



anthropogeny tracks

a CARTA newsletter

Volume 3, Issue 2 - May 2015

Human-Climate Interactions and Evolution: Past and Future

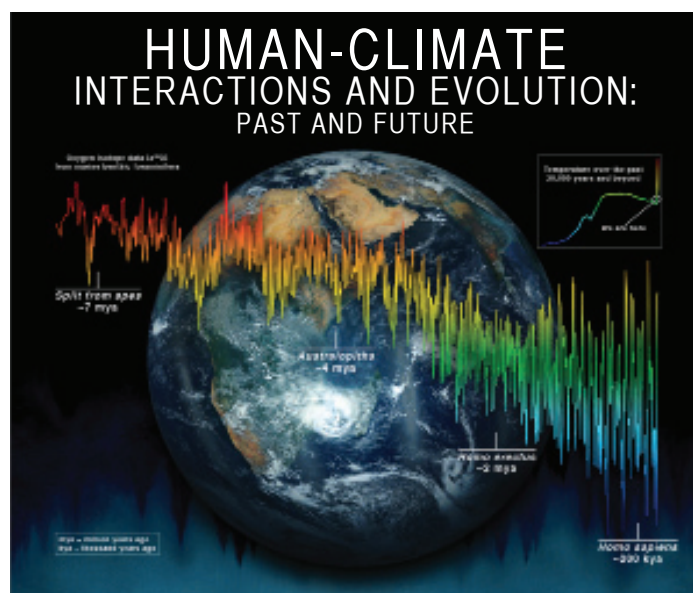
Our early ancestors evolved on a drying, cooling, and highly variable planet, which has led to competing ideas as to how climate may have shaped human evolution. Equally compelling is the question of how and when humans began to affect their surroundings to such an extent as to become a force of climate change, with disruptions affecting the globe today. According to earth scientists, paleontologists, and scholars in other fields, the planet has entered a new geological phase – the Anthropocene, the age of humans. How did this transition of our species from an ape-like ancestor in Africa to the current planetary force occur? What are the prospects for the future of world climate, ecosystems, and our species?

CARTA's May 15, 2015 symposium, **Human-Climate Interactions and Evolution: Past and Future**, presents varied perspectives on these critical questions from earth scientists, ecologists, and paleoanthropologists.

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

Symposium Details

- Friday, May 15, 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: <http://carta.anthropogeny.org/events/human-climate-interactions-and-evolution-past-and-future>



The fantastic lineup of speakers includes:

African Climate Change and Human Evolution

Peter deMenocal, Columbia University

The Climatic Framework of Neandertal Evolution

Jean-Jacques Hublin, Max Planck Institute for Evolutionary Anthropology

Climate Instability and the Evolution of Human Adaptability

Rick Potts, Smithsonian Institution

Abrupt Climate Transitions and Humans

Jeff Severinghaus, Scripps Institution of Oceanography, UC San Diego

How Humans Took Control of Climate

William Ruddiman, University of Virginia

The Impacts of Arctic Sea Ice Retreat on Contemporary Climate

Charles Kennel, Scripps Institution of Oceanography, UC San Diego

A Tipping Point: Using the Past to Forecast our Future

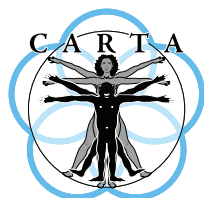
Elizabeth Hadly, Stanford University

Human Impacts: Will We Survive the Future?

Naomi Oreskes, Harvard University

Climate Change Mitigation: In Pursuit of the Common Good

Veerabhadran Ramanathan, Scripps Institution of Oceanography, UC San Diego

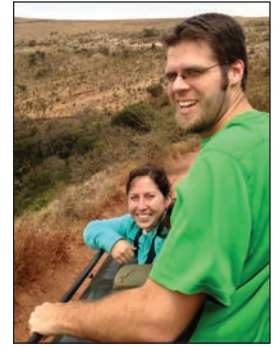


Center for Academic Research and Training in Anthropogeny
"to explore and explain the origins of the human phenomenon"

CARTA • University of California, San Diego • 9500 Gilman Drive, MC# 0060 • La Jolla, CA 92093

2015 Anthropogeny Specialization Graduates

As the end of the academic year approaches, it is appropriate to recognize the efforts of the two students who will complete the requirements for the Graduate Specialization in Anthropogeny, adding a parenthetical degree in anthropogeny to their Ph.D.s already in progress. Over the past three years, Jeremy Karnowski (cognitive science) and Heidi Sharipov (neuroscience) have participated in the required course work, CARTA symposia, journal meetings, presentations, and in the three-week long field course in Africa. We have asked Jeremy and Heidi to reflect on their experience as an anthropogeny specialization student, as well as the impact of the specialization on their career. You can read their comments below and on the following page. We wish both Jeremy and Heidi much success in their future academic and professional careers as well as a hearty congratulations on a job well done!



Jeremy Karnowski Cognitive Science

As a data scientist in the cognitive science department at UC San Diego, I explore how we can leverage new tools and technology to uncover relationships in data from non-human social and communicative interactions. Currently, I use data collected from a study with bottlenose dolphins, as dolphins exhibit many characteristics that we associate with humans and other social primates. Studying human origins and investigating the differences and similarities between humans and non-human primates has offered a chance to explore which features of highly complex and social mammal species have deep genetic bases and which may have emerged through systematic social engagements.

Being an active participant in the anthropogeny specialization significantly broadened my experience during my time UC San Diego. My colleagues in anthropology challenged me to interpret the mind through the lenses of evolutionary history, environment, and nature. Humans are biological organisms, have particular morphological differences, and have evolved to solve problems that many other social mammals have faced. Being connected with geneticists and biomedical students has helped shed light on which features, both phylogenetic and ontogenetic, distinguish the human experience. Experiencing how basic research is done in the field, especially the collection of video and audio data on wild primates, has enriched my analyses and provided avenues for collaborations. I am now better off by having unique perspectives with which I can constrain and supplement my own investigations.

The CARTA symposia offered me a chance to interact with distinguished scientists outside of my own field, broadening my knowledge and giving me confidence to discuss my research and results to a wider research community. This has been invaluable in my early career.

As sensor technologies become inexpensive and ubiquitous, our culture will have a vast amount of data about human interaction. In the future, I hope that my unique anthropogeny perspective can help make use of this data in a way that not only is helpful for society, but also helps inform us about the human mind and allows for cross-species comparisons.



Top: Jeremy examines a hominin skeleton (*A. ramidus*) at the National Museum in Addis Ababa, Ethiopia. Middle: While scouting for wild chimpanzees, Jeremy and company (not pictured here) observe a chimpanzee "fishing" for termites. Bottom left: A great example of the size difference between Australopithecus and modern humans. Bottom right: While at Olduvai Gorge, Jeremy took part in fossil hunting.

Heidi Sharipov Neuroscience

When I first joined the anthropogeny specialization, I expected to learn all of the current theories on human origins, but I never expected to be taken on a journey into the origins of these theories and experience, firsthand, the science behind them.

However, the most exciting part of participating in the specialization was experiencing and discussing everything with fellow graduate students from different fields of study. It was through these discussions that I began to understand the importance of the anthropogeny specialization in inspiring young scientists to pursue individual questions that, when joined with the efforts of other young scientists may one day reveal the answers about human origins.

The four main portions of the program, which included the courses, journal clubs, field trip, and the symposia, each helped me navigate through the different areas of anthropogeny in unique ways.

In the introductory anthropogeny course, I was able to build a foundation which allowed me to interact more easily with scientists in other fields (which was an invaluable skill during the symposia, and will continue to be throughout my career). In the advanced anthropogeny course, we were able to contribute to CARTA's online Matrix of Comparative Anthropogeny (MOCA). This was the outlet for my culmination of knowledge of anthropogeny.

The second student-specific portion of the specialization, the journal clubs, allowed for open and unabashed discussion of scientific literature, as well as various controversial topics within the studies of anthropogeny. It was in these meetings that I (and many other students) opened up the most to discuss areas of research that were very familiar, in addition to areas that were almost unknown prior to the discussion.

I went on the field trip to Ethiopia and Tanzania with four other students. As much as I enjoyed the intellectual stimulation of the courses and journal clubs, the field trip was the most enlightening and exciting part of the program because it allowed us to see, experience, and participate in some of the most important research related to anthropogeny.

During our behind-the-scenes tour at the National Museum in Ethiopia, we were introduced to the "uglier" side of archeology, where clumps of dirt slowly become beautiful fossils and ownership over fossils hinders scientific progress. In Ngorongoro Crater, we witnessed the type of landscape that may have existed during the dawn of mankind, and for the first time, I understood how hunter-gatherers may have thrived. At Olduvai Gorge, we were astonished by the small area in which countless groundbreaking fossils have been found, and we met with the scientists who are currently finding more of them! In Gombe, we observed the natural behaviors of chimpanzees that once shook the anthropology community, such as the use of tools to fish for termites. Finally, in Issa, we helped the scientists who are building a new field site to study non-human primates, and we learned just how much work goes into the early stages of such a challenging project. This field trip will always be a reminder for me of the importance of collaborative efforts and the beauty of the scientific process across disciplines.

The last aspect of the program, the symposia, was a great venue to interact with the top scientists studying questions related to anthropogeny. However, my favorite part of each symposium was the debates that occurred between these scientists in open discussion. These debates forced every person in the room to not only spell out the logic behind their convictions, but also to rethink and possibly redefine their beliefs. This is something that I will try to remember as I progress in my career, and I will try to always keep an open debate around my convictions.



Top left: At the Olduvai Gorge research site, Heidi shows off a stone tool recreation. Bottom left: Heidi uses a Hadza digging stick to uncover wild tubers, an important staple of the Hadza diet, is a part of the curriculum for the students. Middle: Another important aspect of Hadza culture and life is making arrows for hunting. Heidi observes how the Hadza craft arrows, from selecting the appropriate wood, to hafting. Right: Aping a potential ancestor at the National Museum in Addis Ababa, Ethiopia.

Behind the Scenes: CARTA Video Production



In an effort to raise awareness for CARTA and its mission and broaden our appeal for support, Lyon & Associates Creative Services was brought in to create a short video introduction that would lead into CARTA symposia talks before they are shown online on multiple websites (CARTA, UCSD-TV, iTunes, YouTube).

Lyon, a strong partner of UC San Diego's, is an award-winning boutique film, design, and advertising shop in San Diego. After several meetings to exchange ideas, Lyon presented CARTA with their vision: In order to capture the essence of CARTA in one minute, they suggested filming a collage of human faces representing a variety of ages and populations, with a narrated script that delicately unfolds in the background. (See sidebar for script.)

Colleagues, friends, and family were recruited and filmed in a beautiful eucalyptus grove on the UC San Diego campus. In thanks for their volunteering, each was presented with a pristine digital image of their personal portrait.

Unbeknownst to CARTA's Associate Director, Pascal Gagneux, the Lyon team had already identified his voice as perfect for the voice-over. Pascal was lured to a studio with the excuse that a "scratch recording" was needed – a placeholder until the real voice was found. After just a few takes, the final voice recording was in the can.

While Lyon's editing team set to work stitching together 25 filmed portraits, meticulously synchronizing the images with the spoken word, the musical score was commissioned. In keeping with the production's homegrown spirit, Pascal recruited the help of his nephew, Manuel Gagneux, a musician who lives in Harlem, NYC (Birdmask, <https://birdmask.bandcamp.com/>) who composed a musical score that adds a sense of wonder and depth.

The final version of this inspirational video can now be viewed on the CARTA website – and shared!

CARTA's Video Voice-over

as read by Dr. Pascal Gagneux, CARTA Associate Director and Associate Professor of Pathology, UC San Diego

We are the paradoxical ape.

Bipedal. Naked. Large-brained.

Long the master of fire, tools, and language.

But still trying to understand ourselves.

Aware that death is inevitable.

Yet filled with optimism.

We grow up slowly.

We hand down knowledge.

We empathize and deceive.

We shape the future from our shared understanding of the past.

CARTA brings together experts from diverse disciplines to exchange insights on who we are, and how we got here.

An exploration made possible by the generosity of humans like you.



Visit

<http://carta.anthropogeny.org/donate>
to watch the CARTA video



Top left: Dr. Pascal Gagneux recording what he thought was the "scratch" narration.

Middle left: Birdmask (Manuel Gagneux), <https://birdmask.bandcamp.com/>

Bottom left: Final scene bringing both the narrative and the people together.

Right: Filming in the eucalyptus grove at UC San Diego.

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.)



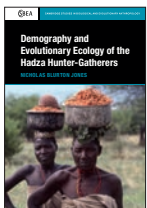
Allen-Blevins, C.R., Sela, D.A., and **Hinde, K.** Milk Bioactives May Manipulate Microbes to Mediate Parent-Offspring Conflict. *Evol Med Public Health*. 2015; advance access 04/02/2015 (doi: 10.1093/emph/eov007).

The immunological and nutritional impacts of breast milk and microbiota are increasingly well-understood; less clear are the consequences for infant behavior. Here we propose that interactions among bioactives in mother's milk and microbes in the infant gut contribute to infant behavioral phenotype and, in part, have the potential to mediate parent-offspring conflict.



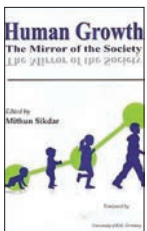
Berl, R.E. and **Hewlett, B.S.** Cultural Variation in the Use of Overimitation by the Aka and Ngandu of the Congo Basin. *PLoS One*. 2015; 10(3):e0120180.

Existing studies indicate that overimitation, i.e., the copying of causally irrelevant actions in the presence of clear causal information, was a key feature of children's social learning in the evolution of *Homo sapiens* because it facilitated rapid adoption of causally opaque cultural knowledge. This study demonstrates that overimitation does not emerge in early childhood in Aka hunter-gatherers as it does in studies with Western children, but that it is common by adulthood.



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

Detailed report on 8 censuses of Hadza between 1985 and 2000. Fertility, mortality, length of child-bearing career were halfway between !Kung and Ache. Regression analyses of individual differences in reproductive success delve into theories of marriage, mate choice, mobility and sharing, and show the expected effect of grandmothers on child survival was strong, just like the grandmothers themselves. [Cover photo by James F. O'Connell]



Bogin, B. and Varela-Silva, I. The Maya Project: A mirror for human growth in biocultural perspectives. In: Sikdar, M., ed. *Human Growth: The Mirror of the Society*. Delhi: India: B.R. Publishing Corporation; 2015: 3–23.

Human physical growth reflects the biological, social, economic and political environment in which people live. The Maya people of Mexico and Central America, a population of 7-8 million, are one of the most short-statured human groups. In combination with our Maya Project (<http://mayaproject.org.uk>), this book chapter portrays the biocultural realities of life for the Maya people.



Bozek, K., et al. including **Pääbo, S.**, **Sherwood, C.C.**, **Hof, P.R.**, and **Khaitovich, P.** Exceptional Evolutionary Divergence of Human Muscle and Brain Metabolomes Parallels Human Cognitive and Physical Uniqueness. *PLoS Biol*. 2014; 12(5):e1001871.

Human evolution studies commonly focus on phenotypic or genetic features unique to humans. We looked for another type of features: metabolic changes unique to human tissues. We find that human metabolism evolved rapidly, especially in brain cortex and in skeletal muscle. Our strength tests indeed show that human muscular performance decreased markedly compared to chimpanzees and macaque monkeys.



Brooks, R. and **Meltzoff, A.N.** Connecting the Dots from Infancy to Childhood: A Longitudinal Study Connecting Gaze Following, Language, and Explicit Theory of Mind. *J Exp Child Psychol*. 2015; 130:67–78.

The results from this study illuminate the bridging role that language plays in connecting infants' social cognition to children's later understanding of others' mental states—their 'theory of mind.' The obtained specificity in the longitudinal relations informs theories concerning mechanisms of developmental change.



Chang, E.F. Towards Large-Scale, Human-Based, Mesoscopic Neurotechnologies. *Neuron*. 2015; 86(1):68–78.

A potential key to unlocking the neurological basis of human abilities, such as language, is new neurotechnology to study the detailed function of cortical microcircuits. The options for study in humans are limited—but novel, safe, scalable, high-density sensor technology may provide a new way to study the detailed processes of language with unprecedented resolution. There is tremendous opportunity for scientific discovery on human origin if this technology can be applied across species.



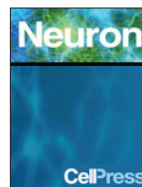
Cloutier, C.T., Coxworth, J.E., and **Hawkes, K.** Age-Related Decline in Ovarian Follicle Stocks Differ Between Chimpanzees (*Pan troglodytes*) and Humans. *Age (Dordr)*. 2015; 37(1):1–9.

Ovarian follicle stocks deplete at similar rates from birth to age 35 in chimpanzees and humans. But in this 3-fold larger sample with older ages than previously studied, stocks of chimpanzees over 35 vary more than they decline with age – unlike stocks of same-aged humans. The difference may implicate changes in perimenopausal ovary-brain interactions that evolved along with humans' slower somatic aging.



Davidson, I. Stone Tools: Evidence of Something in Between Culture and Cumulative Culture. In: Haidle, M., Conard, N., Bolus, M., eds. *The Nature of Culture*. Springer International Publishing; In-Press.

The search for culture in non-humans often forgets what culture is. This paper identifies first principles of what culture is and how to identify it. On this basis, I make predictions about the cultural production of stone tools and examine when they are met archaeologically. Finally, I point out the fallacy of progressivist tendencies in some models of evolutionary change in cultural behavior.



Izpisua Belmonte, J.C., et al. including **Churchland, P.**, **Muotri, A.R.**, **Reynolds, J.H.**, and **Sejnowski, T.J.** Brains, Genes and Primates. *Neuron*. 2015; In-Press

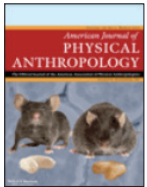
A great strength of the mouse model is the powerful array of genetic tools available for probing the brain. However, brains have evolved considerably over the ~80 million years that have passed since the rodent and primate lineages separated, limiting the degree to which insights derived from the mouse can be applied to understanding human neurobiology. Recent developments now make it feasible to apply genetic tools borrowed from the mouse to the non-human primate brain.

CARTA-Inspired Publications, Continued



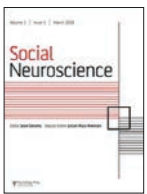
Knigge, R.P., **Tocheri, M.W.**, Orr, C.M., and McNulty, K.P. Three-Dimensional Geometric Morphometric Analysis of Talar Morphology in Extant Gorilla Taxa from Highland and Lowland Habitats. *Anat Rec (Hoboken)*. 2015; 298(1):277–290.

This article shows that gorilla talar morphology (ankle) is tightly linked to habitat, with lowland gorillas showing more adaptive commitment to climbing than highland gorillas. Interestingly, eastern and western lowland gorillas appear to have evolved these climbing features independently, providing important insights into debates over the role and importance of climbing in early human evolution.



Marzke, M.W., **Marchant, L.F.**, McGrew, W.C., and Reece, S.P. Grips and Hand Movements of Chimpanzees During Feeding in Mahale Mountains National Park, Tanzania. *Am J Phys Anthropol*. 2015; 156(3):317–326.

What is riveting about the hands of wild chimpanzees who are eating? We authors thought videotaping wild chimpanzees while they retrieved and processed food might tell us more about the grip repertoire of wild versus captive apes. In addition, this focus on ape grips provided new ideas about the selective pressures that shaped the evolution of hominin hand morphology, particularly the thumb!



Ng, R., Fishman, I., and **Bellugi, U.** Frontal Asymmetry Index in Williams Syndrome: Evidence for Altered Emotional Brain Circuitry? *Soc Neurosci*. 2015; ahead of print 01/29/2015 (doi: 10.1080/17470919.2015.1005667)

Our group has been characterizing Williams Syndrome, a specific genetic disorder that exhibits excessive sociability. This paper uses electroencephalography (EEG) to measure cortical activity linked to approach and positive affect. We demonstrate that individuals with Williams Syndrome exhibit a unique neural signature, different from that shown by a control group of extroverts (despite a common social profile).



Saitou, N. *Homo sapiens* Under Neutral Evolution. *Genes and Environment*. 2014; 36(3):99–102.

Many evolutionists seem to believe that Darwinian natural selection is the most important mechanism in evolution. However, most evolution at the molecular level, such as genomes and proteins, is known to follow the neutral process, in which chance plays the most important role. Human evolution is no exception, and there are many evidences of neutral evolution in our genomes.



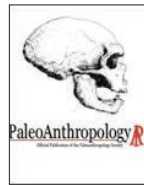
Sejnowski, T.J. Consciousness. *Daedalus*. 2015; 144(1):123–132.

Consciousness remains an elusive scientific problem. Progress has been made by focusing first on visual awareness and studying the non-human primate, whose visual system is similar to ours. Francis Crick did more than any other scientist to raise the level of scientific interest in this problem, searching for neural correlates of consciousness in recordings from neurons in the visual cortex.



Sejnowski, T.J., Churchland, P.S., and Movshon, J.A. Putting Big Data to Good Use in Neuroscience. *Nat Neurosci*. 2014; 17(11):1440–1441.

Our paper addresses some of the unique challenges facing neuroscience in getting the most out of big data. Many different techniques are used from the level of the whole brain to the level of the molecule, from imaging to optogenetics, and different animal models are used for very specific questions. Integrating results is thus rather complicated.



Speth, J.D. When Did Humans Learn to Boil? *PaleoAnthropology*. In-Press.

Boiling changed human diet by making starches more digestible. But when did it begin? Archaeologists assume that, before pottery, humans had to boil in perishable vessels using heated stones—which don't appear until ~35,000 years ago. This paper shows that one can easily boil in hide or bark vessels without using heated stones; thus boiling—and increased use of starches—may have begun much earlier.



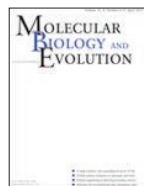
Thomas, G.S., et al. including **Kaplan, H.S.**, and **Finch, C.E.** Why Did Ancient People Have Atherosclerosis?: From Autopsies to Computed Tomography to Potential Causes. *Glob Heart*. 2014; 9(2):229–237.

The Horus team of cardiologists and evolutionary biologists discusses atherosclerosis found in mummies from Peru that predate the Inca and in Egyptian mummies. We consider the role of inflammation, which can accelerate 'athero' in rheumatoid arthritis. We conclude that athero is a basic condition of human aging that can be exacerbated by inflammation, as well as diet and genetic predisposition.



Trevathan, W. Primate Pelvic Anatomy and Implications for Birth. *Philos Trans R Soc Lond B Biol Sci*. 2015; 370(1663):20140065.

Recent accounts of birth in nonhuman primates have called into question aspects of human birth that have been viewed as unique, including rotational birth, the position of fetal emergence, and reliance on assistance. Taken as a whole, however, the constellation of features that describe human birth point to evolutionary changes favoring large brains, bipedal walking, and cooperative child care.



Xu, K., Schadt, E.E., **Pollard, K.S.**, Roussos, P., and Dudley, J.T. Genomic and Network Patterns of Schizophrenia Genetic Variation in Human Evolutionary Accelerated Regions. *Mol Biol Evol*. 2015; advance access 02/12/2015 (doi: 10.1093/molbev/msv031).

Human accelerated regions (HARs) are evolutionarily conserved genome sequences that evolved significantly during human evolution, suggesting a human-specific change in an ancient function. Genome-wide association studies (GWAS) link many genomic variants to human diseases and other traits. This study discovered significant overlap between HARs and schizophrenia GWAS loci. Analysis of regulatory networks involving genes in these uniquely human loci revealed an important role for a GABA-related module, which is differentially expressed in schizophrenia.

CARTA Seeks to Maximize Access and Reach for Its Symposia Videos with High-Quality Closed Captioning



The recent CARTA symposium on “How Language Evolves” drew a large and enthusiastic crowd, both in the auditorium and via the live webcast. That afternoon, we learned how language develops structure, with contrasts between mature languages and several present-day examples of newly emerging languages, both spoken and signed. We also learned about which regions of the human brain are active in language use and what happens if they are not activated during childhood. An enormous amount of information was shared in four short hours.

Understandably, the deaf community showed a strong interest in the subject matter, and, although American Sign Language translators were present for the live audience at UC San Diego, CARTA was keenly aware that hard-of-hearing viewers worldwide could not share in this wealth of information. Thanks to the generosity of our supporters, CARTA was able to recruit a local company, Speechpad, to produce high-quality captions for each talk. These captions are now embedded in the video recordings from the symposium on “How Language Evolves,” and can be viewed on YouTube (see right).

High-quality captions will not only benefit the hard-of-hearing, but also non-native English speakers, who might have difficulty

understanding certain speakers due to accents or clarity of speech. An additional benefit of closed captions is the potential use of CARTA videos as course material for teachers around the world.

With the support of loyal friends and donors, we hope to make high-quality closed captioning a permanent feature of all future video recordings of our symposia. Are you interested in sponsoring a symposium and receiving credit for closed captioning? Contact Ingrid Benirschke-Perkins at ibenirschkeperkins@ucsd.edu.

CARTA Videos on YouTube - How Language Evolves

Program 1: *How Languages Get New Structure*

https://www.youtube.com/watch?v=LfOWX95a_8A#t=102

Program 2: *Contrasts between New and Mature Languages*

https://www.youtube.com/watch?v=Q_j_gYgOmGQ

Program 3: *Language in the Brain*

<https://www.youtube.com/watch?v=0aFMzANQd7A#t=225>

CARTA Symposia Schedule

**Human-Climate Interactions and Evolution:
Past and Future**
May 15, 2015, Salk Institute

Unique Features of Human Skin
October 16, 2015, Salk Institute

Origins of Genus *Homo*
February 5, 2016

Ancient DNA and Human Evolution
April 29, 2016

CARTA on the Web



Want to re-watch a CARTA symposium? All symposia, including “How Language Evolves” (February 2015), are available at the above websites.



facebook.com/ucsdcarta



twitter.com/cartaucsd

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 such as 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 <http://carta.anthropogeny.org>

Support CARTA

Your donation helps to ensure that CARTA’s symposia remain free and available to all. There are three ways to donate to CARTA:

ONLINE Visit <http://carta.anthropogeny.org> and click on “Support CARTA”

BY MAIL Make your check payable to the **UC San Diego Foundation** and include a brief note specifying your donation is to go to CARTA. Mail to:

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La Jolla, CA 92093-0140

BY PHONE Call Ingrid Benirschke-Perkins, CARTA Community Relations Director, at (858) 246-0846