], K Igai[6], KW Soli[3], Phuanukoonnon S[3], PM Siba[3], M Umezaki[1]. [1]The University of Tokyo, Tokyo, Japan; [2]The Japanese Red Cross Akita College of Nursing, Akita, Japan; [3]Papua New Guinea Institute of Medical Research, Goroka, Papua New Guinea; [4]Chiba University, Chiba, Japan; [5]Tokyo University of Foreign Studies, Tokyo, Japan; [6]Nagasaki University, Nagasaki, Japan.

Papua New Guinea has undergone rapid industrialization and modernization but evidence of their impacts on dietary patterns and nutritional status are limited. The study objective was to estimate protein intake by a food frequency questionnaire (FFQ) in highlanders where traditional staples are root crops, mainly sweet potatoes. We determined the consumption frequency of 29 food items commonly consumed and highly contributing to protein intake in the region over a 1 month period. Intakes of each food item were estimated from weighing real food samples or typical market size and household serving portion. We administered FFQ and collected first morning voids and a hair sample from 87 healthy males and females aged between 9-66 years in Asaro valley, Eastern Highland Province and Tari basin, Southern Highland Province. The estimated median of protein intake was 32.2 g/day (30.4 g/day in the male, 33.0 g/day in the female). The estimated total protein intake was compared with urea nitrogen to creatinine ratios (UN/Cre) and nitrogen isotopic composition of hair ($\delta^{15}N$), potential biomarkers of total and animal protein intake. Correlations were observed with 3-days UN/Cre ($r = 0.60$, $p < 0.05$) and with $\delta^{15}N$ ($r = 0.49$, $p < 0.001$) in the male but not in the female. Our results suggest that this FFQ can be used to estimate animal and total protein intake in highland males.

Support: Japan Society for the Promotion of Science, Funding Program for Next Generation World-Leading Researchers.

## P38

Skin color is correlated with blood pressure and socioeconomic status in New Mexicans of Spanish-speaking descent. C Mosley, M Healy, K Hunley, HJH Edgar. Department of Anthropology, University of New Mexico, Albuquerque.

A cultural bias against individuals with darker skin color may have a detrimental effect on health in different ethnic and racial groups in the US. Darker skin color, for example, is associated with high blood pressure (BP) in African-derived populations throughout the Americas. It is unclear whether skin color affects health and well-being in other US ethnic groups. The purpose of this study is to examine the relationship between skin color and BP in an ethnically diverse New Mexican population. Skin color and BP data were collected from 418 self-identified New Mexicans of Spanish-speaking descent. We used multiple linear regression to test the associations between BP and skin color in the full sample, and within four self-identified ethnic sub-groups. Additional variables included SES, age, and sex. In the full sample, only age and sex were associated with systolic and diastolic BP ($p < 0.001$). For individuals identifying as "Spanish American", lighter skin color was correlated with lower systolic BP ($r = -0.5016$, $p = 0.0061$), whereas among individuals identifying as "Mestizo", lighter skin color was associated with higher SES ($r = 0.6620$, $p = 0.0052$) but not lower BP. In contrast, skin color was not significantly correlated with BP within self-identified "Latino" and "Mexican" groups. These findings indicate that skin color may be an important predictor of health in some Spanish-speaking subgroups but not others. We examine the cultural and historical processes that led to New Mexico's unique and ethnically diverse landscape within the American Southwest, and discuss the broader health-related and sociocultural implications of our findings.

Support: National Science Foundation (BCS 0962825) and the University of New Mexico Graduate Research Development Grant.

## P24

Growth and nutritional status among Gwembe Tonga migrants in Zambia: the effects of seasonality and gender. J Neumann, DL Crooks, Department of Anthropology, University of Kentucky, Lexington KY.

Among smallholder farmers, child growth and nutritional status is often seasonally compromised. Many researchers report reduced HAZ and WAZ during the rainy season resulting from a variety of circumstances including increased infectious disease, increased workload and reduced food stores. We present seasonal anthropometric data for 74 children in 10 households in southern province Zambia. Paired t-tests indicate no difference by season for HAZ (-1.84, -1.84), but a small and significant difference in WAZ (-1.62 in dry, -1.80 in rainy, $p = .01$). The differences are more distinct by gender, with boys' HAZ at -1.79 in the dry season and -1.85 in rainy ($p = .07$;) and WAZ at -1.57 in the dry and -1.97 in the rainy season ($p = .001$). Girls, however, exhibit no significant differences in either HAZ (-1.87, -1.83, $p = .29$) or WAZ (-1.65, -1.69, $p = .67$) by season. Interview data suggest changes in food consumption patterns and increased agricultural work in the rainy season that coincides with increased reports of malaria and coughs and colds, and problematic access to clean water. Ethnographic observations indicate differential patterns of work related activities between boys and girls that may help explain the gender differences in nutritional outcomes.

Support: National Science Foundation (BCS 0517878) and University of Kentucky College of Arts and Sciences.

## P56

The impact of Ramadan fasting on measurements of salivary testosterone among Gambian men. A Núñez-de la Mora[1], DW Lawson[2], G Cooper[1], S Moore[3], T Fulford[4] and R Sear[4]. [1]Department of Anthropology, Durham Uni-

versity; [2]Department of Anthropology, University College London; [3]MRC Keneba and [4]Department of Population Health,, London School of Hygiene and Tropical Medicine.

Human reproductive function responds to chronic and mild energetic imbalances derived from increased exercise, reduced caloric intake and/or immune action. Reduced testosterone in low-energy balance situations is hypothesized to reflect redirection of resources from reproduction to survival. In human males and non-human primates, short-term and multi-day experimental fasting have been shown to suppress the hypothalamic-pituitary-gonadal (HPG) resulting in reduced circulating testosterone levels. Such suppressed activity however, reverts fairly rapidly upon re-feeding. During Ramadan, individuals refrain from consuming food and drinking liquids from dawn until sunset during a period of a lunar month. Although observed by a large number of people in many parts of the world, little is known about the impact of this practice on individuals' reproductive hormones. We analyse the impact of sampling before and during Ramadan on average salivary testosterone levels in a group of 100 Gambian men aged 18-70 years old. Analyses control for potentially confounding factors such as age, marital and paternal status, time of collection, anthropometrics and socio-economic status. Findings are discussed within the framework of human reproductive ecology and recommendations are made for salivary data collection protocols, in particular among populations where ritual fasting is commonplace.

## P40

Sex disparities in body composition and chronic disease risk: Health transition in Vanuatu. KM Olszowy[1,3], KN Dancause[5], A Pomer[1,2,3], CW Chan[1,2,3], G Lee[3], H Silverman[2,3], C Sun[2,3], S Waldman[2, 3], MM Fernandez[1, 3], L Tarivonda[7], G Taleo[7], M Abong[8], R Regenvanu[9], A Kaneko[10,11,12], C Weitz[6], JK Lum[2,3,4], RM Garruto[1,3,4]. [1]Laboratory of Biomedical Anthropology and Neurosciences, [2]Laboratory of Evolutionary Anthropology and Health, [3]Department of Anthropology, [4]Department of Biological Sciences, Binghamton University, State University of New York, Binghamton, NY; [5]Psychosocial Research Division, Douglas Hospital Research Center, McGill University, Montreal, Canada; [6]Department of Anthropology, Temple University, Philadelphia, PA, [7]Ministry of Health, Republic of Vanuatu, [8]Kaljoral Senta, Republic of Vanuatu, [9]Land and Justice Party, Republic of Vanuatu, [10]Island Malaria Group, Department of Microbiology, Karolinska Institutet, [11]Department of Parasitology, Osaka City University Graduate School of Medicine, [12]Institute of Tropical Medicine, Nagasaki University.

Prevalence of obesity is increasing in developing nations as part of the 'health transition', a model which describes the persisting global burden of infectious disease in conjunction with increasing rates of noncommunicable chronic diseases. In transitioning populations, it is widely recognized that females tend to exhibit greater rates of obesity than males, indicating a growing sex disparity in chronic disease risk. We seek to understand the demographic and behavioral contributors to this differential in Vanuatu, a rapidly developing Pacific Island nation. In 2007, a field research team from Binghamton University collected demographic, dietary, and activity data, and anthropometric measurements, on Ni-Vanuatu children and adults (n = 1260) from three islands (Ambae, Aneityum, and Efate). During the summer of 2011, the field research team returned to Vanuatu and collected the same measurements on these same islands (n = 1181). Preliminary results indicate that Ni-Vanuatu women aged 18 and older are increasing central body fat deposition (as measured by waist circumference) at younger ages in 2011 than in 2007, with a large proportion of the population over the age of 30 at risk for developing metabolic disorders. While we found a similar trend in adult men, it is not as dramatic in terms of metabolic disorder risk. Additionally, women on Efate, the most developed island in the survey, exhibited significantly greater fat deposition and rates of obesity than men, as measured by percent body fat and body mass index. Further analysis of the demographic and behavioral data will elucidate possible drivers for this observed growing sex disparity in obesity in Vanuatu.

Support: Wenner-Gren Foundation for Anthropological Research, Harper College Grants in Support of Research, Scholarship, and Creative Work.

## P39

Heterogeneity identified at birth and cardiovascular risk at age 45. EK O'Neill[1], F Fang[2], TB Gage[1,2,3]. [1]Department of Anthropology, University at Albany; [2]Center of Social and Demographic Analysis, University at Albany; [3]Department of Epidemiology and Biostatistics, University at Albany.

The etiology of chronic diseases begins before birth and compromised growth in utero may be associated with differential organ development, increased allocation of nutrients to adipose tissue, accelerated weight gain, and a greater risk of diseases later in life. Birth weight is often used as an indicator of this fetal programming and there is a continuous relationship between birth weight and chronic disease. The aim of this paper is to examine the association of birth weight with chronic disease, specifically high blood pressure, using a latent mixture of regressions approach. This method, the Covariate Density Defined mixture of regressions (CDDmr), identifies latent subpopulations using a finite mixture model of normal distributions (birth weight) and fits an independent regression (blood pressure) to each latent subpopulation. These subpopulations are labeled as "normal" and "compromised" based on previous research using this method with an infant mortality outcome. The data used are the 1958 National Child Development Study which reports birth weight and clinically measured blood pressure at age 45. Compared to "normal" births, "compromised" births are at much higher risk of high blood pressure. The relative risk of stage I systolic blood pressure (greater than 140 mmHg) between "compromised" and "normal" births is 14.7 in females and 56.2 in males while the relative risk of stage II systolic blood pressure (greater than 160 mmHg) is 50.7 in females and 58.7 in males. Results for diastolic blood pressure are similar. CDDmr is likely to be useful for studying fetal programing as a complex phenotype.

Supported by NIH grants R24HD044943 and R01HD037405

## P41

The San Diego model: using historic records to develop a model of an infectious disease outbreak among indigenous neophytes at Mission San Diego in the early 19th century. CM Orbann. Department of Anthropology, University of Missouri-Columbia.

Agent-based modeling has been used to investigate the spread of infectious disease in contemporary populations with great success. It has proven effective in predicting epidemic pathways, the efficacy of potential control measures, and identifying at-risk populations. It is particularly useful in examining disease dynamics in small populations where the actions of single individuals or small fluctuations in behaviors can play significant roles in determining the outcome of an epidemic event. This poster describes the use of historical records from a variety of sources to develop an agent-based computer simulation model used to investigate the spread of acute, infectious disease among the Kumeyaay neophytes of Mission San Diego de Alcala, in present-day San Diego, CA. The model, built using the RePast toolkit for social sciences modeling, uses a population based on the historically known population at the mission. The mission baptismal, marriage, and death records serve as the primary data source on which the model population was structured, but ethnographic and historic data were critical during model development. Information such as the scheduling of activities, the social geography of the mission environment, and the general health of mission neophytes contributed to model development. Strengths and weaknesses of modeling a historic population are discussed. The use of an agent-based model to study disease in a Spanish colonial context is novel, but well-suited to the kinds of data available from this period. This model could be further applicable to contemporary small, kin-based populations worldwide.

This study was funded by NSF DDIG 1123918.

# PODIUM D, THURSDAY, 3:15 P.M.

Viromes and anthropology. AT Ozga, RY Tito, A Obregon-Tito, CM Lewis Jr. Department of Anthropology, University of Oklahoma.

Viruses have played an important role in anthropology for the past several decades, including tracking human migrations, examining virulence and global dispersion, and attempting to understand processes related to disease transmission to at-risk populations. Recent next generation sequencing techniques have allowed geneticists to examine viruses in ways that were previously inaccessible; now large numbers of single and double stranded DNA and RNA viruses can be characterized from metagenomic samples, including those from human body sites. The Human Microbiome Project (HMP), funded by the National Institutes of Health from the U.S. and MetaHIT from Europe, examines the microbes within various human body sites resulting in information related to health, diet and lifestyle. While human microbiome research seeks to understand the complex microbe-host relationships, the virus-microbe interactions have been largely ignored in these studies. While we host bacterial cells that outnumber our own cells by 10 to 1, it is estimated that viruses and bacteriophages outnumber microbial cells 100 to 1, making them the most abundant biological entities known. It has been established that viruses play an important functional role within microbiomes. Here we use previously published data from MetaVIR and MG-RAST, along with novel viral metagenomic sequences from indigenous communities, to illustrate the informative nature of viral sequence data and its pertinence to the field of human biology. We will discuss the importance of viruses in the greater context of human subjects research and how viruses alone may be able to provide new insights into diet and disease.

## P11

Parents' perceptions of residential neighborhood, children's sedentary behaviors, and outdoor play in school children. C Padez. Research Center for Anthropology and Health, Department of Life Sciences, University of Coimbra, Coimbra, Portugal.

Although the causes of obesity are multifactorial, environmental factors such as unsafe neighborhoods are one factor that has been thought to increase obesity risk in younger children by limiting their outdoor play and increasing sedentary indoor. The main purpose of this study is to analyze the association between sedentary behaviors, children's outdoor play and parents' perceptions of some characteristics of the built environment. A cross-sectional study was done in a sample of 1466 children, aged 6.0-10.0 years. Parents filled out a questionnaire about family and child behaviours and the "Environmental Module" standard questionnaire of the International Physical Activity Prevalence Study (IPS, 2002). A Multivariate Logistic Regression analysis adjusted for age, parental education and the cluster of schools was used. A negative parental perception of the residential environment was positively associated with the following behaviors: more time watching Television, among boys (> 2 hours/day, OR = 1.66); more time spent using the computer, in boys and girls: (> 1 hours/day, OR = 2.17; OR = 1.13); more time spent playing electronic games, in boys and girls: (> 1 hours/day, OR = 2.97; OR = 1.66); less time playing outdoors, in boys and girls: (activity outside < 1 hours/day, OR = 1.69; OR = 1.31). When parents have a negative perception of their residential environment the children tend to spend more time inside house watching television, using the computer and playing electron games and less time playing outside.

## P12

Hospital policy change and childbirth decision-making among rural Tanzanian women. CL Patil, ET Abrams, EJP Antalis, S Chibber and SR Nadimpalli. Department of Anthropology, University of Illinois at Chicago (UIC), Chicago, IL.

This study focuses on how policies concerning the Millennium Development Goals 4 and 5 have been enacted in rural Tanzania. An approach for reducing disparities in maternal and infant mortality has been to encourage

women to deliver in the presence of a skilled birth attendant (SBA). In sub-Saharan Africa healthcare worker shortages, distance to a health facility and household economics have been identified as barriers to delivering in the presence of a SBA. To address these barriers, a hospital in rural Tanzania changed two of its policies in January of 2008. Here, we present the results of a mixed-methods study focusing on the biosocial impact of making ambulance and maternity services free of charge for all pregnant women in the catchment area. Survey results show that the policy changes were associated with a significant increase in the number of women delivering at the hospital; the number of hospital births increased by more than 50% in two years. Women delivering at the hospital stated that available services and technologies played a role in their decision to deliver at the hospital. However, proximity to the hospital, infrastructure, social support and expectations for quality of care were identified as barriers to delivery in a health facility even with the policy changes. We conclude with discussions about how policy, healthcare worker shortages and quality of healthcare are related and have implications for variation in pregnancy and health outcomes and present future directions of this research.

Support: Wenner-Gren Foundation for Anthropological Research, Chicago Developmental Center for AIDS Research, Office of Social Science Research at UIC, and the Department of Anthropology.

## PLENARY SESSION, WEDNESDAY, 2:15 P.M.

Food and nutrition policy: A biological anthropologist's experiences from an academic platform. DL Pelletier. Division of Nutritional Sciences, Cornell University.

Food and nutrition are inherently multidisciplinary themes for academic research and multisectoral problems for society. For these reasons they pose exciting opportunities for biological anthropologists, but also pose risks and challenges when approached from an academic platform. In this presentation I draw upon personal experiences to illustrate some of the many contributions human biologists can make in this area, the intellectual and practical challenges and some lessons learned by working from an academic platform. The experiences range widely, such as hypothesis-testing research concerning diet and cardiovascular disease in Polynesia; application of quantitative methods to estimate the contribution of malnutrition to global child mortality; analyzing national survey data or creating a micro-simulation model to inform policy development; engaging with government officials to assess and mitigate the effects of crop failure on rural African communities; developing and testing methods for strengthening the implementation of community and national food and nutrition programs in domestic and international settings; critically evaluating the FDA's policy on genetically engineered foods; participant-observation research in national institutions to better understand and address the political economy dimensions of nutrition policy; and drawing upon a multi- and trans-disciplinary perspective to advise international agencies on the design and implementation of policies and programs. This work spans traditional (Mode 1, detached, academic) research to fully-engaged (Mode 2) orientations, a portfolio that draws upon the diverse skill set of many biological anthropologists, ensures intellectual vitality and has strategic value for gaining access to policy communities and navigating the political environment within academia.

## BREAKOUT SESSION 1, WEDNESDAY 11:30 A.M., 300 B, LEVEL 3

Early Career Mentoring. I Pike[1] and D Crooks[2]. [1]School of Anthropology, University of Arizona; [2]Department of Anthropology, University of Kentucky.

This break-out session creates opportunities to match senior graduate students transitioning into post-doctoral positions and early career colleagues with a cross-section of more senior Human Biology Association Fellows. The session will be organized around three topics of central interest to junior colleagues: tricks for learning to write regularly, creating a successful publication strategy, establishing a national reputation. The session will begin with a brief 10-minute presentation, followed by roundtable discussions of the three topics. Each table will have at least two senior colleagues available to work as active mentors on these topics with participants moving to the tables based on interest. This session is designed to start the process of introducing junior colleagues to more senior colleagues to share strategies for successfully navigating early career transitions.

## P13

Young women's education as a social determinant of fertility in Vanuatu? A Pomer[1,2,3], CW Chan[1,2,3], KN Dancause[5], G Lee[3], KM Olszowy[1,3], H Silverman[2,3], C Sun[2,3], CA Weitz[6], SA Waldman[2,3], MM Fernandez[1,3], L Tarivonda[7], G Taleo[7], M Abong[8], R Regenvanu[9], A Kaneko[10,11,12], RM Garruto[1,3,4], JK Lum[2,3,4]. [1]Laboratory of Biomedical and Neurosciences, [2]Laboratory of Evolutionary Anthropology and Health, [3]Department of Anthropology, [4]Department of Biological Sciences, Binghamton University, State University of New York, Binghamton, NY; [5]Psychosocial Research Division, Douglas Hospital Research Center, McGill University, Montreal, Canada; [6]Department of Anthropology, Temple University, Philadelphia, PA; [7]Ministry of Health, [8]Kaljoral Senta, [9]Land and Justice Party, Republic of Vanuatu; [10]Island Malaria Group, Department of Microbiology, Karolinska Institutet, Stockholm, Sweden; [11]Department of Parasitology, Osaka City University Graduate School of Medicine, Osaka, Japan; [12]Institute of Tropical Medicine, Nagasaki University, Nagasaki, Japan.

Development and modernization are often associated, in the long term, with decreased rates of fertility; such changes can be a result of many factors associated with modernization, including change in nutritional status, increased access to health care, and increased access to education and employment for women and girls. There is ample research confirming education as one of the key social determinants of female fertility rate. The Pacific island nation of Vanuatu is currently experiencing such modernizing trends. In 2011, we surveyed over 500

women on five islands in Vanuatu regarding their education level and childbearing history, particularly age at first birth and number of live births. Preliminary analysis indicates that there is little difference in age at first birth across islands and age cohorts (average 20-21 years old at first birth). There are also indications that the number of children per woman is decreasing slightly (from over 5.5 children per woman over age 60, to just over 4.5 children per woman age 40-59), especially on the most rapidly modernizing islands. Interestingly, young women 15-19 years old have attained an average of one year's worth of schooling more than their mothers' generation (7.6 to 6.5 years), and two years more than their grandmothers' generation (5.4 years). However, there does not seem to be a direct correlation between age at first birth and education, although it appears there may be some connection between the level of education attained and the number of children a woman has.

Support: Wenner-Gren Foundation for Anthropological Research, Harper College Grants in Support of Research, Scholarship, and Creative Work.

## PODIUM A, THURSDAY, 9:00 A.M.

Maternal predictors of human milk leptin levels and associations with infant size. EA Quinn[1] and CW Kuzawa[2,3]. [1]Department of Anthropology, Washington University in St. Louis; [2]Department of Anthropology, Northwestern University; [3]Cells to Society, The Center for Public Health Disparities, Northwestern University.

It has been hypothesized that leptin in human milk may influence neonatal development and act as a mechanism linking breastfeeding and decreased risk of later obesity. Leptin levels in human milk have investigated in very few populations, particularly non-Western populations. This study specifically investigates maternal predictors of milk leptin levels in milk samples from 120 Filipino women participating in the Cebu Study. Individuals from this study have serum leptin levels lower than those reported for many other populations (Kuzawa et al., 2007); and lower than those for any population with comparable milk leptin data. Here, we specifically invested the association between maternal adiposity and milk leptin levels and between milk leptin levels and neonatal size for age. Milk samples were collected using standard protocols (Ruel et al., 1997) and analyzed for leptin using EIA. Maternal body composition was calculated from skinfolds; additional maternal and infant measurements were also collected. Milk leptin levels for this sample averaged 0.287 (0.257) ng/mL, on the low end of leptin levels reported for other populations. Mean maternal BMI was 20 (3), with maternal body fat averaging 24.7% (3.6). There was a significant, positive association between infant age, maternal body fat, and milk leptin ($r^2 = 0.30$, $p < 0.006$). Milk leptin was inversely associated with infant length but not weight after adjustment for infant age ($r^2 = 0.03$, $p < 0.04$). Differences in milk leptin, reflecting maternal adiposity, may be associated with changes to infant growth and may be protective against excess weight gain in infancy.

Support: National Science Foundation DCS 0746320.

## P57

Water from fruit or the river? Examining hydration strategies among Tsimane' adults in the Bolivian Amazon. AY Rosinger, SN Tanner. Dept Anthropology, University of Georgia, Athens, GA.

Nutritional anthropology has closely examined how people use dietary adaptations to sufficiently meet protein and micronutrient needs, but less work has focused on water. Hydration strategies, or how a person meets daily water needs through foods and liquids, are important to physiological and cognitive health. Strategies vary worldwide by local ecology and food culture, yet rapid transitions may create a mismatch between strategies and the nutritional ecology. This research documents how forager-horticulturalist adults in lowland Bolivia meet daily water needs and how strategies relate to health outcomes. During July-August of 2012, I conducted 24-hour multiple-pass dietary-, activity-, and health-recall interviews, and took anthropometric measurements with 45 adults in a Tsimane' community. Preliminary analysis suggests men and women in this community consumed an average of 4.95 (1.74 SD) and 4.43 (1.32 SD) liters of water daily, respectively. Men and women acquired approximately 48% and 51% of their water from food sources, 20% and 14% from chicha (a homemade fermented beverage), 14% and 13% from calorically-rich beverages, and, 18% and 22% from raw water, respectively. Water intake varied significantly with age and between individuals. After controlling for age, gender, BMI, and wealth, each percent increase in water obtained from foods was associated with an 8% reduction ($P = 0.05$) in reporting any illness. Both total water intake and percent water from foods were significantly higher than averages reported in industrialized countries. These findings suggest that in areas without potable water, people may use water-rich foods as dietary adaptations to reduce risk of disease.

This research was supported by a Dean's Award and a Summer Doctoral Research Fellowship from the Graduate School and a Summer Travel Award from the Latin American Caribbean Studies Institute at the University of Georgia.

## P42

C-reactive protein, body mass index and psychosocial stress/distress among Brazilian women in the early post-partum. AEF Rudzik. Department of Anthropology, Durham University, Durham, UK.

C-reactive protein (CRP), a common marker of inflammatory response, has been widely associated with negative health outcomes including cardiovascular disease and stroke. Psychosocial stress in pregnant women and others has been found to be associated with dysregulation of the inflammatory response and increased levels of CRP. As part of a larger study of stress among a group of 65 low income post-partum women in São Paulo, Brazil, the associations between CRP, body mass index (BMI) and psychosocial stress/distress were examined. At 12 weeks, blood spot samples were collected for CRP analysis using ELISA, weight was recorded for BMI calculation, and the Edinburgh Post-natal Depression Scale (EPDS) was

administered. Linear regression analysis demonstrated that the overall relationship in which BMI predicted CRP ($R^2$ = .237, p = .003; β = .534, 95% CI .062-.212) was driven by those women with higher levels of psychosocial stress or distress. Among women above the EDPS depression cut-off (12+) the association with BMI was strong and statistically significant ($R^2$ = .693, p < .001; β = .938, 95% CI .233-.481). Among women below the cut-off point (0-11) there was no relationship between BMI and CRP. Similarly, a strong significant association existed between BMI and CRP for women whose recent pregnancy was unplanned, a situation identified in interviews as a substantial source of stress ($R^2$ = .366, p < .003; β = .693, 95% CI .076-.246). No relationship existed for women who had planned their pregnancy. These results support earlier findings suggesting an important role for psychosocial stress in mediating dysfunction of the CRP inflammatory response.

## P58

Differing ratios of the omega-3 long-chain polyunsaturated fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) may have differing triglyceride-lowering effects. AS Ryan, SS Porter, FD Sancilio. Sancilio and Company, Inc. Riviera Beach, FL.

In a recent statement from the American Heart Association, an elevated triglyceride (TG) level is directly associated with increased atherosclerotic risk. Omega-3 products available in the marketplace contain different ratios of EPA and DHA. It is unclear whether differing ratios of EPA to DHA have different TG-lowering effects. The purpose of the present study was to evaluate the TG-lowering effect of three products with different EPA to DHA ratios (2.3:1, 1.2:1, 1:0) in subjects with elevated TG levels: Ocean Blue® Professional Omega-3 2100™ (OB, 675mg EPA, 300 mg DHA), Lovaza® (P-OM3, 465 mg EPA, 375 mg DHA), and Vascepa™ (AMR101, 960 mg EPA). P-OM3 and AMR101 are drugs for individuals with TG levels ≥ 500 mg/dL. Subjects with a baseline TG level of 321.7 ± 108.7 mg/dL were administered 4 g/day of OB for 30 to 228 days (mean = 106 ± 50 days). Baseline and end of study fasting levels of TG, total cholesterol (TC), LDL-cholesterol (LDL-C), and HDL-cholesterol (HDL-C) were evaluated. Comparisons were made with mean and median lipid levels reported for P-OM3 and AMR101. Compared with P-OM3, subjects given OB showed a much larger mean decrease in TG levels (48.0% vs. 28.0%) and smaller increase in LDL-C levels (16.4% vs. 42.8%). Compared with AMR101, subjects administered OB had comparable median decreases in TG levels (AMR101 = 33.1% vs. 34.9%) and slightly larger increases in LDL-C levels (AMR101 = 5.0% vs. 10.3%). Results indicated that certain ratios of EPA to DHA may have a larger TG-lowering effect with more favorable changes in LDL-C levels.

## P43

Preliminary analysis of the relationship between persistent organic pollutants (POPs) and indices of health and reproductive well-being among women of reproductive age. LM Schell[1,2,3], MV Gallo[1,2], KK Burnitz[1], KR Nelder[1]. [1]Department of Anthropology, University at Albany, Albany NY; [2]University at Albany, Center for the Elimination of Minority Health Disparities, Albany, NY; [3]Department of Epidemiology and Biostatistics, School of Public Health, Rensselaer NY

POPs such as polychlorinated biphenyls (PCBs), hexachlor0benze (HCB) and dichlorodiphenyltrichloroethane (measured as its metabolite *p,p*'-DDE) can interfere with the synthesis, secretion, transport, activity, and/or elimination of endogenous hormones. As many populations experience POP exposure we seek to determine the relationship of POP exposure to measures of health and reproductive function. POPs, HDL, LDL, cholesterol, triglycerides and reproductive and thyroid hormones as well as blood pressure were assessed in 184 Akwesasne Mohawk women between the age of 21 and 38 years. Women were on average 30.1 years old and blood pressures were within the normal range according to the American Heart Association. Over 40% of the women are overweight or obese, 17% are hyperglycemic, 25% have high cholesterol levels, and 50% have LDL levels above the normal range. Mean (geometric) lipid adjusted toxicant levels range between 9 (HCB) and 214 ppb (total PCBs), with mean *p,p*'-DDE at 38 ppb. In preliminary analyses there are significant positive correlations between the sum of 18 PCB congeners and diastolic blood pressure, between *p,p*'-DDE and both systolic and diastolic pressure. Also, *p,p*'-DDE was significantly, positively correlated with serum glucose levels. Among the reproductive hormones, *p,p*'-DDE was negatively related to luteinizing hormone levels on day 3. These findings suggest that POPs influence lipoproteins and other cardiovascular disease biomarkers, as well as some aspects of reproductive function. There is a clear need for further analyses of these relationships.

This work was supported by grants from the National Institute of Environmental Health Sciences (NIEHS-ESO4913; ES10904), and the National Institute on Minority Health and Health Disparities, National Institutes of Health (P20 MD003373).

## P14

The Indigenous Siberian Health and Adaptation Project: Chronic stress and its relation to lifestyle change, Epstein-Barr virus, blood pressure, and C-reactive protein among the Yakut (Sakha) of Siberia. KE Schweber[1], MA Liebert[1], WR Leonard[2], LA Tarskaia[3,4], TM Klimova[5], VI Fedorova[5], ME Baltakhinova[5], VG Krivoshapkin[5], JJ Snodgrass[1]. [1]Department of Anthropology, University of Oregon, Eugene, OR; [2]Department of Anthropology, Northwestern University, Evanston, IL; [3]Institute of Molecular Genetics, Russian Academy of Sciences, Moscow, Russia; [4]Department of Anthropology, University of Kansas, Lawrence, KS; [5]Research Institute of Health, MK Ammasov North-Eastern Federal University, Republic of Sakha/Yakutia, Yakutsk, Russia.

Chronic psychosocial stress has been linked to numerous negative health outcomes, including infectious disease progression and the development of cardiovascular disease. Chronic stress is also an important pathway linking social change with increased chronic disease burden. Previous research among the indigenous Yakut (Sakha) of Siberia has identified associations between measures of

lifestyle change and stress biomarkers such as Epstein-Barr Virus (EBV) antibodies; these studies also document greater psychosocial stress burden among men. Despite progress on understanding how adverse social conditions affect health, little is known about the specific physiological pathways through which social and psychological stressors shape cardiovascular health. This study investigates associations between several stress biomarkers (EBV, C-reactive protein [CRP], and blood pressure) and measures of wealth and lifestyle in 288 Yakut adults (145 women; 143 men) from the rural community of Berdygestiakh, Russia. Yakut women had higher EBV antibody levels ($P < 0.001$) but lower systolic blood pressure (SBP; $P = 0.05$) than men. In addition, CRP, SBP, and diastolic blood pressure (DBP) were positively correlated with waist circumference and percent body fat in both women (all $P < 0.01$) and men (all $P < 0.05$). EBV, CRP, and SBP were significantly correlated with one another in women ($P < 0.05$) but not men. In addition, after controlling for age and body composition, all biomarkers considered here were correlated with various measures of wealth and lifestyle such as consumer good ownership and subjective social status. These analyses highlight the important role that social factors play in contributing to chronic health risks among populations undergoing economic and lifestyle changes.

Support: NSF ARC-0802390; Northwestern University; University of Oregon; FSRI Institute of Health.

## P15

Changes in mood, behavior, cortisol, and interleukin-6 in adults during immune activation: A pilot study to assess sickness behavior in humans.

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Sickness behavior, a suite of behavioral changes subsequent to infection that includes depression, anhedonia, and decreased food intake, as well as reduced movement and exploration, has been well described in model organisms. In humans, however, the phenomenon is largely unexplored, in part because of the difficulty in studying a naturally infected sample. To evaluate the utility of a vaccine as an ersatz infection, 11 rabies vaccine naïve participants (five male, six female, mean age 22.8 years) were recruited from the School of Veterinary Medicine at Purdue University. Participants provided daily saliva and urine samples and completed daily questionnaires to assess mood and social behaviors for a period of six weeks. Saliva samples were assayed for cortisol and urine samples for interleukin-6 (IL-6) and creatinine. We hypothesized that social behaviors would decrease and negative mood would increase during immune activation. We further hypothesized that levels of both cortisol and IL-6 would be positively correlated with measures of negative mood and would be negatively correlated with social behavior. Upon analysis of a four day sub-sample focused around the first immunization, we found no significant correlations between IL-6, cortisol and mood/social behavior. Nor did we find significant differences between affect and social behavior independent of these biomarkers for these days. Our negative results are likely due to a small sample size and possible confounding factors, such as the psychosocial stress of veterinary school. Future analyses will examine other time points in this dataset, while future studies will address the small sample size.

This research was supported in part by Indiana University, Bloomington.

## P25

Aiding and abetting: a new perspective on life history theory x $10^{13}$.

GM Sheets. Dept of Anthropology, Emory University, Atlanta, GA.

Life history theory (LHT) has proven to be a valuable guiding principle in human biology. However, emerging research on the microbiome suggests a need to reconsider its unit of analysis. LHT focuses on the individual organism, but humans are symbiotic hosts for over 100 trillion other organisms, whose activities directly influence fitness. Rapidly expanding insights into the form and function of our resident microbiota have raised the need for theoretical work that accounts for them and opens new avenues for comparative studies of human adaptation. This paper charts phases of early microbial and immune development in humans and suggests where these microbial partners may have contributed to the evolution of key human adaptive features. For example, early microbial colonization is associated with long-term variation in metabolism, energetics and immunity. The developmental energetic demands of brain and body sharpen trade-offs against maintenance demands of the immune system. Microbiota moderate this trade-off by enhancing nutrient harvesting, providing human infants with antimicrobial properties, and at the same time stimulating early immunity. Defense mechanisms of a healthy microbiome moderate immune response and/or tolerance to novel microbes, protecting from infant diarrhea. Additionally, the extended period of infant dependency may provide a window for the horizontal transfer of niche-specific microbes, as well as plant-based *genetic factors*, critical not only for organizing immune activities, but also for inducing more effective metabolization. Thus, the need for empirical and theoretical work on the role of the microbiome in human life history and adaptation opens exciting opportunities for human biology.

## P44

The characterization of hot flashes among women in Campeche, Mexico.

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Hot flashes are associated with the hormonal changes of menopause; however, hot flash frequencies vary across populations. Variation may be due to differences in physiology or symptom perception/report. Past investigations suggested very low hot flash frequencies among Mayan women. In preparation for a cross-sectional investigation of menopausal symptoms, in-depth interviews were

conducted with 60 women aged 37 to 63 years (mean 47.7 years) to understand how Mayan and Mestizo women experience and talk about hot flashes. Participants were recruited from the city of Campeche (n = 19) and 3 rural *pueblos* (n = 41); 53% spoke Maya. Interviews were guided by 20 open-ended questions including, "Are you familiar with *bochornos o calores* (hot flashes)?" A body diagram supplemented hot flash descriptions. Women reported low levels of education (mean 6.7 years, s.d. 5.3), and 0 to 12 children (mean 3.8, s.d. 2.8). Almost 100% of the sample had access to health services or at least information about menopause; 76% lived with a husband. Forty-three percent were post-menopausal, including 3 with a history of hysterectomy, and mean recalled age at natural menopause was 47.1 (s.d. 3.9, n = 23). Forty-five percent had experienced hot flashes recently; an additional 22% had experienced hot flashes in the past. Women attributed hot flashes to the hot climate, going in and out of air conditioning, eating chiles, emotional stress, high blood pressure, "*nervios*," and physical exertion, as well as to the menopausal transition. In conclusion, studies of reported hot flashes may be eliciting responses beyond the heat dissipation attributed to hormonal change.

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## PODIUM D, THURSDAY 3:45 P.M.

The color of sickle cell anemia in Amazonia. AKLS Silva, HP Silva. Programa de Pós-Graduação em Antropologia, Universidade Federal do Pará, Belém, PA, Brazil.

Sickle cell anemia (*HB*SS*) has a high prevalence in African derived groups worldwide. It is estimated to affect about 1% of the population in Pará, Amazonia. Individuals affected face daily challenges ranging from access to health services to biossocial stigma related to their "color". This work investigated a group of 40 *HB*SS* randomly selected individuals attending the reference hemocenter of Pará. Of those, 35% autodeclared their color as 'dark brown', 27% 'brown', 15% 'white', 13% 'negro', 7% 'black' and 3% 'yellow'. This is different of the hemocenter's registry done by the attending clerks at the first visit of the patient, which shows 70% 'brown', 15% 'white', 2% 'black', and 13% 'missing information'. In order to improve the Social Determinants of Health it is fundamental to have adequate data about the country's population diversity and to engage government in a nationwide effort to identify race/ethnic disparities in health. Nevertheless, there is still resistance on the part of workers to discuss racism in the public health system. This is reflected in their struggle to ask patients about their color as recommended, leading to the vast majority being classified in the generic 'brown' group, and to the large number of 'missing' information. This study shows that data available in the health services records may not be reliable to the planning of public health policies in Amazonia.

## P16

Linking self-perception of stress experiences with blood pressure and salivary cortisol levels in undergraduate college students. ME Silva and KS Wiley. School of Anthropology, University of Arizona.

A large body of research suggests self-perception of stressful experiences is not always a good predictor of stress biomarkers. On this front anthropologists have an opportunity to disentangle the interactions between individual perceptions of stress and the stress response. To better understand these interactions we chose a sampling frame that allows individual participants to self-identify as high, medium, and low stress responders. We chose to conduct this research in an undergraduate student community for two reasons: 1) final exams serve as a similarly timed stressor, 2) given the perceived stress associated with student work loads, recruitment should be easier in an undergraduate community. With two data collection points, we recruited and sampled thirty-two students. Stress biomarker data include blood pressure and salivary cortisol, analyzed using Salimetrics high sensitivity salivary cortisol enzyme immunoassay kits. A short questionnaire was used to indicate an individuals' perception of the role of stress in their lives. Our interview data suggest an awareness of highly variable responses to stress. By comparing the interview data to stress biomarkers across self-designated categories of stress reactions we plan to link variation in perception, reactivity, and biomarkers to develop a more nuanced understanding of the stress response and its physiological outcomes.

## P17

Play? Chores? Work? Unanswered questions on the nature of children's domestic activities: A review of theories and evidence with a special focus on Guyana. EI Singh. Anthropology Department, Indiana University, Bloomington, IN.

In many societies, children are considered important producers of resources and services promoting their families' wellbeing. Children can earn income from economic work or free parents' time by assisting in domestic work including childcare. This review evaluates the research on children's work, highlighting areas that have not been adequately addressed. Much of this research relies on hypotheses (e.g., helpers-at-the-nest, wealth-flows) that focus on the effects of work on parents' reproductive success, rarely considering the costs and benefits for the child-worker. For example, studies of child-workers engaged in hazardous labor often assume, without justification, that work *for* families (both in and out of the home) does not negatively affect children. Children's domestic work is important not only because it is relatively unexplored but also because it is often a gendered activity. Ignoring children's involvement in domestic activities leads, in particular, to ignoring girls and the trade-offs between costs and benefits that they face. The few studies of children's domestic activities suggest it may be linked to decreased school attendance and potentially decreased weight-for-age (Amin et al., 2006; Brewis and Lee, 2010), but these and other sequelae of child work are not well understood, especially among girls. In Guyana, ~72% children engage in domestic work (Guyana MICS 2000) and a sexual division of labor is commonplace. Thus Guyana is an ideal site for gaining a better understanding of the nature of children's domestic activities and the influence of gender on the costs and benefits of children's work on themselves and their families.

## PODIUM C, THURSDAY, 1:30 P.M.

The Indigenous Siberian Health and Adaptation Project: Seasonal variation in metabolic rate among indigenous Siberians.

JJ Snodgrass[1], WR Leonard[2], LA Tarskaia[3,4], TM Klimova[5], VI Fedorova[5], ME Baltakhinova[5], SB Levy[2], VG Krivoshapkin[5]. [1]Department of Anthropology, University of Oregon; [2]Department of Anthropology, Northwestern University; [3]Department of Anthropology, University of Kansas; [4]Institute for Molecular Genetics, Russian Academy of Sciences; [5]FSRI Institute of Health, Republic of Sakha/Yakutia, Russia.

Studies of indigenous circumpolar groups have documented systematically elevated basal metabolic rates (BMRs) that appear to reflect physiological adaptation to chronic cold stress. Despite nearly a century of research, a number of key questions remain about metabolic adaptation among northern populations, including the extent to which BMR varies by season.The present study investigated BMR among the indigenous Yakut (Sakha) of northeastern Siberia in order to: 1) examine the extent of metabolic elevation in the Yakut relative to international norms; 2) compare winter and summer values; and 3) assess whether metabolic rates are significantly correlated with proxy measures of cold exposure such as subsistence participation. Results indicate that metabolic rates are significantly elevated in both summer (+5.2%; n = 203) and winter field seasons (+6.8%; n = 249) relative to predicted values based on fat-free mass; however, these values are lower than in previous field seasons (+~15% in 2003). Further, results indicate that, contrary to predictions, BMR values in the winter are modestly, but not significantly higher than in the summer months. For the 94 subjects on which we have metabolic measurements in both seasons, BMRs are 23 kcal/day higher in winter months (1403 vs. 1380 kcal/day), with elevations in BMR being 1.5% greater in winter (+5.1 vs. +3.6%). Among individuals, BMR measurements across the seasons are highly correlated ($r = 0.573$; $P < 0.001$) and we documented a positive association between winter BMR and days spent haycutting ($r = 0.231$; $P < 0.001$).

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## P59

Celiac Disease: Symptom Relief and the Gluten Free Diet.

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Incompletely digested seed storage proteins from wheat (e.g., gluten), rye and barley can lead to systemic pathological responses in vulnerable individuals. Individuals with malabsorption and gastrointestinal (GI) complaints are usually diagnosed with the autoimmune disorder, Celiac Disease (CD), but many symptoms overlap other conditions or are not detected. The only treatment is a gluten-free-diet (GFD). A sample of gluten-averse individuals mostly representing BGIG was queried regarding knowledge of gluten in foods, frequency of symptoms in the last month before diagnosis and after adopting a GFD. Expectations are that participants are more likely to follow a GFD and be more knowledgeable if they experience: 1) more severe symptoms prior to adopting the GFD and 2) significant relief from symptoms once on the diet. Most (5 M: 51 F; mean age 54.4 ± 15.5 years) were diagnosed as adults: 41 with CD and 15 with non-Celiac gluten sensitivity. All experienced statistically significant reductions in the frequencies for most symptoms post-GFD. There were no statistically significant differences in average: age, months to diagnosis and in frequencies of most symptoms between CD and non-CD participants (although ≤ in non-CD participants). Participants with CD showed significantly higher frequencies of anemia, chronic fatigue and depression prior to diet change; anemia and chronic fatigue post-GFD; and in the last month rumbling in the stomach, bloated stomach, low energy, and unexpected loss of appetite. As predicted, test scores for gluten knowledge were significantly higher for CD vs. non-CD participants ($t = 3.162$, $p = 0.003$, $df = 54$).

## P45

The Indigenous Siberian Health and Adaptation Project: Tissue hypoxia, adiponectin dysregulation, and hemoglobin levels among the Yakut (Sakha) of Siberia.

EA Streeter[1], EC Squires[1], WR Leonard[2], LA Tarskaia[3,4], TM Klimova[5], VI Fedorova[5], ME Baltakhinova[5], VG Krivoshapkin[5], JJ Snodgrass[1]. [1]Department of Anthropology, University of Oregon; [2]Department of Anthropology, Northwestern University; [3]Department of Anthropology, University of Kansas; [4]Institute for Molecular Genetics, Russian Academy of Sciences; [5]FSRI Institute of Health, Republic of Sakha/Yakutia, Russia.

Animal models suggest that tissue-level hypoxia may play an important role in promoting chronic inflammation and the development of obesity-related cardiovascular disease in humans. The present study addresses this issue by examining associations among body composition, adiponectin, and hemoglobin in an indigenous population from northeastern Siberia (the Yakut). The Yakut (Sakha) are currently experiencing increasing rates of obesity and chronic health problems associated with rapid dietary and lifestyle change in the post-Soviet period. Past research has demonstrated that increased hemoglobin is seen not only in hypoxia but also with insulin resistance and atherosclerosis. In contrast, the production of the adipocyte-derived hormone adiponectin is suppressed in an insulin-resistant state. Thus, we hypothesize that hemoglobin and adiponectin will be inversely related. Anthropometric and plasma biomarker data were collected from 252 healthy Yakut adults (≥18 years old; 135 females, 117 males). Yakut women had higher adiponectin than males (15.1 ± 9.7 vs. 11.6 ± 10.6 μg/ml; $P < 0.01$), whereas males had higher hemoglobin levels than females (14.4 ± 1.4 vs. 12.6 ± 1.5 g/dL; $P < 0.001$). In both Yakut men and women, greater body fatness and body mass index (BMI) were positively associated with hemoglobin levels and negatively associated with adiponectin levels. After

adjusting for age and BMI, adiponectin levels were negatively correlated with hemoglobin levels in men, but not in women. The present study provides additional support for the involvement of hypoxia-related dysregulation of adiponectin associated with obesity and cardiovascular disease.

Support: NSF ARC-0802390; Northwestern University; University of Oregon; FSRI Institute of Health.

## P60

Motivations and perceived barriers among Chicago gardeners: results from a preliminary study and future directions. SR Taylor. Department of Anthropology, Northwestern University, Chicago, IL.

The urban agriculture movement is growing in Chicago. Across the city, residents are installing gardens in their backyards, communities, and schools. Whether consciously or unconsciously, these individuals are participating in a broader movement that encourages others to eat fresh, natural foods; improve their neighborhoods; and create opportunities for healthier lifestyles among youth and adults—often in the presence of unequal access to quality food and health care. Meanwhile, social enterprises such as WeFarm America (WFA) are actively working to provide Chicago's underserved communities with access to healthful, sustainable produce. In this preliminary study, I worked closely with WFA to explore and document the views, concerns, and motivations of urban gardeners using anonymous surveys and in-person semi-structured interviews. The study included a diverse sample of adults from a variety of Chicago neighborhoods and gardening backgrounds. During the interview, when asked about their top reasons for gardening, almost all participants alluded to gardening as a stress-reducing activity, using words such as "meditative," "calming," or "Zen." Gardening may therefore be an empowering, holistic tool for increasing physical activity, improving nutrition, and reducing stress, especially in urban areas where access to quality food and health care is lacking. Biological evidence of the stress-reducing effects of gardening would strengthen this argument significantly and would lend itself to ongoing policy, advocacy, and outreach efforts. Given what we know about stress and disease, my next steps are to identify and then measure key biomarkers that can inform our understanding of the complex relationships between gardening and health.

## PODIUM A, THURSDAY, 8:30 A.M.

Intergenerational effects of maternal experience: Influence of SES on maternal and offspring stress physiology in New Zealand. ZM Thayer,[1] CW Kuzawa[1,2]. [1]Department of Anthropology, Northwestern University; [2]Cells 2 Society, Institute for Policy Research, Northwestern University.

Maternal hypothalamic pituitary adrenal-axis (HPA-axis) function regulates production of the stress hormone cortisol, which can pass across the placenta and have lasting impacts on fetal growth and development. This paper tests the hypothesis that maternal socioeconomic status (SES) will predict cortisol levels during pregnancy and offspring postnatal HPA reactivity among an ethnically diverse sample from Auckland, New Zealand. Saliva samples were collected at waking and prior to going to sleep on two consecutive weekdays in late pregnancy (34-36 weeks gestation). SES was quantified using the Individual NZ Deprivation Index score. Women with lower SES in this sample are less likely to own their own home, are more likely to live in crowded homes, have more anxiety about their pregnancies and have higher postpartum depression scores. We found that, after controlling for ethnicity and other covariates, women with lower SES had significantly higher evening but not morning cortisol (all $p < 0.04$), suggesting a pattern of chronic strain. Consistent with a model of intergenerational effects of maternal stress, infants of women with lower SES had an elevated cortisol response to a standardized vaccination at 6 weeks of age ($p = 0.05$). This study provides evidence that variation in SES influences maternal biology with lingering impacts on HPA-axis function in the next generation.

## PODIUM C, THURSDAY, 2:15 P.M.

Pathogenic and obesogenic pathways to inflammation in Chinese children and adults. AL Thompson,[1,2] S Du[2,3], B Zhang[4], J Li[5]. [1] Department of Anthropology, University of North Carolina at Chapel Hill; [2] Carolina Population Center, University of North Carolina at Chapel Hill; [3] Department of Nutrition, Gillings School of Global Public Health, University of North Carolina at Chapel Hill; [4] Institute of Nutrition and Foods Safety, Chinese Centers for Disease Control; [5] Department of Laboratory Medicine, China-Japan Friendship Hospital.

Exposure to changing social and physical environments has been implicated as an important force driving the increasing global prevalence of obesity and chronic disease. Influenced by both pathogen exposure and obesity, inflammation provides a critical biological pathway for understanding how changing environments can influence the development of cardiometabolic disease. However, relatively little is known about the complex pathways linking social and biological environments to the development of inflammation across the life course and less still is known about these pathways in populations undergoing changes in diet, disease burden, and urbanization. Using community-level measures of urbanicity and individual-level anthropometric, environmental, and illness data from 8795 participants in the China Health and Nutrition Study (CHNS), this study tests the impact of pathogenic and obesogenic exposures on inflammation in children and adults. Age-stratified multilevel logistic models controlling for clustering by household and community were used to test the effect of urbanicity level, pathogenic exposures, and anthropometrics on moderate (3-10 mg/dl) and acute (>10mg/dl) elevations in CRP. We found appreciable levels of inflammation at all ages. Sanitation, exposure to livestock, and illness history were significantly associated with moderate and acute inflammation. Higher urbanization, waist circumference, and BMI were associated with moderate inflammation. The pathogenic pathway was more pronounced in older adults while obesogenic risk factors were more salient for both children and younger adults. These results highlight the importance of understanding age-related vulnerability to changing social and

physical environments in shaping inflammation and cardiometabolic disease risk.

## P18

The human biology of 'justice': an experimental study in Papua New Guinea. DP Tracer. Department of Anthropology and Health & Behavioral Sciences, University of Colorado Denver.

Sociality in the human species implies the presence of remediative measures that are employed when norms are transgressed. These remediative actions, known collectively as 'justice,' have not previously been examined by human biologists. Several researchers have recently suggested that humans have a taste for 'altruistic punishment' – a willingness among individuals to exact retribution upon norm violators even at a cost to themselves – and that the threat of punishment acts to maintain cooperation in the species. Punishment, however, is only one form of 'justice' in which humans engage. Apart from punishing transgressors ("retributive justice"), humans may instead prefer to compensate victims ("restorative justice") or engage in a combination of the two, exacting a fine upon transgressors that is then used to compensate victims. An experiment was conducted among 138 subjects in Papua New Guinea in which individuals were given a choice among expending resources to punish transgressors, compensate victims, do both, or neither. Results show that subjects were willing to expend resources to punish and compensate with about equal frequency. They engage less frequently in the doubly-costly combined punishment-compensation option. Moreover, men have a propensity to punish transgressors whereas women have a propensity to compensate victims. It remains to be seen whether these sexually-dimorphic justice preferences are a result of culturally-inculcated sex roles in the society or manifestations of broader evolutionary propensities. The implications of these experimental results for models of human cooperation are discussed.

Support: The MacArthur Foundation (Network on Economic Environments and the Evolution of Individual Preferences and Social Norms).

## P61

Dietary patterns of rural children living in food insecure households in the Brazilian Amazon. MB Tranter[1], BA Piperata[2]. [1]College of Nursing, The Ohio State University, Columbus, OH; [2]Department of Anthropology, The Ohio State University, Columbus, OH.

Data on the dietary intakes and food consumption patterns of children ($n = 52$) were collected as part of a larger project aimed at understanding the effect of changes in household economic strategies and market integration on food security and nutritional status of rural Amazonian peasants. Interviews with female household heads revealed high levels of food insecurity with the majority of households classified as moderately or severely food insecure. Dietary data were collected over a three-day period using the weighed-inventory method. The children's diets were 70% carbohydrate, 12% protein and 18% fat. Children's average energy adequacy (76%) supports maternal perceptions of inadequate food. However, their average protein intakes exceeded their estimated needs (adequacy = 181%). We found no difference between girls and boys in energy ($t = 1.5$; $p = 0.15$) or protein adequacy ($t = 1.3$; $p = 0.19$). Controlling for household food availability, we found a significant negative relationship between age and both energy ($r = -0.49$; $p < 0.01$) and protein ($r = -0.48$; $p < 0.01$) adequacy meaning younger children had more adequate diets than older children. These quantitative data, along with qualitative data on the types of food children ate and their daily consumption patterns are used to address the high rates of stunting found in the population and discuss household strategies for coping with inadequate access to food. Finally, the observed inadequate energy intakes and frequent meal skipping impede children's abilities to take advantage of improved educational opportunities provided through by world's largest poverty alleviation program, Bolsa Família.

## P26

Physical Growth Status of Somali Children Born in the United States to First Generation Immigrants. D Tyree[1], D Crews[2]. [1]Department of Anthropology, Monroe Community College, Rochester, NY; [2]Department of Anthropology, The Ohio State University, Columbus, OH.

Assessing health of populations in transition from one environment to another provides insights into how humans adapt to biological and cultural stressors. Research on immigrant populations relocated to the U.S. (e.g. from Europe, Japan, Guatemala) demonstrates greater growth (i.e. health) due to improved living conditions. We examined this relationship in a population of Somalis who migrated to the U.S. following governmental collapse in 1991. We hypothesized that U.S.-born Somali children would experience significant increases in body size when compared to Somali-born children. An opportunistic sample of 358 U.S.-born Somali children (179 boys and 179 girls) between 6 and 78 months of age was examined. Anthropometrics (e.g. height, weight, BMI, skinfolds) and socio-demographic data were collected. Results show that U.S.-born Somalis are significantly ($p \leq 0.05$) taller and heavier than those born in Somalia. They are also taller and heavier than age-matched non-Somali children. Access to better dietary choices, clean drinking water, improved sanitation, and healthcare are likely contributing factors. Intergenerational influences and variation in genetic potentials may also explain these differences. This study supports previous research in demonstrating the ability of humans to adapt to changing environments.

This research was supported by the National Science Foundation and The Ohio State University Alumni Grants for Graduate Research and Scholarship.

## P62

Assessing the influence of dietary micronutrients on ethnic differences in diurnal blood pressure among women. HM van Berge-Landry, GD James. Decker

School of Nursing and Department of Anthropology, Binghamton University.

Many epidemiological studies have examined the impact of diet on high blood pressure in human populations. However, relatively few have actually examined the immediate impact of dietary micronutrient intake on daily blood pressure (BP) in healthy women. The purpose of this study was to assess the impact of dietary micronutrients as assessed from food journals on diurnal BP variation in healthy women of European (83), African (27) and Asian (11) descent. The women all worked in clerical, technical, or professional positions at a major medical center in NYC. Ambulatory BP and food diaries were collected over a 24-hour period. Micronutrients were calculated by a nutritionist from the food diaries. Proportional changes in BP were calculated from mean awake and sleep pressures. Ethnic groups were compared using ANCOVA models. The results show that proportional SBP and DBP changes were highest in EA women and lowest among AA women ($p < .05$). Of the micronutrients examined, total magnesium intake appeared to vary significantly with proportional changes in SBP (.045) but not in DBP and this effect was not related to the ethnic differences in proportional changes in BP. These findings suggest that the nutrients obtained from daily dietary intake can influence BP directly. However, in this study the findings do not explain persistent differences in diurnal BP variability in young, healthy women.

Supported by NIH grant HL37054.

## PODIUM D, THURSDAY, 3:30 P.M.

The Outer Limits: Genic and Intergenic Polymorphism Between Geographically Distinct Populations. A Van Horn[1], MF Keller[1,2], JZ Mao[3], RJ Kulathinal[3], LC Rockwell[1]. [1]Department of Anthropology, Temple University, Philadelphia PA; [2]Laboratory of Neurogenetics - NIH/NIA, Bethesda, MD; [3]Department of Biology, Temple University, Philadelphia PA.

Patterns of dispersal out of Africa largely account for modern human genetic diversity and structure, but accumulating data also suggest positive selection played a role in shaping genetic variation through parallel divergence and soft selective sweeps in response to novel environments. If selection is a strong shaper of diversity, populations should differ most in genic not intergenic regions. We used genome-wide single nucleotide polymorphism (SNP) data from the 1000 Genomes Project to estimate genetic diversity (Fst) for all known autosomal SNPs ($n = 3.5\times10^7$; GRCh37) across three populations (African n = 185, Asian n = 286, European n = 379). We then defined a "highly differentiated SNP" (HDS) within each population as one for which the average of both pairwise Fst comparisons was >0.85. We characterized genomic distribution of these loci and analyzed gene ontology for HDS-containing intragenic regions using DAVID. We found 182,886 HDSs in the African sample compared with only 10,651 in the Asian sample and 7,485 in the European sample. Given that 24% of the genome is intragenic, we were surprised to discover 46-50% of the HDSs are located intragenically in all populations (Af = 85002/182,886, As = 5250/10,651, Eu = 3745/7485). Intragenic HDSs were located within relatively few genes (Af = 6510, As = 735, Eu = 586), many containing large numbers of HDSs. Across populations, we found overrepresentation of HDS-containing genes related to inter-and-intracellular signaling and membrane transport. We suggest two possible explanations for this distribution of HDSs. Positive selection may affect some sites, while robust purifying selection on substantial portions of intergenic genomic regions may constrain variation to those areas where it is tolerated.

## PODIUM B, THURSDAY, 11:15 A.M.

Impact of activity levels, early life events and maternal factors on the nutritional status of Maya children in Yucatan. MI Varela-Silva[1], H Wilson[2], H Azcorra[1], P Griffiths[1], B Bogin[1], F Dickinson [3]. [1]Centre for Global Health and Human Development, Loughborough University, UK; [2]Department of Anthropology, Northwestern University, USA; [3]Centro de Investigación y de Estudios Avanzados, Unidad Mérida, Mexico.

Research focusing on daily energy expenditure in developing countries, estimated under free-living conditions, is a relatively new area. Some studies show that people in developing countries have higher levels of energy expenditure than people in developed countries. Other studies show that the behavioural transition (i.e. from active to sedentary lifestyles) has occurred and people are, overall, very inactive. Reduced physical activity may, in turn, exacerbate the pernicious effects of the nutritional transition contributing to the increase of the obesity pandemic. There is also evidence showing that early life events and maternal factors contribute to the pandemic although the relative contribution of each factor is difficult to determine. The purpose of our study is to assess the impact of activity levels, early life events and intergenerational factors on the nutritional status of 54 Maya children (n = 28 boys, 7.0-9.9 years old) and their mothers living in Merida, Mexico. We collected data on anthropometry, body composition, early life events and maternal factors. Data on physical activity levels (PAL) and hours/day spent in moderate-to-vigorous physical activity (MVPA) were collected by Actiheart in a subsample of 33 children (n = 17 boys). The results show that these Maya children have high prevalence of overweight/obesity. However, their physical activity levels are above the WHO global recommendations for health. Neither PAL nor hours spent in MVPA predict overweight/obesity. No early life event predicts current children's nutritional status. Mother's high waist circumference increases the odds of children's overweight-obesity status, suggesting maternal intergenerational effects acting during prenatal or early post-natal life.

Support: Wenner-Gren Foundation for Anthropological Research, and Santander Travel Awards.

## P19

Does social status insulate against ill health in an egalitarian, small-scale society? C von Rueden[1], M Gurven[1], H Kaplan[2]. [1]Department of Anthropology, University of California, Santa Barbara; [2]Department of Anthropology, University of New Mexico.

Within developed countries, humans experience greater morbidity from cardiovascular, infectious, and other diseases the lower their socio-economic status. This status-health gradient is as much the product of material inequalities as the psychosocial stress that accompanies feeling poor, subordinate, or powerless relative to other members of one's neighborhood, office, or society-at-large. In developing countries, it is sometimes the richest who are most susceptible to cardiovascular disease, due to reduced energetic expenditure and the psychosocial stress of exposure to Western lifestyles they cannot emulate. However, we know little about the effects of social status on disease in small-scale societies, whose egalitarianism and relative lack of material wealth may preclude a status-health gradient. We compare multiple indicators of social status and of health, measured repeatedly over a seven-year period, among adult men (n = 198) of the Tsimane forager-horticulturalists of lowland Bolivia. Our analysis employs generalized estimating equations that control for subject and community effects, age, height, and weight. Irrespective of the status measure (influence during community meetings, number of allies, number of food-sharing partners, income), high status Tsimane men are neither more nor less susceptible to psychosocial stress as assessed by systolic blood pressure, urinary cortisol, or responses to a depression questionnaire. Status does not predict parasitic infection, lymphocyte counts, or number of physical ailments, but blood sedimentation rate and hemoglobin count produce moderate negative and positive relationships, respectively, with several of the status measures. Overall, men's social status is not a strong determinant of their health among the Tsimane.

Support: National Science Foundation and National Institutes of Health.

## P46

Energy expenditure and physical activity levels in employees of an organic farm in central Pennsylvania. KJ Weinstein, Department of Anthropology, Dickinson College, Carlisle, PA.

Consumer participation in the local food movement is growing. While the positive effects of consuming locally grown foods are well known, the heavy physical labor required of organic farm employees has received little attention. This study measures total daily energy expenditure (TDEE) and physical activity levels (PAL) in employees of the Dickinson College Organic Farm, which grows vegetables for a local CSA, college dining facilities, farmer's market, and local food bank. Work on this farm relies on non-mechanized labor by individuals committed to building a vibrant local food community. I measured TDEE and PAL for four consecutive days in 10 farm employees from June through August, 2012 using 24-hour activity logs and the Actiheart device calibrated for individual oxygen consumption. I conducted semi-structured interviews to understand how employees rank the intensity of their work. Participants ranged from 18 to 41 years-of-age. Mean BMI was 21.8 ± 1.48; mean TDEE was 3,237.40 ± 598.15 kcal/day; and mean PAL was 2.17 ± 0.35/day. The most taxing work involved weeding and harvesting crops using repetitive motions in uncomfortable postures, lifting heavy loads, and working in excessively hot weather. Many participants engaged in daily exercise in addition to farm work. Their high TDEEs and PALs, however, are based predominantly on farming tasks, which rank as vigorous based on FAO/UNU/WHO (2004) categories and exceed PALs of many farmers working in impoverished conditions. Unlike most farmers worldwide, employees at this organic farm earn a decent wage or salary regardless of the profitability of their crops.

This work was supported by funding from the Dickinson College Research & Development Committee.

## PODIUM C, THURSDAY, 2:45 P.M.

Patterns of pulmonary pathology related to modernization in Vanuatu. CA Weitz[1], CW Chan[2,3,4], KN Dancause[6], G Lee[4], KM Olszowy[2,4], A Pomer[2,3,4], H Silverman[3,4], C Sun[3,4], L Tarivonda[7], G Taleo[7], M Abong[8], R Regenvanu[9], A Kaneko[10,11,12], JK Lum[3,4,5], RM Garruto[2,4,5]. [1]Department of Anthropology, Temple University; [2]Laboratory of Biomedical Anthropology and Neurosciences, Binghamton University; [3]Laboratory of Evolutionary Anthropology and Health, Binghamton University; [4]Department of Anthropology, Binghamton University; [5]Department of Biological Sciences, Binghamton University; [6]Psychosocial Research Division, Douglas Hospital Research Center, McGill University; [7]Ministry of Health, Republic of Vanuatu; [8]Kaljoral Senta, Republic of Vanuatu; [9]Land and Justice Party, Republic of Vanuatu; [10]Island Malaria Group, Department of Microbiology, Karolinska Institutet; [11]Department of Parasitology, Osaka City University Graduate School of Medicine; [12]Institute of Tropical Medicine, Nagasaki University.

In 2011, lung function tests were performed in Vanuatu, as part of a study of the health of populations undergoing rapid modernization. $FEV_1$, FVC, $FEV_1$/FVC ratios and $FEF_{25-75}$ values of 1236 inhabitants of 5 islands were compared to NHANES III standards to determine the prevalence of restrictions and obstructions, relative to the degree of modernization. Children and teenagers on more modernized islands show frequencies of pulmonary restrictions that are as low as those observed among Americans. On less modernized islands, the percent of children and teenagers showing restrictions is relatively high – up to twice the rate observed among Americans of the same ages. Adults show a much higher percentage of pulmonary restrictions than children; and on less modernized islands, the percent of adult men showing evidence of pulmonary restriction is higher than adult women. The generally higher frequency of pulmonary restrictions among adults compared to children indicates that one potential cause is some experience that produces progressive lung damage. In Vanuatu, this is likely to include inhaling smoke from bush fires and cook fires, or from smoking cigarettes rolled in newspapers, copybook paper or plant leaves. The pollutants in such smoke are well known to be major contributors to pulmonary restrictions. The gender difference in restrictions might then be associated with different patterns of pollutant inhalation. In addition, less modernized islands are characterized by low birthweights and childhood growth stunting, opening the

possibility that early-life environmental stress may lead to lower FVC values, as has been noted in other studies.

## P20

Do active parents have active kids? The influence of parents on physical activity levels among elementary school children in rural Colorado. HS Williams[1], DL Dufour[1], JM Marshall[2]. [1]Department of Anthropology, University of Colorado, Boulder; [2]Department of Epidemiology, Colorado School of Public Health, University of Colorado, Denver.

In the past fifteen years there has been interest in understanding the factors which influence children's physical activity levels. One of these factors is assumed to be the influence of their parent's physical activity related behaviors (e.g. physical activity levels, support and views). Here, we present accelerometer data collected from 29 children (7-11 years of age) and their parents participating in a randomized controlled intervention study among families living in a rural, low income community in southern Colorado. Physical activity was monitored for 7 consecutive days using an Actigraph-7164 accelerometer set to record activity counts at 1-minute intervals. Children and parents wore the accelerometers on the same days. Activity levels were assessed using activity level cut points previously established for adults and children and counts per minute (CPM). Both parents and children spent the largest percentage of their days at sedentary activity levels (98 % and 76.5%, respectively), but on average children accumulated more counts per minute than their parents (620 ± 217 CPM and 319 ± 114 CPM, respectively). There was no correlation between parent and child activity levels ($r^2 = 0.008, p\ 0.63$), or accumulated CPM ($r^2 = 0.02, p = .457$). However, we did observe parents facilitating physical activity among their children by volunteering at sports events, coaching or taking their children to gymnastics lessons and playgrounds, suggesting that parental encouragement and support may play an important role in increasing physical activity levels in children.

This research was supported by funding through the National Institutes of Health, NIH/NIDDK # DK064997.

## P63

School food in West Belfast: A study of the reaches and limits of improved school food environments amidst economic deprivation. JL Williams. Department of Anthropology, University of Kentucky.

In this paper, I will examine the role of a school food environment in shaping adolescent nutrition practices in a low-income community in Belfast, Northern Ireland. As a whole, great strides have been made in the United Kingdom's public schools over the past decade to improve nutrition amidst fears of climbing rates of chronic ailments such as coronary heart disease. However, recent research has shown that schools in low-income communities in the UK have a more difficult time instituting nutritional standards due to budgetary constraints; and, in addition to these struggles, there are other factors inhibiting the role of school food environments in West Belfast. In this paper, I show that school is a primary source of nutrition information but it is not a major influence shaping diet and exercise practices or nutritional status outcomes in the community. Although teachers are regarded as a primary source of nutritional information in a questionnaire filled out by secondary school students, teens place family, friends, and media outlets ahead of teachers when listing the most prominent influences on their diet and exercise behaviors. In this paper, I will make connections between school as a sociocultural influence on nutritional practices and outcomes in a sample of secondary school students. My objective is to demonstrate that improving school food environments is a positive endeavor and yet it is not a complete solution to existing concerns about the nutritional practices and outcomes of young people.

This study was funded by an NSF doctoral dissertation improvement grant.

## P47

The Indigenous Siberian Health and Adaptation Project: Physical activity and markers of cardiovascular health in the Yakut (Sakha). HJ Wilson[1], WR Leonard[1], TJ Cepon-Robins[2], LA Tarskaia[3,4], TM Klimova[5], VI Fedorova[5], ME Baltakhinova[5], VG Krivoshapkin[5], JJ Snodgrass[2]. [1]Department of Anthropology, Northwestern University; [2]Department of Anthropology, University of Oregon; [3]Department of Anthropology, University of Kansas; [4]Institute for Molecular Genetics, Russian Academy of Sciences, Russia; [5]Research Institute of Health, MK Ammasov North-Eastern Federal University, Yakutsk, Russia.

Physical activity has been linked to improved health among Western populations; however, little is known about the relationship among indigenous populations who combine traditional subsistence activities with more sedentary/market lifestyles. This study examines the relationship between physical activity and selected biomarkers of cardiovascular health in a sample of 75 Yakut adults (41 men) who have been undergoing the transition to a wage/market economy since the fall of the Soviet Union. Physical activity was objectively estimated using indirect calorimetry to predict activity energy expenditure (AEE: kcal/d) and accelerometry. Women had significantly lower AEE but not lower accelerometry counts than men. Multiple linear regressions were performed on men and women separately with biomarkers as the dependent variables and physical activity measures, age and percent body fat as the independent variables. Neither measure of physical activity predicted any of the biomarkers in women. In men, AEE was positively associated with high density lipoproteins (HDL) and inversely related to Epstein-Barr virus (EBV) antibodies. Accelerometry counts were negatively associated with C-reactive protein (CRP) and EBV and positively associated with total, HDL and low density lipoproteins (LDL) cholesterol. In men, physical activity appears to reduce the risk for negative health outcomes, predicting lower immune activity and higher levels of the "good" cholesterol and is linked with lower inflammation, though also predicting higher levels of all plasma cholesterols. Overall, physical activity appears to predict improved health in these Yakut men

but not for the women, though the reasons behind this sex difference have yet to be investigated.

Support: NSF ARC-0802390; Northwestern University; University of Oregon; FSRI Institute of Health.

## PODIUM B, WEDNESDAY, 10:15 A.M.

The Predictive Adaptive Response model fails to explain fasting-induced changes in calorie requirements. M Workman. Department of Anthropology, University of New Mexico, Albuquerque, NM.

To date, little empirical evidence is available to either support or refute the Predictive Adaptive Response (PAR) model forwarded by Gluckman and Hanson. This model ascribes adaptive significance to the adult phenotypes associated with small birth size, proposing that they confer energetic savings within energy-sparse adult environments. One avenue to energetic savings that would suggest a 'predictive adaptive phenotype' is improved sensitivity of metabolic demands to bouts of acute negative energy balance. To test this hypothesis, within-subject energy consumption rates were compared before and after a 29-hr fast. The PAR model predicts that adults born small should enjoy relative energetic savings during this bout of negative energy balance. Indirect calorimetry was used to quantify the declines in resting energy expenditure (REE) and gross mechanical efficiency (assessed during sub-maximal cycling) known to occur during fasting. Multiple regression analysis linked birth weight to pre- and post-fast values while controlling for appropriate confounders (e.g., sex, age). Those born small did not enjoy relatively greater fasting-induced reductions in REE or relatively preserved mechanical efficiency. Just the opposite, for each 1kg deficit in birth weight subjects were nearly 2% less efficient ($p = 0.034$)—suggesting that individuals born small can perform only a proportion of the physical work that heavier-born peers can support on an equivalent energy budget. These results directly contradict the PAR hypothesis considered in this study. Adults born small did not enjoy enhanced energetic savings either before or in response to fasting.

## P48

Maternal health status does not predict infant outcomes in township neighborhoods of Cape Town, South Africa: Does absence of correlation reflect presence of life history trade-offs? CM Worthman[1], I Le Roux[2], N Ciya[3], ML Tomlinson[3], MJ Rotheram-Borus[4]. [1]Dept Anthropology, Emory University, Atlanta, GA, USA; [2]Philani Nutrition and Development Project, Cape Town, South Africa; [3]Dept Psychology, Stellenbosch University, Stellenbosch, South Africa; [4]Psychiatry and Behavioral Sciences, UCLA, Los Angeles, CA, USA.

Global health policy and practice target maternal condition for improving child outcomes. By contrast, adaptationist life history analyses of life course and intergenerational trade-offs suggest the need for long-term structural rather than short-term targeted interventions and predict that the latter will be relatively ineffective. To test this prediction, we assessed the relationship of maternal physical status with infant outcomes among participants in a randomized control trial for a community-based intervention to improve maternal-child outcomes in a disadvantaged population with high health burden (30.4 % $HIV^+$). Mothers ($n = 564$) were enrolled during pregnancy and assessed, with their infants, at six months postpartum. Multisystemic maternal measures included blood pressure, glycosylated hemoglobin, serum lipids, C-reactive protein, EBV antibodies, peak expiratory flow, hemoglobin, and body mass index. $HIV^-$ mothers ($n = 392$) had high rates of low HDL cholesterol (60.5%), elevated CRP (25.4%), elevated EBV antibodies (32.6%), low peak air flow (53.8%), anemia (22.4%), and obesity (40.6%). Despite such chronic health risks (mean summed allostatic load = 2), infant outcomes (low birth weight 11.0%; mean 6-month WHO Z-scores for length-for-age 1.7, weight-for-length 1.5, head circumference 1.6) were largely unrelated to maternal health biomarkers, both individually and collectively as an index of allostatic load. Remarkably, results did not differ by maternal serostatus or experimental group. Findings suggest apparent reproductive resilience from trade-offs favoring infant outcomes against accumulating maternal health costs of childbearing. They furthermore support the potential value of life history analysis for building sustainable, effective health intervention and policy.

Research support: NIAAA 1RO1AA017104; Emory Global Health Institute.

# Presenting Author/Session Index

# Proceedings of the Human Biology Association 37th Annual Meeting
# Hilton Portland, Portland, Oregon

## MINUTES OF THE ANNUAL BUSINESS MEETING
## 12 APRIL 2012

The 37th Annual Business Meeting of the Human Biology Association was called to order by President William Leonard at 5:10 pm in the Hilton Portland, Galleria South. Around 35 people were in attendance. President Leonard welcomed all attendees and announced that the new edition of the Human Biology textbook was now available. The floor was opened for corrections to or questions about the minutes from the 2011 business meeting. There being none, Stephen McGarvey moved to accept the 2011 minutes. The motion was seconded and the minutes were unanimously approved.

### *Secretary-Treasurer's Report*

Andrea Wiley gave the Secretary-Treasurer's report. The Association is in good financial shape with a current balance of approximately $68,000 that has been maintained over the past year. The 2011 meetings in Minneapolis had been relatively expensive, but royalties were up and there had been a $10,000 surplus in 2010. Major sources of income are, as always, memberships (down a bit from year before) and meeting registrations (up a bit). We've renewed a 5-year contract with Allen Press for our membership services.

Gary James moved to accept the budget report; the motion was seconded and the report was unanimously accepted.

### *Report of the Editor-in-Chief of the American Journal of Human Biology*

Bill Leonard gave the *AJHB* report in Editor-in-Chief Peter Ellison's absence. *AJHB* continues to thrive. The journal's ranking is good (#2 of 104 anthropology journals, according to Scimago/Scopus) and impact factor has been high and steady. A new "methods section" (to be published 3 times per year) is about to be inaugurated with Thomas McDade as its editor. Thom noted that 3 methods articles are already in the pipeline, and that the section is intended to be a collective resource, so if there's a topic that members would like to see, please contact him.

Bill added that Peter's term as Editor-in-Chief ends at the end of 2013, so there will be a call for nominations for a new Editor-in-Chief.

Gary James moved to accept the *AJHB* Editor's report; the motion was seconded and the report was unanimously accepted.

### *Reports From Standing Committees*
### *Report of the Nominations and Elections Committee*

Betsy Abrams gave the Nominations and Elections Committee's report. Following submission of a nomination packet to the N&E Committee and subsequent deliberations by the HBA Executive Committee (EC), the Franz Boas Distinguished Achievement Award was presented to Albert Theodore ("Ted") Steegmann, Jr. at the Awards Luncheon on Thursday, April 12.

As per revised guidelines for nominations developed by the EC at the 2011 meetings, the N&E Committee selected only two nominees for each position on the ballot. Candidates for the 2012 elections were requested to provide a platform statement and information on their research. Ballots were emailed to 141 HBA Fellows and Emeriti members, of whom 90 voted in the election. The ballots had been sent out 3 times before the election closed. The election winners, with terms beginning on April 13, 2012, are Ellen Demerath for the Public Relations position on the Executive Committee, and Crystal Patil and Amanda Thompson for 2 positions on the Nominations and Elections Committee.

Next year's ballot will include President-elect, the international Relations position on the EC, 2 positions on the Publications Committee, and 2 positions on the N&E Committee. Betsy thanked the N&E Committee members Peter Gray, Steve McGarvey and Susan Tanner for their work.

Gary James moved to accept the report; the motion was seconded and the report was unanimously accepted.

### *Report of the Publications Committee*

Linda Gerber gave the Publications Committee's report. This year the E.E. Hunt Student prizes were awarded to Lauren Houghton and Benjamin Trumble, with an honorable mention to Genevieve Ritchie-Ewing (Awards Luncheon is described below). There were 17 posters and 6 podium papers (somewhat fewer than in 2011). Eligibility and judging followed the criteria and guidelines posted on the website last year for the 2011 meetings. Linda encouraged students to submit and especially encouraged undergraduates (for whom, perhaps, we should consider a separate prize). Linda thanked the committee members, and Ellen Demerath and Barry Bogin for their help with judging.

Wiley has proposed a new book partnership with HBA that would involve 3-4 books/year, 2% royalty, and some vagueness regarding format (hardcover/softcover/electronic). There was not a lot of support for it at the Executive Committee meeting because of concern about the fact that the new Human Biology textbook did *NOT* come out in paperback. This less expensive format had initially been promised. It is still unclear where miscommunication occurred, but this is a disappointment to many and this colored the EC's perception of the new proposal. Deb Crooks noted that the Publications Committee could not take on this new task—this proposed project would need someone who is willing to do the work of a series editor. But if someone were passionate about being the series editor, she/he should contact Linda.

Gary James moved to accept the report; the motion was seconded and the report was unanimously accepted.

### *Report of the Student Committee*

Lindsey Mattern gave the Student Committee's report. Student memberships at the end of March stood at 32 (compared to 49 last year and 36 the year before at this time), but typically surge after renewal or joining at the meetings. There's a new student Facebook page to get students connected. She thanked everyone for participation in the student reception and support for the reception. Bill Leonard thanked the Student Committee for organizing such a successful event, which is open to all students and invitees.

Gary James moved to accept the report; the motion was seconded and the report was unanimously accepted.

### *Report from the Representative for the American Association for the Advancement of Science*

Cynthia Beall gave the AAAS report. The 2012 AAAS meetings were held in Vancouver, Canada. Section H (Anthropology) sponsored 12 sessions. A number of sessions included human biologists. The meetings are well attended, so it's a good way to meet a lot of other folks who are interested in your topic, and there are more than 1000 science journalists there, so it's a good opportunity for public outreach and publicity. Next year in Boston, the theme is "Beauty and Benefits of Science." Proposals are due in 2 weeks – there is time! It's easy to propose a AAAS symposium—go to the AAAS website. A 3-person symposium is 90 min; 4-6 is 180 min. The Executive Committee of Section H can help you.

Mike Little suggested contacting Bob Sussman (secretary of Section H) when submitting a symposium proposal. Cynthia confirmed suggestion, noting that Section H does have limited funds and could give people a few hundred dollars toward participation.

Bill Leonard echoed Cynthia's encouragement to attend AAAS – get broader impact/outreach –sessions have large audiences and we (the HBA) can get more publicity. Next year the EC could discuss sponsoring and/or supporting a AAAS symposium.

Gary James moved to accept the report; the motion was seconded and the report was unanimously accepted.

### *Executive Committee Reports*
### *Program Committee*

Christie Rockwell gave the Program Committee's report. There were 92 presentations this year, a 13% decrease from last year. There were 63 poster and 22 podium presentations, 6 Plenary speakers, and the Pearl Memorial Speaker. Students were first authors on 44% of the presentations; Christie encouraged students to participate, and urged Fellows to encourage their students.

There is a strong interest in participating in "real life" (applied human biology) sessions: 35 submitters self-identified as fitting this category, but often Program Committee members' assessment of an abstract did not correspond with that of the author. There appears to be some language ambiguity on meaning of these terms, and the Program Committee would like feedback on defining "applied human biology."

Abstract submission went smoothly. The upcoming deadline for submitting proposals for Plenary and Pearl at the 2013 meeting is July 15, 2012, which corresponds to the deadline for joint HBA/AAPA session. Please consider putting together a proposal for the Plenary session and also the break-out session. Last year there was a successful break out session on epigenetics, but this year there were no proposals – members should think about possibilities and are welcome to offer new ideas. Christie thanked the Program Committee members (Betsy Abrams, Heather Norton, Amanda Thompson, and Virginia Vitzthum), the Local Arrangements Committee, and everyone who participated.

Mike Little asked if we should solicit particular topics for the Plenary rather than waiting for someone to submit – to generate excitement about it to increase submissions. Christie replied, "Happy to follow up on that suggestion."

Bill offered Christie and her committee a round of applause – a great meeting this year!

Gary James moved to accept the report; the motion was seconded and the report was unanimously accepted.

### *Membership*

Ivy Pike gave the report on membership. During 2011, membership held steady (265) compared to 2010 (272). As of the meetings, 2012 membership is down to 166, but this typically rises with the meetings' registration. The EC approved Fellow status for Geraldine Moreno-Black and Laura Hauff.

Gary James moved to accept the report; the motion was seconded and the report unanimously accepted.

### *Public Relations*

Thomas McDade gave the report on public relations, noting that he is pleased to hand over the responsibilities of PR to Ellen Demerath, in her new capacity as member of the EC. The HBA website provides an effective mechanism for communication about relevant topics. There's a new page on graduate training programs – an excel file lists all of the programs that members contributed as part of the member survey last year including topics on which they offer training. Programs were not vetted, but website links were tested. Perhaps a more interactive searchable database could be developed. There is now better security for the website (last year it was hacked by professionals and required a complete rebuild by Chris Barrett, but this problem has not reoccurred since). Thom issued a media advisory about the current meetings, especially the plenary and other sessions. Josh Snodgrass (Local Arrangements Committee) helped with local media outlets. It's important for us to get the word out. Ann Gibbons from *Science* attends the AAPA each year, but she is seeing some of our sessions as well.

Gary James moved to accept the report; the motion was seconded and the report unanimously accepted.

### *International Member Relations*

Bill Leonard gave the report on international relations. We have 31 international members as of the beginning of April 2012. This year there were 4 applicants for international travel award and 2 were given the award. The EC has discussed how to encourage more applicants and the intention of the award. The increase in award amount this year ($1000), compared to last ($500), did not generate more applicants. The EC decided to more actively publi-

cize the award rather than fine tuning the eligibility for next year.

Cynthia Beall suggested direct mailings to other international societies. In response to a question, Andrea Wiley noted that HBA sends email regarding the award directly to international HBA members.

Gary James moved to accept the report; the motion was seconded and the report unanimously accepted.

### *Old Business*

There was no old business for discussion at this meeting.

### *New Business*

(1) New Editor-in-Chief for *AJHB*: Bill Leonard explained that the EC will put out a call for nominations and will make an announcement about the new editor at next year's meeting.

(2) Retaining junior faculty and recent PhDs as HBA members: At last year's (2011) EC and business meetings, we had discussed the loss of members who had been HBA student members but had not continued as members after receiving their doctorate. Last year's EC had considered possible ways to address this issue including mentoring and an early career award. At this year's meeting, the EC decided to pursue two initiatives.

(2.1) Mentoring: At next year's meeting there will be a breakout session on mentoring – junior members can talk with fellows about relevant professional issues (e.g. tenure process, etc). Deb Crooks emphasized that we'll reach out to colleagues who are currently in and/or seeking non-academic jobs. Will send out a call for next year – we'll experiment with this break out session to see if that process will work or if we'll need a one-on-one mentoring process.

Marquisa LaVelle noted a recent article in *American Scientist* about the major negative effects of having children on women in academia –impacts productivity, jobs, etc; high drop out rate. How will we address this? Deb agreed that this issue is very important, and that we'll consider this, and we'll work at incorporating the kinds of mentoring that work at different kinds of institutions.

(2.2) A young scholar award: Intended to acknowledge and encourage junior members in the organization. The EC has discussed the nature of the award. The consensus was that we didn't want to create another paper or poster prize. We decided to create a junior scholar equivalent of the Boas Distinguished Achievement Award. During the coming fall, nominations would be solicited for honoring an up-and-coming scholar. Nominations would require two HBA Fellows to make the nomination, and the EC will present the award at the Awards Luncheon. Details of monetary amount and preparing the call and such are still to be worked out. There was, nonetheless, unanimous agreement in the EC that, in light of all of his contributions to the Association, the award would be named after Michael A. Little.

Mike Little graciously thanked the association for this significant honor.

Steve McGarvey noted that it was a "great idea" and suggested that the monetary gift should be put toward attending the next meeting!

There were no other responses to Bill's question of whether there were other issues that people would like to raise.

Ted Steegmann extended appreciation to Bill for his service to the organization, to which Bill replied, "It's been my distinct honor and pleasure."

Bill thanked Andrea Wiley for her 4 years of service as Secretary-Treasurer, welcomed Virginia Vitzthum as her successor, and introduced incoming President, Deb Crooks.

Deb replied, "Thanks again to Bill and Andrea and all of you! I will entertain a motion to adjourn."

Gary James moved to adjourn; unanimously agreed.

The 2012 HBA Business Meeting was adjourned at 6:03 pm.

## PLENARY SESSION AND RAYMOND PEARL MEMORIAL LECTURE

The 2012 Human Biology Association Plenary Session, "A Half-Century of High Altitude Studies in Anthropology" was held on Wednesday afternoon, April 11, 2012. The session was organized to commemorate the 50$^{th}$ anniversary of Andean studies initiated by Paul T. Baker in 1962. Papers dealt both with the history of high altitude research and the current status of the human biology of high altitude populations. The session was organized by Michael A. Little and Ralph M. Garruto (Department of Anthropology, Binghamton University of SUNY). A brief introduction by Little, R. Brook Thomas, and Garruto provided background to the session.

A. Roberto Frisancho (University of Michigan), a native of Cusco, Peru, and who had been associated with Paul Baker's Andean project from the outset, summarized his and others' research on physiological and morphological development in residents and non-residents at high altitude. His talk, entitled "Developmental and evolutionary components of human adaptation to high altitude environments," began with a detailed outline of oxygen transport and lung function at altitude, and then reviewed developmental changes in high altitude residents and in low-altitude migrants to altitude. Following this, he focused on child growth, lung and chest morphology, and other aspects of development at high altitude. In the next paper, Charles A. Weitz (Temple University) presented original research on Tibetan residents and Han Chinese migrants to the Tibetan Plateau in the paper, "Migrant studies at high altitude." Similarities between the Han and Tibetans were attributed to the fact that the Han were born and reared at high altitude, which is consistent with a developmental adaptation model. Next, Virginia J. Vitzthum's (Indiana University, Bloomington) paper on "Fifty fertile years: anthropologists' studies of reproduction in high altitude natives" discussed models used by anthropologists to understand fertility and reproduction at high altitude. Drawing on some of her own research on the Bolivia *altitplano*, she used the "proximate determinants of natural fertility" framework to evaluate whether altitude residence has an effect on fertility. She found that high altitude hypoxia has minimal or no effect on fertility among permanent residents, and suggests that the "...human reproductive system evolved to be flexible and responsive to the conditions in which the individual was born and matured."

Fig. 1. HBA President Bill Leonard presenting the Raymond Pearl Memorial Award to Cynthia Beall.

Following a brief coffee break, the next three papers addressed problems of candidate genes for adaptation to and natural selection at high altitude. Megan Wilson (University of Colorado, Denver) discussed "High altitude, natural selection, and pregnancy." She and her colleagues found several alleles more frequently found in Andeans that were positively associated with birth weight, and, hence, also associated with reproductive success and fitness. Next was Abigail W. Bigham's (University of Michigan) paper on "Natural selection at high altitude: Andean and Tibetan patterns of adaptation to an extreme environment." One important commonality in Andean and Himalayan populations is in the hypoxia-inducible transcription factor (HIF) pathway and the gene *EGLN1*. Bigham and her co-workers suggest that the *EGLN1* gene, which influences molecular oxygen sensing, shows genetic variation between the Tibetan and Andean populations and ". . .may have adapted to high altitude hypoxia via distinct modifications of the same gene, *EGLN1*." The final contribution before the Pearl Lecture was Thomas D. Brutsaert's (Syracuse University) paper on "Origins of high arterial hemoglobin-oxygen saturation ($SaO_2$) during exercise in Andean high altitude natives." He and his colleagues identified several genomic regions in Andeans that showed evidence of natural selection by use of a dense panel of single nucleotide polymorphism (SNP) genetic markers. Several of these SNP markers were associated with exercise $SaO_2$ in the Quechua sample, but not in the Aymara sample.

The Pearl Memorial Lecture was given by Cynthia M. Beall (Case Western Reserve University) on "Fifty years of research on high altitude adaptation in anthropology: instrumentation advances, research designs and selected discoveries." In her talk, she outlined some of the history of high altitude studies in anthropology and the early research designs employed by Paul Baker as a framework for discussion of research up to the present. She compared biochemical, physiological, and genetic differences among the three main populations that she studied (Ethiopian Amhara, Andean Quechua and Aymara, and Himalayan Tibetans), and identified several candidate genes linked to high altitude adaptation. She then accepted, with her thanks, the Pearl Memorial Speaker Award from President William Leonard.

## AWARDS LUNCHEON

The Annual Awards Luncheon was held on Thursday, April 12, 2012. Linda Gerber announced the two Edward E. Hunt award winners for 2012: Lauren Houghton ("The timing of adrenarche among Bangladeshi and British youth"), and Benjamin Trumble ("Acute changes in male salivary testosterone in response to intense physical activity among Tsimane forager horticulturalists"), with an honorable mention to Genevieve Ritchie-Ewing ("Household food consumption of Ribeirinhos, eastern Amazon, Brazil").

The 2012 Franz Boas Distinguished Achievement Award was presented to Albert Theodore ("Ted") Steegmann, Jr. Dr. Steegmann was introduced by Deb Crooks with these remarks:

In the announcement to the HBA membership of Ted Steegmann as the winner of the 2012 Boas Award, Bill Leonard wrote:

*Ted is widely regarded as one of the world's leading researchers on the biology of cold adaptation among*

Fig. 2. Linda Gerber, Chair of the Publications Committee, and winners of the 2012 E.E. Hunt Student Awards: Benjamin Trumble, Lauren Houghton, and Genevieve Ritchie-Ewing.

*contemporary and prehistoric human populations. His influential work over the last 40 years has transformed our understanding of how humans adapt to extreme environmental stressors.*

As Bill pointed out, Ted is not only a researcher on cold adaptation, but his work spans a range of topics, for example, human biology in the American colonies, the health and illness of the children of Love Canal, stature in a 19th C poorhouse population in upstate New York, physical growth and cognitive development of children in the Philippines, the productivity of Chinese cycle haulers in Beijing, and the work capacity of rice farmers in Ifugao.

This range of topics begs the question, "Why does Ted move so seamlessly among research topics and research places?" I think over the years, I've come to some partial insight on this. The first has to do with his broad and far-reaching vision. Once when we were discussing Kansas, where Ted grew up, I made some remark about Kansas being so very flat. "Ah yes," Ted said, "but you can see forever!" My sense is that his wide and far-reaching vision was formed early on in childhood and is not wholly independent of place.

The second insight is that Ted takes absolute delight in learning what it is that people do. As a consequence, one is just as likely to find him trying to get a handle on human biology by mapping contaminants across the Love Canal landscape, as trekking with farmers up and down mountainous rice paddies, or cycling through the streets of Beijing, or playing around in Amish workshops. It is this delight in what people do that propels Ted, as a human biologist, to ask questions that go beyond the biological. As he wrote in the opening chapter of the Boreal Forest,

*The regulation of deep body temperature is clearly of some importance, but again, I suspect only a small portion of its management is biological. One could live for years among the people of the northern forests and never see a case of serious frostbite, nor a death by hyperthermia. In stark contrast, our field notes carry numerous accounts of death by drowning, fire, homicide, and disease. The struggle to raise children to maturity, stay healthy, and extract a living from the environment requires that people practice adaptive skills constantly. To the native and to the visitor, this aspect of adaptation is simply central to life, whether it is exclusively behavioral, or conditioned by biological advantages as well. Those problems, in my view, must become the focus of human adaptation research.*

Now I promised Ted that I wouldn't take too long in this introduction – he has some things to tell you about his newest research project. But a proper introduction MUST include certain things, so here goes:

Albert Theodore Steegmann, Jr. (Ted) received his BA from the University of Kansas in 1958; his M.A. from the University of Michigan in 1961 and his PhD from the same institution in 1965. He did a brief stint at the University of Missouri, Columbia, and then in 1966 landed in the Department of Anthropology at SUNY Buffalo, where he has remained – except for one brief year at the University of Hawaii – where he curiously did research on cold adaptation!

Fig. 3. Chris Wahlfield, Rene Cadzow (both Ted's students), incoming HBA President Deb Crooks, Ted Steegmann (2012 winner of the Franz Boas Distinguished Achievement Award), wife Ruth, and Ted's collaborator, Anna Kjellstrom.

Ted has held numerous administrative and service positions at SUNY Buffalo – everything from DGS to Faculty Senate - and when I first arrived as his student, he was just coming off of the "dreaded chair years." He currently is Professor Emeritus at SUNY Buffalo.

Among his service to the Profession, Ted has been the local arrangements chair for the AAPA meetings, President of the Human Biology Association, Editor of the Yearbook of Physical Anthropology and Chair of Section H of the American Association for the Advancement of Science. He has published numerous papers, chapters, books, short papers and reviews, and presented at far too many professional meetings to enumerate here.

Ted was honored in 2006 by the Human Biology Association as the Raymond Pearl Memorial Lecturer, and in 2007 by the Biological Anthropology Section of the American Anthropological Association as their Distinguished Speaker.

Ted has regularly volunteered in his local community – both at the Amherst Museum (he IS a history buff) and as a Teacher/Consultant in the Outdoor Ed Program for middle-schoolers in Kenmore/Tonawanda Schools. (I understand that one of his favorite activities is leading students on nature hikes and teaching them how to recognize which animal passed their way by tasting their scat - he salts the area with raisins before the students come along!)

Over the years, Ted has consulted for the Honolulu Police Department, Environmental Defense Fund, Erie County Department of Social Services, Battel Corporation/U.S. army, various county health departments, the U.S. working group for the Philippines bases cleanup, and many other groups and organizations, in other words – he has a strong sense of community.

Ted has received numerous grants and awards, but perhaps his greatest award and scholarly reward are the 21 graduate students who have had the privilege to be guided and mentored by Ted to their PhDs and beyond. However, I suspect Ted takes his greatest pleasure from his wonderful family – his wife, Ruth; Katie and Tom (his children); and his grandchildren.

So – for all of those reasons and more, please join me in recognizing Albert Theodore Steegmann, Jr. (Ted) as the 2012 recipient of the Franz Boas Distinguished Achievement Award.

Dr. Steegmann graciously accepted the award with thanks to many, followed by an engaging presentation on what might be learned about human adaptations to previous periods of major climate change. He has provided the following summary.

As the end of this century nears, the world will be in crisis due to rising sea level, erratic rainfall and general ecological disruption. But we have been through climate change before. If we are to make the best of it, then there are lessons from the past about what worked to buffer the pressures, what did not, and why. It is now important to examine those specific adaptive behaviors.

Colleagues from Sweden and the U.S. are proposing a study of human health in the late medieval crisis (ca. 1300-1500 AD). The setting is Jamtland, Sweden, then at the extreme northern margin of European agriculture. We bring a range of tools to the task including archival investigation, environmental archaeology, paleoecology and osteology. The goal is to compare skeletal mortality and

stress markers from an early medieval Jamtland population (Westerhus) to one interred during the subsequent crisis. No local skeletal materials are available from the later period, so they will be excavated. Several abandoned churchyard cemeteries from the time are known by parish name and location.

Stress level estimation will be complex. The documented numbers and locations of abandoned farms, as the Little Ice Age began, indicate farming productivity was faltering. There are records of famine, but also warfare, social oppression, excessive taxation, loss of social order, and especially the onset of the Plague in Sweden starting 1350 AD. General mismanagement finally led to peasant revolts late in the crisis. If local people responded effectively to offset the biological consequences of these pressures, then the skeletal evidence will show little change through time.

The current schedule proposes a start of fieldwork in the summer of 2014. That of course depends on funding from both Swedish and American agencies.

*Proceedings were Respectfully Submitted by*
*Virginia J. Vitzthum,*
*HBA Secretary-Treasurer*

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