

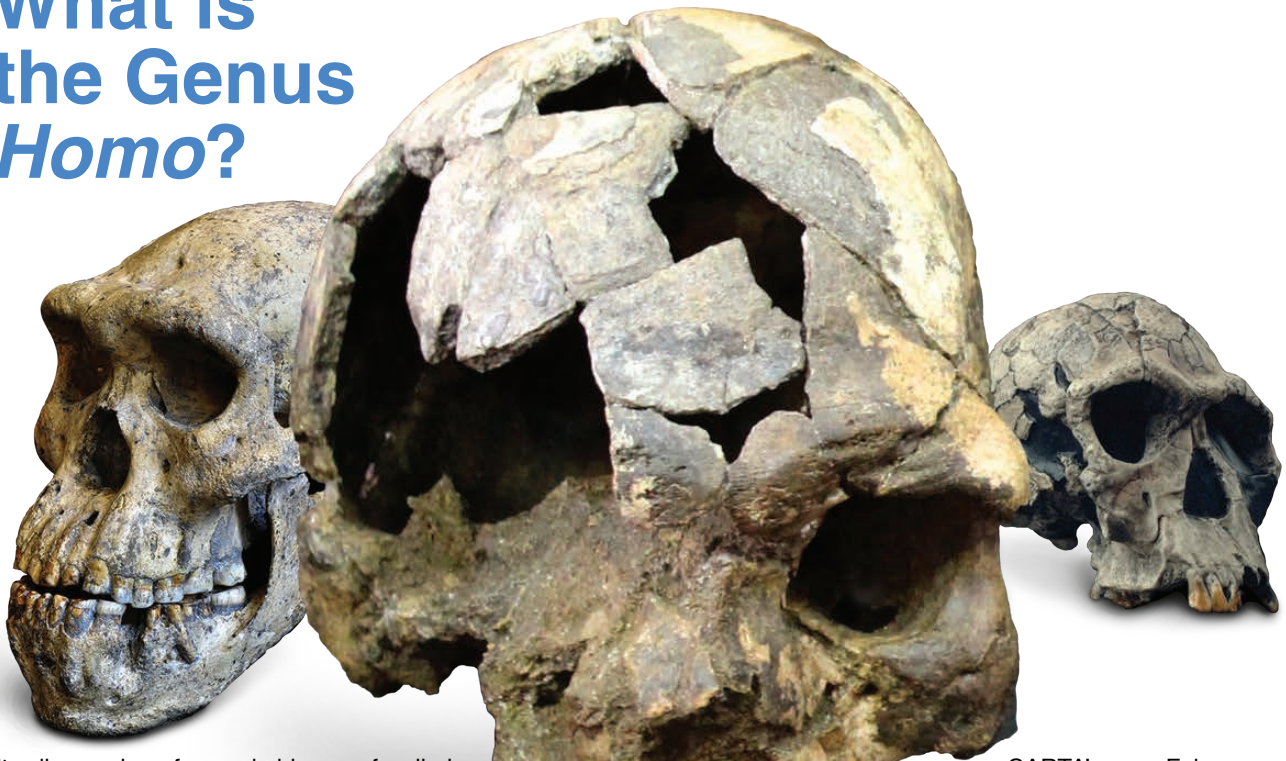


anthropogeny tracks

a CARTA newsletter

Volume 4, Issue 1 - February 2016

What is the Genus *Homo*?



Despite discoveries of remarkable new fossils in recent years, the evolutionary events surrounding the origins of genus *Homo* are incompletely understood.

What was once thought to define the biological boundary between our genus and earlier hominins has blurred as fossils, genomes, and incredibly old stone tools reset the criteria used to distinguish one species from the other. The question becomes, which biological features, cultural innovations, items in the human “toolkit,” and responses to environmental conditions truly originated with the genus *Homo*?

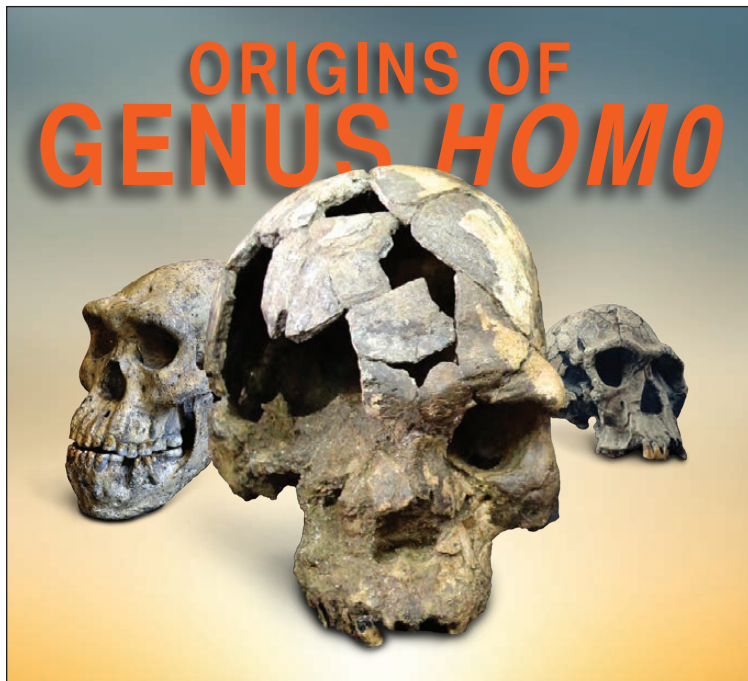
CARTA’s February 5th symposium, **Origins of Genus *Homo***, features renowned researchers who study the earliest fossils belonging to our genus found in Africa and Eurasia. They will present evidence bearing on the emergence of *Homo*, focusing on possible antecedents, changes in diet and body form as *Australopithecus* evolved toward *Homo*, other ancient species within the genus, and evolutionary processes likely operating 2.5 - 1.5 million years ago.

This CARTA symposium is made possible by **The G. Harold and Leila Y. Mathers Charitable Foundation**.

More information on this symposium on the following page



Center for Academic Research and Training in Anthropogeny
“to explore and explain the origins of the human phenomenon”
CARTA • University of California, San Diego • 9500 Gilman Drive, MC# 0060 • La Jolla, CA 92093



The outstanding lineup of speakers for CARTA's symposium, **Origins of Genus *Homo***, features:

***Homo* - What, Who, When, Where?**

Bernard Wood, George Washington University

Australopithecus and the Emergence of Earliest *Homo*

William Kimbel, Arizona State University

Dmanisi, Variation, and Systematics of Early *Homo*

Philip Rightmire, Harvard University

Adaptive Shifts Accompanying the Origin of *Homo*

Daniel Lieberman, Harvard University

A Potential Molecular Mechanism for the Speciation of Genus *Homo*

Pascal Gagneux, UC San Diego

Southern Africa and the Origin of *Homo*

Steven Churchill, Duke University

Evolution of Early Human Body Form

Carol Ward, University of Missouri

Evolution of Human Life History Patterns

Leslie Aiello, Wenner-Gren Foundation

Energetics and the Ecology of Early *Homo*

Herman Pontzer, Hunter College

Symposium Details

- Friday, February 5, 1:00 - 5:30 p.m., Pacific
- Conrad T. Prebys Auditorium, Salk Institute
- Free and open to the public, however, registration is required
- Live webcast
- For more information or to register, visit: <https://carta.anthropogeny.org/events/origins-genus-homo>

New CARTA Website Debuts

If you've visited the CARTA website recently, you may have noticed things look a little different. On December 21, 2015, a year-long website redesign project went live.

The CARTA team worked to develop a modern website to meet user needs for mobile platforms, to improve and increase user interface and features, and to streamline the overall site experience.

At the core of this work was a move to a more advanced website content management system. This required hundreds of hours of detailed coding and troubleshooting by a dedicated group of San Diego Supercomputer Center programmers to ensure all original content and features survived the integration to the new platform.

The aesthetics of the website were given consideration as well, with the goal of improving the user experience and to give the website a fresh, clean look for both desktop and mobile applications.

Take a tour of the website; we think you'll like the new layout, interface, and features.

(You'll want to create a CARTA user account, if you don't already have one, to learn about future events: <https://carta.anthropogeny.org/user/register>)

Excerpts From Student Essays: *Unique Features of Human Skin*

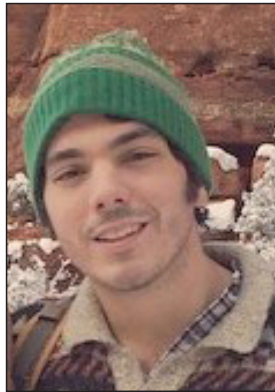
Student engagement with the expert scientists who speak at CARTA's human origins symposia is an important part of our endeavor. At each symposium, students enrolled in the Graduate Specialization in Anthropogeny have the unique opportunity to "host" these internationally renowned speakers. Participating in the symposia proceedings provides a great opportunity for students to create important scholastic and research connections, as well as to gain valuable knowledge from the brightest minds representing diverse fields of inquiry. As part of the curriculum requirement, each student summarizes their assigned speaker's presentation and ensuing discussions in a written essay, which is vetted by the speaker and the Faculty of Anthropogeny (who administer the Specialization). The following excerpts were taken from those essays written by students who participated in the October 2015 CARTA symposium, [Unique Features of Human Skin](#).

Matthew Boisvert, Neuroscience

Speaker: [Mark Stoneking](#), Director of the Human Population History Group, Max Planck Institute for Evolutionary Anthropology

Talk: [Of Lice and Men: The Molecular Evolution of Human Lice](#)

Obligate parasites can often provide insights about their hosts. For his presentations at the Center for Academic Research and Training in Anthropogeny's [Unique Features of Human Skin](#) symposium, Dr. Mark Stoneking talked about human parasites as a lens into recent human evolution. His public talk delved into his earlier published work (Kittler et al 2003) on human lice, *Pediculus humanus*, which can only prey on humans. The main thrust of this talk was that he could generate an estimate of when humans first started utilizing clothing based upon tracking the divergence of human body (*P. humanus corporis*) and head (*P. humanus capitis*) lice. This idea is grounded in the fact that clothing provided a new ecological niche for the louse to exploit as the body louse lives in the clothing, not the hair of its host.



In order to estimate when human body and head lice diverged, parts of two different mitochondrial genes, ND4 (579 bp) and CYTB (440 bp), were sequenced. As mitochondrial DNA (mtDNA) undergoes more rapid evolution than nuclear DNA, a phylogenetic estimate of when they diverged can be generated from the mutation rate of the mtDNA. This research yielded the date of the divergence between the two lice as 75,000 thousand years ago (kya), which means that humans developed clothing some time before then. This evidence pushes back the date for the oldest definitive signs of clothing we have: previous evidence from needles apparently used to stitch cloth were dated to 40kya.

Stoneking also described research detailing comparisons between African and European and North American lice, again using mtDNA. Here, he found that African lice were more divergent than either European or North American populations, implying that these lice species originally came out of Africa (much like humans). Additionally, there was much greater diversity in head lice than body lice, indicating that head lice is older, and came first.



Alison Caldwell, Neuroscience

Speaker: [Mark Shriver](#), Professor of Anthropology and Genetics at Pennsylvania State University

Talk: [The Genetics of Skin Pigmentation](#)



During his talk, Dr. Shriver gave an overview on what we know about the genes influencing skin color and how examining different populations can provide clues to the history of our skin pigmentation. Globally, skin pigmentation is highly variable. When examining different populations, Dr. Shriver found that population averages tend to fall over different points across the melanin index based on population location. For example, white college students from Penn State had melanin profiles that overlapped more with those of African Americans from Washington D.C. than with Afro-Caribbeans. Even within populations, however, there is high variation - all three of the populations mentioned above overlapped to some degree.

When discussing the evolution of lighter skin among Asian and Northern European populations, Dr. Shriver highlighted two key environmental pressures that could influence skin color. Geographically, skin color is most strongly correlated with UV radiation at ground level - populations located in regions with the highest levels of UV radiation had the darkest skin pigmentation, and vice-versa. As populations traveled to higher latitudes with less UV exposure, they may have evolved lighter skin to aid in vitamin D production. Dr. Shriver believes that we can study individual alleles, particularly those genes influencing skin color active in the melanocytes and keratinocytes, to better understand how these changes arose.

We can consider three major events in the evolution of human skin color. As we lost our body hair, we can infer that our skin color began to darken. Next, as some populations left Africa, they experienced the initial skin lightening event that led to lighter East Asian and European skin colors. Finally, a second branching resulted in the specific skin pigmentation patterns seen in European and East Asian populations. Concurrently, there may have been further skin darkening and lightening events occurring in African populations leading up to today.

Sara Goico, Anthropology

Speaker: **James Cleaver**, UC San Francisco

Talk: *The Skin and Ultraviolet Radiation: Effects on DNA and Carcinogenesis*



Skin is our major defense against one of the strongest carcinogens that we experience – ultraviolet light.

Dr. Cleaver's presentation discussed the role that the nucleotide excision repair pathway plays in sunburn and cancer. Dr. Cleaver has worked for many years on the disease known as xeroderma pigmentosum (XP), one of a family of sun sensitive diseases involving different components of the nucleotide excision repair pathway.

In the United States, it is a recessive disease that affects about 1-4 per 1,000,000 people. Due to this work, he was put in contact with a village in Northern Guatemala where 25% of the population is affected by a disease that appeared to be XP.

In the village, children suffer from extreme sun damage and are dying from enormous levels of skin cancer. Testing samples of cells from the Guatemalan population, he and his research team found that they are affected by a mutation in the gene XPC, one of the main damage recognition proteins in the skin and part of the global genome repair pathway.

In the population, there is no expression of the gene, with the result that the cells fail to recognize DNA damage, thus leading to cancer. XP is unique among the repair system diseases in that it results in very high cancer rates.

For example, another repair system disease, Cockayne syndrome, results in photosensitivity, along with developmental and neurological disorders, but never cancer. This demonstrates that there is a wide variation in the genetic response to sun exposure.

Kiri Hagerman, Anthropology

Speaker: **Michael Sawka**, Professor of Applied Physiology at Georgia Institute of Technology

Talk: *Human Skin: Sweating, Thermoregulation, and Water Balance*



In his talk at the October 2015 CARTA symposium, Michael Sawka discussed the exceptional thermoregulatory capabilities of human skin, and the selective advantages that these capabilities confer.

Humans are very good at maintaining a stable body temperature during physical exertion, more so than many other species. Sawka cited two possible theories that have been suggested that could account for the development of these abilities: the foraging hypothesis, and persistence hunting hypothesis.

Regarding the foraging possibility, early humans may have foraged during the middle of the day and during the hottest hours to avoid competition with other dangerous predators that rest during this time. Persistence hunting, which involved the running down of game until the animal collapsed from exhaustion, was another subsistence method that was used by our early ancestors. Both of these activities were important to early human development and would have required humans to have an increased ability to regulate core temperature during periods of exertion and during the hottest parts of the day.

Regardless of how or why we initially developed this ability, the question remains, how do humans regulate core temperature during exercise-heat stress? The answer lies in the ability of human skin to support heat loss, which is achieved through several different features of the skin and bodily anatomy. These features include our upright posture, skin blood flow, eccrine sweating, surface area, sodium reabsorption, and sensory reflexes.

Sequoyah Reynoso, Neuroscience

Speaker: **Nina Jablonski**, Evan Pugh Professor of Anthropology at Pennsylvania State University

Talk: *Naked, Colorful Skin and Its Role in Human Social Interactions*

Have you ever wondered why most mammals have more hair than we do? Or why humans, a single species, exhibit such variability in skin appearance?

Nina Jablonski, an anthropologist and paleobiologist at Pennsylvania State University, illustrates the diverse patterning of skin that exists across the globe and the selective pressures that caused such variation.

Jablonski explains how skin is a critical portion of the body because it is the first point of contact with the harsh external environment. What's more, skin serves both as a barrier against and as a means of interacting with that environment. At such a critical threshold, the qualities of skin comprise important adaptations for a particular habitat. Hair and skin pigmentation are two of these qualities that contribute to an organism's fitness.



pigmentation. In other words, more eumelanin means darker skin.

Historically, people who had the the darkest pigmentation lived very near the equator or at high altitudes relatively close to the equator. People who lived further from the equator had progressively lighter skin, and those who lived nearest the poles were the lightest.

Today, this pattern is less pronounced due to people of all pigmentations relocating to other parts of the planet. However, Jablonski demonstrates how the historical pattern of pigmentation makes sense given the dispersal of the human species from an African origin near the equator. This depends on an understanding of the relationship between skin and the ultraviolet radiation (UVR) that comes from the sun.

Interested in learning more about human origins?

All past CARTA symposia are viewable online at:
https://carta.anthropogeny.org/symposia/past_list

The pigmentation of human skin ranges from near black darkness to snow-like whiteness. At a molecular level, the amount of eumelanin is one factor which determines the degree of skin

Camille Toarmino, Psychology

Speaker: **Chris Kuzawa**, Professor of Anthropology, Northwestern University

Talk: *Subcutaneous Fat in Humans*

Human babies strike us as worthy creatures of study for many reasons. For Dr. Chris Kuzawa, a biological anthropologist from Northwestern University, human babies are intriguing because, in stark contrast to other species, they are incredibly fat at birth.



In fact, there are few other known species that even come close to the whopping 15% body fat which human infants exhibit during their first year of life. Moreover, this fat deposition begins in utero, unlike our closest primate relatives who don't store large quantities of white adipose tissue until after birth.

During the first six months after birth, the fat deposition of human babies accounts for 75% of the caloric costs of growth. This deposition of subcutaneous fat is puzzling, as resources that are vital for muscular and skeletal development are instead diverted into fat storage.

The traditional reason given for this anomaly is that we need to compensate for losing our hair, a means of insulation, by buffering

ourselves with extra fat. But this explanation wasn't sufficient for Dr. Kuzawa, as he pointed out that we don't preferentially deposit fat under our skin, and moreover, cold-adapted populations don't have increased fat deposition compared to warm-adapted populations.

According to Dr. Kuzawa, a big piece of the puzzle has been largely ignored when considering the evolutionary basis for this period of massive fat deposition. That missing puzzle piece is the human brain.

Unique in a plethora of ways, the human brain is also the most energetically demanding of animal brains. In adults, 20% of the resting metabolic rate (RMR) can be attributed to keeping the brain functioning properly. A dedication of 20% RMR is huge compared to other species, which rarely allocate more than 3% of the RMR to the brain. These demanding energetics can be largely attributed to the number of synapses in the brain. Neuronal synapses proliferate in infancy and childhood but then eventually decline in number during a period of synaptic pruning, during which the number of synapses gradually drop to their adult level.

Dr. Kuzawa compares having a brain to having a house. Each month that you own a house, you pay a mortgage. If the house is more expensive, so is the mortgage. But what would happen if you lost your job? Ideally, you would dip into your savings account until you found another. If the mortgage is quite expensive, then a large savings account would be crucial.

Like a mansion, the human brain is incredibly costly. We cannot turn down the energy going to the brain without risking serious brain damage. Thus, as humans, our mortgage is quite high, necessitating a large savings account. During early life, fat stores function as the crucial savings account necessary for periods of uncertainty.

National Chimpanzee Brain Resource: The CARTA Connection

On October 11, 2015, George Washington University (GWU) announced the establishment of the National Chimpanzee Brain Resource, funded by a \$1 million NIH grant and based at GWU, Georgia State, and Emory universities. This project grew out of the need to preserve biological materials and information about such "great apes," resources essential for understanding these remarkable creatures and human evolutionary specializations. The Brain Resource is the outcome of a collaboration involving CARTA members **Dr. Chet Sherwood**, **Dr. Bill Hopkins**, and **Dr. Todd Preuss**.

Preuss noted that "The CARTA organization has long recognized the importance of such resources, most explicitly in the form of a 2005 symposium largely devoted to the matter, **Understanding Great Apes in the Genomic Era**. The symposium laid out the problems and prospects for acquiring and preserving great ape biomaterials, and the Chimp Brain Resource can trace its lineage to that event, and the fruitful interactions that it generated."

CARTA Executive Co-Director, **Dr. Ajit Varki**, responded enthusiastically to the news about the funding of the Brain Resource. "We are extremely pleased and proud to have facilitated the origins of this very important project," he said. "This is an excellent example of what CARTA strives for, to facilitate transdisciplinary interactions that generate new research directions about anthropogeny."

To learn more about this valuable resource, you can read the full GW press release here: <http://gwtoday.gwu.edu/gw-establish-national-chimpanzee-brain-resource-neuroscience-research>



Source: nature.com; Photo credit: Chet Sherwood.

Did you know CARTA posts relevant and informative anthropogeny articles on Facebook and Twitter every day? Stay up-to-date on anthropogeny by visiting:

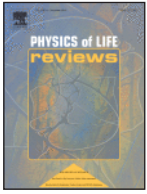


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CARTA-Inspired Publications

Transdisciplinary interaction is at the core of CARTA's mission to advance human origins research. CARTA symposia provide a forum for experts from vastly different fields to share knowledge and work together to spark new research. The following is a selection of publications inspired by interactions amongst CARTA members (**in bold**) and facilitated by CARTA. (Complete list at the [CARTA website](#).)



Arbib, MA. Towards a Computational Comparative Neuroprimatology: Framing the language-ready brain. *Phys Life Rev.* 2015;S1571-0645(15)00162-1.

Michael Arbib argues that the capability for manipulation in our last common ancestors with monkeys laid the basis for the emergence of a limited system of manual gestures as communicative actions in our last common ancestor with apes, and these provided scaffolding for the human capacity for both signed and spoken language. He shows how comparative data on brain and behavior in monkeys, apes and humans can help us explore such hypotheses on the evolution of language.



Blurton-Jones, N. *Demography and Evolutionary Ecology of Hadza Hunter-Gatherers.* New York: Cambridge University Press; 2016.

Detailed study shows that a thriving, "normal" human demography can be sustained by foraging in sub-Saharan savanna. Data on child growth and survival confirm importance of grandmothers. Hunting was productive, but social monogamy persists in the apparent absence of "father effects." This leaves us seeking alternatives to the theory that paternal care accounts for key aspects of human evolution.



Cheryan, S, Master, A, **Meltzoff, AN.** Cultural stereotypes as gatekeepers: increasing girls' interest in computer science and engineering by diversifying stereotypes. *Front Psychol.* 2015; 6:49.

Women are underrepresented among undergraduates in computer science (CS). We identify a main culprit for that disparity: Narrow stereotypes depicting computer scientists as geeky, brilliant, socially awkward males. Students often think you have to fit that image to be successful at CS. The result: Girls feel like they don't belong, and stay away. The article reports concrete ways of drawing more women into CS by broadening those stereotypes and redesigning CS classrooms.



Collins, CE, et al. including **Kaas, JH.** Cortical cell and neuron density estimates in one chimpanzee hemisphere. *Proc Natl Acad Sci U S A.* 2016; 113(1):74-79.

Our study shows how neuron packing densities and sizes vary across neocortex in a chimpanzee brain in ways that reflect the different functional roles of cortical areas. Future comparisons to human brains will reveal differences between our brains and those of our closest primate relatives, and help us further understand how humans evolved.



Coxworth, JE, Kim, PS, McQueen, JS, **Hawkes, K.** Grandmothering life histories and human pair bonding. *Proc Natl Acad Sci U S A.* 2015;112(38):11806-11811.

In simulations of an agent-based model, grandmothering drives sex ratios in the fertile ages from female-biased at the ancestral great ape-like equilibrium to male-biased at the human-like one - as seen in chimpanzees and hunter-gatherers. Theory and data show mate-guarding increases with more males, linking grandmothering to men's proprietary claims on women and the evolution of human pair bonds.



Dang, X, Eliceiri, BP, **Baird, A,** Costantini, TW. CHRFBAM7A: a human-specific $\alpha 7$ -nicotinic acetylcholine receptor gene shows differential responsiveness of human intestinal epithelial cells to LPS. *FASEB J.* 2015;29(6):2292-2302.

In these studies, we explored the possibility that human-specific genes can specify a human-specific inflammatory response to injury. We show that CHRFBAM7A, which regulates the anti-inflammatory activity of the $\alpha 7$ -nAChR neurotransmitter receptor, is regulated by inflammation. These data support the hypothesis that the anti-inflammatory effects of vagus nerve stimulation may be gauged in species-specific fashion.



Denli, AM, et al. including **Gage, FH., Moore, L., and Hunter, T.** Primate-specific ORF0 contributes to retrotransposon-mediated diversity. *Cell.* 2015;163(3):583-593.

Transposons are mobile genetic elements that spread in the host genomes via insertions and play significant roles in adaptation and evolution. We identified a novel, primate-specific protein-coding stretch of DNA in L1 retrotransposons, ORF0, which can generate insertion-site specific proteins. ~1,000 human-specific ORF0 loci exist in our genomes, with the potential to shed light on our evolution.



Girkin, CA, et al. including **Nievergelt, CM.** Biogeographic Ancestry in the African Descent and Glaucoma Evaluation Study (ADAGES): Association With Corneal and Optic Nerve Structure. *Invest Ophthalmol Vis Sci.* 2015;56(3):2043-2049.

Populations of African ancestral descent (i.e. African-Americans in the US) have greater susceptibility to certain types of glaucoma and higher rates of blindness compared to people of European ancestral descent. We show that higher amounts of African ancestry are associated with heritable eye features, which are in turn associated with the development of glaucoma.



Izpisua Belmonte, JC, et al. including **Churchland, P, Moutri, AR, Reynolds, JH, Sejnowski, TJ.** Brains, genes, and primates. *Neuron.* 2015;86(3):617-631.

The mouse is used as a genetic model for brain disorders. However, our brains are much bigger and our cognitive behaviors are distinctly different from those of mice. Recent advances in molecular genetics have now made it possible to develop a genetic non-human primate model, which has great potential for understanding the biological basis of human behavior and brain disorders.



Kuhl, PK, Ramírez, RR, Bosseler, A, Lin, JF, Imada, T. Infants' brain responses to speech suggest analysis by synthesis. *Proc Natl Acad Sci U S A.* 2014;111(31):11238-11245.

The nature of perception-action links for speech has been debated for over half a century. New infant MEG recordings show 7- and 11-month-old infants activate both auditory and motor areas (Broca's, cerebellum) when hearing speech sounds; experience increases activation to nonnative speech. Infants may use motor knowledge (acquired by babbling) to encode speech in an *analysis by synthesis* process.



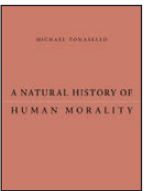
Schwarz, F, Springer, SA, Altheide, TK, **Varki, NM, Gagneux, P, Varki, A.** Human-specific derived alleles of CD33 and other genes protect against postreproductive cognitive decline. *Proc Natl Acad Sci U S A.* 2016;113(1):74–79.

Humans are among the rare species that have survival of post-reproductive adults. Elderly individuals can greatly benefit younger kin by directly supporting the young and by passing on vital cultural and ecological knowledge. This benefit is strongly compromised by cognitive decline including late onset Alzheimer’s disease. Amyloid beta accumulation is thought to contribute to late-onset Alzheimer’s disease, a post-reproductive condition that uniquely affects humans and is aggravated by inflammation and cerebral vascular disease. It appears that humans evolved several unique gene variants that protect older adults from neurodegenerative disease, thus preserving their valuable contributions and delaying dependency.



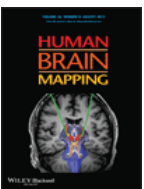
Tierney, JE, Pausata, FSR, **deMenocal, PB.** Deglacial Indian monsoon failure and North Atlantic stadials linked by Indian Ocean surface cooling. *Nature Geoscience.* 2016;9:46-50

The Indian monsoon weakened dramatically during the two cool events of the last deglaciation, Heinrich 1 and Younger Dryas. The underlying cause has been elusive and we show this was associated with Indian Ocean surface cooling subsurface warming, and a corresponding reduction in the thermal stratification. The ocean changes were small (1-3°C), suggesting remarkable sensitivity of the monsoon system.



Tomasello, M. *A Natural History of Human Morality.* Cambridge, MA: Harvard University Press; 2016.

Based on extensive experimental data comparing great apes and human children, Tomasello reconstructs how early humans gradually became an ultra-cooperative and, eventually, a moral species. The key was individuals’ evolving ability to act together as a plural agent ‘we’: first as collaborators, and then as members of a cultural group. Human morality is essentially a “we over me” way of thinking.



van den Heuvel, MP, et al. including, **Preuss, TM, Rilling, JK.** Comparison of diffusion tractography and tract-tracing measures of connectivity strength in rhesus macaque connectome. *Hum Brain Mapp.* 2015;36(8):3064–3075.

Diffusion-weighted imaging (DWI) is the only noninvasive method available for studying brain connectivity, and thus the only method suitable for use in humans and apes. How good is it? This study compared results in monkeys using DTI and “gold standard” chemical tracing, and reports a highly significant correlation, although DWI yields a number of erroneous results.



Wang, GZ, et al. including **Preuss, TM, Geschwind, DH, Konopka, G.** Correspondence between resting-state activity and brain gene expression. *Neuron.* 2015;88(4):659–666.

Brain regions belonging to the “default-mode” network (DMN) are involved in social cognition and self-cognition. This study identified genes with expression levels that correlate with physiological activity in DMN areas. Many of the genes regulate neuronal activity and synapse formation, and some are dysregulated in autism, a condition in which DMN physiological activity is disrupted.



Zhang, LJ, et al. including, **Gallo, RL.** Innate immunity. Dermal adipocytes protect against invasive *Staphylococcus aureus* skin infection. *Science.* 2015;347(6217):67–71.

Insects use a fat-body to protect against infections, but in mammals, fat has been thought of only as a source of energy storage. In this paper by the Gallo lab at UCSD, they demonstrated that the layer of fat below human skin is an essential part of host defense that produces natural antibiotics (AMPs) that kill bacteria and help the skin heal.

Special Lecture by Francisco J. Ayala Airing in February



Tune in to **UCSD-TV** (see the cable provider channel listing, below) on February 15, 2016 for the premiere broadcast of **Evolution of Ethical Behavior and Moral Values: Biology? Culture?**

This special lecture given by eminent evolutionary biologist and philosopher, **Dr. Francisco J. Ayala** (UC Irvine), addresses the nature/nurture debate of ethics and morality.

The question whether ethical behavior is biologically determined may refer to either one of the following two issues.

First, is the capacity for ethics - the proclivity to judge human actions as either right or wrong - determined by the biological nature of human beings? Second, are the systems or codes of ethical norms accepted by human beings biologically determined?

Ayala proposes that the moral evaluation of actions emerges from human rationality and thus it is a necessary implication of our biological make-up. But the norms according to which we decide which actions are good and which actions are evil are largely culturally determined, although conditioned by biological predispositions, such as parental care.

Shortly after airing on **UCSD-TV**, this lecture will be archived on the **CARTA website**, as well as **UCSD-TV**, **iTunes**, and **Youtube**. Stay tuned.

Dr. Francisco J. Ayala is the Donald Bren Professor of Biological Sciences at UC Irvine, and a recipient of the Templeton Prize. His scientific research focuses on population and evolutionary genetics, including the origin of species, genetic diversity of populations, the origin of malaria, the population structure of parasitic protozoa, and the molecular clock of evolution. He also writes about the interface between religion and science, and on philosophical issues concerning epistemology, ethics, education, and the philosophy of biology.

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<http://www.ucsd.tv/search-details.aspx?showID=29977>

Student News



CARTA Fellow and student in the Anthropogeny Graduate Specialization and Department of Anthropology at UC San Diego, **Kiri Hagerman**, will teach the summer 2016 offering of undergraduate class, **ANTH 2: Human Origins**.

ANTH 2: Human Origins is an introduction to human evolution from the perspective of physical anthropology, including evolutionary theory and the evolution of primates, hominids, and modern humans. The class will explore human origins and development through a variety of lines of evidence, although emphasis will be placed on fossil remains and behavioral studies of living primates.



When asked how the Anthropogeny Graduate Specialization helped prepare her for teaching this class, Kiri said “The Specialization has given me a tremendous advantage. I am excited to bring the diverse range of fields and topics that we learn about as Anthropogeny students into the classroom with me this summer and engage students with the exploration of their origins as a species.”

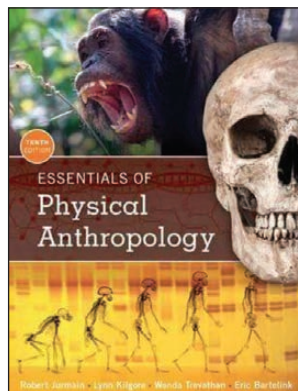


The new edition of the college textbook, *Essentials of Physical Anthropology* (Wadsworth Publishing, 2016), has many CARTA connections and one can be seen on the cover.

Melanie Beasley, a graduate student in Anthropology at UC San Diego, as well as a former CARTA Fellow and an alumna of the Anthropogeny Specialization, contributed the image of the chimpanzee for the tenth edition of the textbook.

The picture was taken by Melanie while participating in the Anthropogeny Field Course in Tanzania, summer of 2011.

In addition, eight of Melanie’s photos from the field course were used throughout the textbook.



CARTA Symposia Schedule

Origins of Genus *Homo*
February 5, 2016, Salk Institute

Ancient DNA and Human Evolution
April 29, 2016, Salk Institute

Implications of Anthropogeny for Medicine and Public Health
October 14, 2016, UC San Diego

Awareness of Death and Personal Mortality: Implications for Anthropogeny
Winter 2017, Location TBD

CARTA on the Web



Want to re-watch a CARTA symposium? All symposia, including “**Unique Features of Human Skin**” (October 2015), are available at the above websites.



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What is CARTA?

The UC San Diego/Salk Institute Center for Academic Research and Training in Anthropogeny (CARTA) is dedicated to answering the age old questions “where did we come from?” and “how did we get here?” As CARTA explores the origins of humanity, we are not only answering philosophical and existential questions, but also addressing very practical issues concerning human nutrition, medicine, mental disease, the organization of society, the upbringing of our young, and the interactions of humans with one another and with our environment. Transdisciplinary interaction is at the core of CARTA’s mission to advance human origins research.

For more information, please visit <https://carta.anthropogeny.org>

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