

anthropogeny tracks

a CARTA newsletter

vol. 7/1 - mar. 2019



“Defining the agenda” was the focus of CARTA’s inaugural anthropogeny symposium in 2008. Now, with ten years of new and relevant information on our species’ origins, we mark our decennial celebration with a view to the past and future of anthropogeny at the special symposium: **CARTA 10th Anniversary: Revisiting the Agenda** on **March 23, 2019**.

More details inside!

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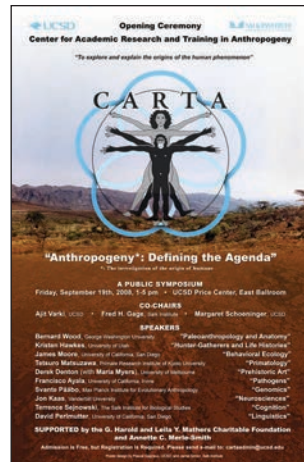
CARTA 10th Anniversary: Revisiting the Agenda celebrates CARTA's decennial achievement and explores the past and future of anthropogeny, the study of human origins.

More than twenty years ago, a small group of La Jolla academics began periodic meetings for transdisciplinary discussions on anthropogeny (explaining the origin of humans). This effort blossomed into what you know today as the Center for Academic Research and Training in Anthropogeny (CARTA): An international intellectual collaboration organized by UC San Diego and the Salk Institute.

At the formal opening of CARTA in 2008, the external advisory panel of prominent researchers set out to “define the agenda” (see Sept. 2008 poster at right) by each addressing a topic in their field of expertise and in relation to our peculiar species.

Ten years later, we will again address a broad array of selected anthropogeny topics, this time with an expanded group of experts who will give the 30,000-foot view of the landscape of anthropogeny. The presenters have been charged with addressing what we know for certain, what we think we know, what we need to know, and how to proceed.

Effectively, the **CARTA 10th Anniversary: Revisiting the Agenda** symposium will be a whirlwind tour of the many approaches to anthropogeny.



SATURDAY, MARCH 23, 2019, 1 - 6 PM (PT)

Conrad T. Prebys Auditorium, Salk Institute

FREE ADMISSION & LIVE WEBCAST!

Tetsuro Matsuzawa, Kyoto University

James J. Moore, UC San Diego

William Kimbel, Arizona State University

Margaret Schoeninger, UC San Diego

Evan Eichler, University of Washington

Anne Stone, Arizona State University

Sarah Tishkoff, University of Pennsylvania

Ajit Varki, UC San Diego

Daniel Geschwind, UCLA School of Medicine

Kristen Hawkes, University of Utah

Alyssa Crittenden, University of Nevada, Las Vegas

Jon Kaas, Vanderbilt University

David M. Perlmutter, UC San Diego

Terry Sejnowski, Salk Institute

Joseph Henrich, Harvard University

Patricia Churchland, UC San Diego

Co-Chairs: **Fred H. Gage**, Salk Institute

& **Pascal Gagneux**, UC San Diego

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*Curious about where we came from and how we got here? Consider attending one of our **FREE** symposia on anthropogeny (the study of human origins) where experts present on topics addressing the origins of the human phenomenon. Can't make it in person? We also offer a **FREE LIVE WEBCAST**. For more details about this CARTA symposium, including registration, the live webcast, or for information on past and future events, please visit:*

<https://carta.anthropogeny.org/symposia>



Anthropogeny Tracks newsletter is produced by CARTA staff and faculty

Center for Academic Research and Training in Anthropogeny

“to explore and explain the origins of the human phenomenon”

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ASK AN ANTHROPOGENY EXPERT

Are you chewing on a particular and ponderous problem related to anthropogeny? Perhaps you're cogitating on where we came from and how we got here. Propose your question to us and we'll recruit experts to weigh in with answers. Selected questions will be featured in a future CARTA newsletter.

Email questions to: carta-info@anthropogeny.org

Q How are wild chimpanzees habituated so they can be studied in their natural habitat?

*Submitted by
P.C., San Diego, CA*

A

There are generally two schools of thought to accomplish habituation (a state of reduced or eliminated fear towards the human observer). The first recommends that a single observer blend into the landscape to cause the least amount of disturbance to the animals. The second recommends the opposite, where teams of observers purposefully stand out. Surely no predator would be so deliberately conspicuous! Regardless, it takes months, even years, to overcome a highly evolved fear of humans (reinforced by their experience with human poaching, logging, etc.). All individuals of a group need to learn that observers are a benign, non-threat to them and their offspring.

Answered by Dr. Alex Piel, Liverpool John Moores University

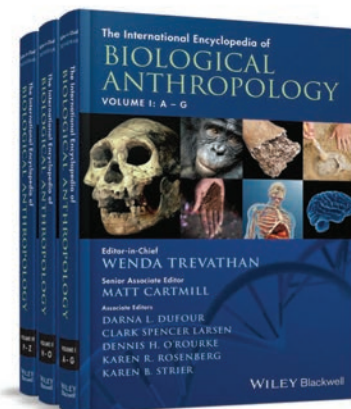
Featuring contributions by CARTA members, this encyclopedia is *the* comprehensive resource on biological anthropology. W. Trevathan, Editor-in-Chief; M. Cartmill, Sr. Assoc. Editor; D. Dufour, C.S. Larsen, D. O'Rourke, K. Rosenberg, K. Strier, Assoc. Editors.

RECOMMENDED RESOURCE

THE INTERNATIONAL ENCYCLOPEDIA OF BIOLOGICAL ANTHROPOLOGY

Susan C. Antón, New York University
Matt Cartmill, Duke University; Boston University
Rachel Caspari, Central Michigan University
Jeremy M. DeSilva, Dartmouth College
Agustín Fuentes, Notre Dame University
Nina G. Jablonski, Penn State University
Donald C. Johanson, Arizona State University
Christopher Kuzawa, Northwestern University
Patricia M. Lambert, Utah State University
Clark Spencer Larsen, Ohio State University
Bruce Latimer, Case Western Reserve University
Linda F. Marchant, Miami University
James J. McKenna, Notre Dame University
Lorna G. Moore, University of Colorado, Denver
Amy L. Non, University of California, San Diego
Briana Pobiner, Smithsonian Institution
Todd M. Preuss, Emory University
Kay Reed, Arizona State University
G. Philip Rightmire, Harvard University
Christopher B. Ruff, Johns Hopkins University
Margaret Schoeninger, UC San Diego

Chet C. Sherwood, George Washington University
Mark Stoneking, Max Planck Institute
Ian Tattersall, American Museum of Natural History
Wenda Trevathan, New Mexico State University
Peter S. Ungar, University of Arkansas
Carel P. van Schaik, University of Zürich
Carol V. Ward, University of Missouri
Adrienne Zihlman, University of California, Santa Cruz



THE MAKING OF A CARTA POSTER

A behind-the-scenes look at how CARTA symposium posters come to life, from initial concept to revisions to final product. You may be surprised how we make it happen.

In contemplation of what it means to be human, you might have wondered why the use of symbolism and abstract representation is universally unique to our species. It's a good thing too, or else we wouldn't be able to capture the theme for each CARTA symposium in poster format.

While we don't have the space in this column to deep dive the humanness of symbolism, we can give you an inside look into how a CARTA symposium poster comes to life.

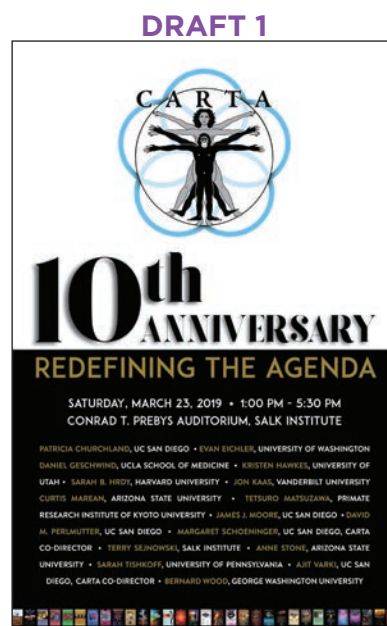
Now, it may come as a surprise that CARTA symposium posters and all other CARTA materials, including our website content and this very newsletter, are composed and designed in-house by CARTA staff. This thoroughly home-grown approach is one of the many things that makes CARTA so unique.

DESIGNER'S NOTE: While some elements from DRAFT 1 will survive to the end, emphasizing the CARTA logo was replaced by prominently showcasing the history of CARTA Posters in DRAFT 2. However, 31 posters is not an easily divisible quantity! This is the draft that was displayed during the CARTA symposium, *Impact of Tool Use and Technology on the Evolution of the Human Mind*, October 12, 2018.

STEP 1 Symposium topics and titles are identified by the CARTA executive committee at least one year before the proposed symposium

STEP 2 CARTA staff generate poster ideas, make rough sketches, collect inspirational examples, and begin to assemble poster components using a suite of graphics and publishing software. For this poster, we wanted to pay homage to the 31 previous CARTA symposia.

STEP 3 Designs are often completely abandoned for a change in direction, so flexibility to conceive of new and better ways to represent the theme is paramount. We aim to have a draft ready for display at the preceding CARTA symposium but sometimes this version is radically different from the final product.



STEP 4 With great relief, a novel (and doable) solution is found. This generally occurs after much consternation, contemplation, hours of staring at the computer screen, and pages of hand-drawn sketches.



STEP 5

More Drafts? Yes, More Drafts! We often tinker and tweak the design just to see if we come across something that has stronger appeal.

DRAFT 2



DESIGNER'S NOTE: The simple grid from Draft 2 just wasn't cutting it and we knew we could make it more interesting and unique. After a lot of finagling and math, we finally hit the right combination of different poster block sizes for DRAFT 3.

STEP 6 Once we decide which version is best, a near-final draft is created and then vetted by the symposium co-chairs for technical and artistic input. Final revisions are then made and a full mock-up with all of the necessary information, such as date, time, location, speakers, contact info, and sponsorship acknowledgements, is sent to the chairs and speakers for final review.

STEP 7 The Finally Final Finale! With all approvals, the poster is printed, and iterations for web formats and presentations are created. It was a long slog but the end result is worthy of CARTA!

DRAFT 2



A CARTA PUBLIC SYMPOSIUM
SATURDAY, MARCH 23, 2019 • 1:00 - 6:00 PM
CONRAD T. PREBYS AUDITORIUM, SALK INSTITUTE

PATRICIA CHURCHLAND UC SAN DIEGO	ALYSSA CRITTENDEN UNIVERSITY OF NEVADA, LAS VEGAS	EVAN EICHLER UNIVERSITY OF WASHINGTON	DANIEL GESCHWIND UCLA SCHOOL OF MEDICINE
KRISTEN HAWKES UNIVERSITY OF ILLINOIS	JOE HENRICH HARVARD UNIVERSITY	JONNY KAAS VANDERBILT UNIVERSITY	WILLIAM KIMBEL ARIZONA STATE UNIVERSITY
TETSURO MATSUZAWA KYOTO UNIVERSITY	JAMES MOORE UC SAN DIEGO	DAVID PERLMUTTER UC SAN DIEGO	MARGARET SCHOENINGER UC SAN DIEGO, CARTA CO-DIRECTOR
TERRY SEJNOWSKI SALK INSTITUTE	ANNE STONE ARIZONA STATE UNIVERSITY	SARAH TISHKOFF UNIVERSITY OF PENNSYLVANIA	AJIT YARKI UC SAN DIEGO, CARTA CO-DIRECTOR

CO-CHAIRS
 FRED H. GAGE, SALK INSTITUTE, CARTA CO-DIRECTOR & PASCAL GAGNEUX, UC SAN DIEGO, CARTA ASSOCIATE DIRECTOR

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Presented by The Center for Academic Research and Training in Anthropogeny | Special Thanks to the Sponsors of this Symposium and Many Generous Friends.

DESIGNER'S NOTE: There were numerous iterations of highly similar poster drafts that we didn't show here. We opted instead to show the most significant revisions.

IN LIVING COLOR: 2018 ANTHROPOGENY FIELD COURSE

A pictorial tour of the 2018 Anthropogeny Field Course in locations throughout the Eastern African Rift.

THE NATIONAL MUSEUM ADDIS ABABA, ETHIOPIA

The Anthropogeny Field Course kicked off in July of 2018, which began a scholastic journey-of-a-lifetime for six UC San Diego Ph.D. students from the Anthropogeny Specialization: **Sean Coffinger** (Psychology), **Anupam Garg** (Neurosciences), **Megan Kirchgessner** (Neurosciences), **Tim Sainburg** (Neurosciences), **Nina Semushina** (Linguistics), and **Linnea Wilder** (Anthropology).

The first learning session was held at the National Museum of Ethiopia in Addis Ababa. There, the students learned about archaeology, fossil preparation, and explored the collection of 8 million years worth of floral and faunal fossils, including important fossils that inform about the evolution of our species.



From left: Megan Kirchgessner, Linnea Wilder, Dr. Alex Piel (field course co-faculty), Sean Coffinger, Anupam Garg, Nina Semushina, Tim Sainburg, Dr. Pascal Gagneux (field course co-faculty), Unknown, Dr. Berhane Asfaw



Fossil preparation of an elephant skull



Linnea with an elephant molar



"Bodo" skull with cut marks around the eye orbit



Extra large stone tool!



A more reasonably sized stone tool



Fossilized baboon skull



Dr. Asfaw pointing out the cutmarks

NGORONGORO CRATER ARUSHA REGION, TANZANIA

To understand the ecology of early human evolution, one must experience the range of environments, plants, and animals our early ancestors would have encountered. At the Ngorongoro Crater, there are over 25,000 animals, large and small, predator and prey. As the second learning session, this faunal exploration gives the students a view into the species that evolved alongside early humans.



Wildebeest



Cape buffalo



Secretary bird



Megan overlooking Lake Magadi, a saline lake in the crater



Spotted hyena



African golden wolf



Thompson's gazelle



Day dreaming of gazelles

OLDUVAI GORGE ARUSHA REGION, TANZANIA

This was followed by a visit to Olduvai Gorge where the Leakeys discovered *Zinjanthropus* and *Homo habilis*.



Entrance to Olduvai



Recreation of the Laetoli footprints



Fossil session in the gorge



A close-up of fossils in sediment



Panoramic section of the gorge

SERENGETI NATIONAL PARK SIMIYU REGION, TANZANIA

After Olduvai Gorge, the students visited Serengeti National Park, where they were able to experience the ecology of a plains ecosystem.



A juvenile giraffe resting



Sean enjoying the safari



Elephants



Plains zebras



Black rhinoceros

HADZALAND

NEAR LAKE EYASI, ARUSHA REGION, TANZANIA

The third learning session involved ethnography of living hunter-gatherers, the Hadza. Over the course of four days, the students lived with the Hadza and partook in the primary activities that the Hadza use to survive: tuber digging, fire making, honey collecting, and hunting.



Group photo with the Hadza



Desert rose



Hadza arrows



Nina successfully dug for tubers



Tim learned how to make fire with a "drill"



It takes effort to make fire



But with fire you can get honey

Along the shore of Lake Tanganyika, the students visited Gombe National Park for the start of the fourth learning session: Comparative primatology. At Gombe, they observed wild, but habituated, chimpanzees, monkeys, and baboons at the research site made famous by Jane Goodall. From lakeside to mountain slope, Gombe is teeming with primates.

GOMBE NATIONAL PARK

KIGOMA REGION, TANZANIA



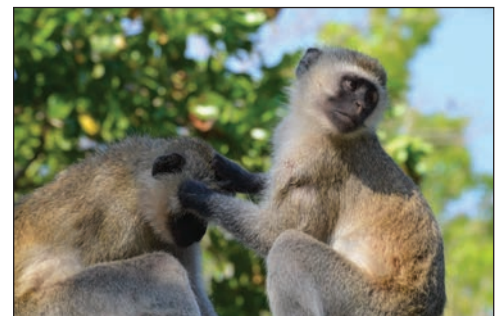
Lake Tanganyika is aquamarine in color



Observing several chimpanzees in a tree



Chimpanzees resting during the midday



Vervet monkeys grooming

GREATER MAHALE ECOSYSTEM RESEARCH AND CONSERVATION ISSA VALLEY, TANZANIA

The final leg of the Field Course brought the students to Issa Valley and the Greater Mahale Ecosystem Research and Conservation (GMERC) site. Run by Dr. Alex Piel, GMERC is focused on studying behavior, ecology, and conservation of wildlife, especially primates. The students joined researchers and students from other universities and participated in ongoing, long-term studies of chimpanzees, yellow baboons, and red-tailed monkeys.



Chimpanzees grooming while up a tree



A red-tailed monkey



Fire is an annual threat in Issa Valley, as Anupam investigates



The students with the GMERC staff and researchers

CARTA- INSPIRED PERFORMING ARTS

A new CARTA-inspired play by Daniel Povinelli and Brandon Barker, *Confessions of a Former Monkey Mind Doctor*, was recently selected as a featured event of Indiana University's College of Arts and Sciences Animal/Human themed Fall 2018 Themester Program.

Confessions of a Former Monkey Doctor strikes at the heart of the question of what it means to be human. The creators, Povinelli and Barker, summarize the play as follows: "A girl falls in love with chimpanzees. She spends her life studying them, trying to close the gap between humans and animals. But what happens when her obsessions leave her trapped in a hall of mirrors from which she can never escape? And what happens to the animals in her care — especially the one inside her head?"

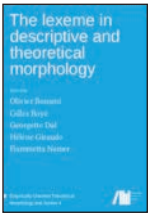
The play is now being produced through the nationally recognized Bloomington Playwrights Project, and will begin touring through the US and elsewhere this Fall.



Daniel Povinelli, above, is the co-creator of this CARTA-inspired play and is a CARTA member.

Transdisciplinary interaction is a core CARTA principle, and our anthropogeny symposia provide a forum for experts from different spheres of knowledge to interact and spark new research on the origins of the human phenomenon. These selected publications were inspired by such interactions. CARTA members are listed in bold. Visit carta.anthropogeny.org for the complete list.

CARTA-INSPIRED PUBLICATIONS



Aronoff, M. Morphology and Words: A Memoir. In: Bonami O, et al., eds. *The Lexeme in Descriptive and Theoretical Morphology*. Berlin: Language Sciences Press; 2018: 3-20.

This article applies the ecological principle of competitive exclusion to the study of words, following Darwin's observation: The survival or preservation of certain favoured words in the struggle for existence is natural selection. The principle explains how affixes compete to form new words in pairs like *exclusiveness* and *exclusivity*. Linguists had approached this problem structurally, with little progress.



Boehm, C, Gintis, H, **Van Schaik, C.** Zoon Politikon: The Evolution of Human Socio-Political Systems. *Behavioural Processes*. In Press.

We deploy the most up-to-date evidence available in various behavioral fields in support of the following hypothesis: The emergence of bipedalism and cooperative breeding in the hominin line, together with environmental developments that made a diet of meat from large animals adaptive, as well as cultural innovations in the form of fire, cooking, and lethal weapons, created a niche for hominins in which there was a significant advantage to individuals with the ability to communicate and persuade in a moral context. These forces added a unique political dimension to human social life which, through gene-culture coevolution, became *Homo ludens*—Man, the game player—with the power to conserve and transform the social order. *Homo sapiens* became, in the words of Aristotle's *Nicomachean Ethics*, a zoon politikon.



Davis, JM, et al., including **Sikela, JM.** A Third Linear Association Between Olduvai (DUF1220) Copy Number and Severity of the Classic Symptoms of Inherited Autism. *Am J Psychiatry*. In Press.

James Sikela's lab has previously implicated Olduvai (DUF1220) protein domains in autism but, due to their complexity, they have been largely unexamined by other investigators. The new study found that as Olduvai copy number increased the severity of the classic symptoms of inherited autism became worse. Sikela hopes that by showing that the link with autism severity holds up in three independent studies, it will prompt other autism researchers to examine this complex family.



Fisher S. Human Genetics: The Evolving Story of FOXP2. *Curr Biol*. 2019;29(2):R65-R67.

Over a decade and a half ago, the discovery that FOXP2 mutations cause speech and language deficits raised interest in possible roles of the gene in human evolution. This article discusses new research that re-evaluates genomic variation at the FOXP2 locus, overturning prior reports of recent positive selection. I explain why FOXP2 can still tell us much about the neurobiology of spoken language.




Grunspan, D, **Nesse, R,** Barnes, M, Brownell, S. Core principles of evolutionary medicine: A Delphi study. *Evol Med Public Health*. 2018;1(1):13-23.

Teaching evolutionary medicine effectively requires focusing on the big ideas that bridge topics in the field. However, no previous research has tried to identify these central principles. A Delphi study with an international panel of

Continued on the next page...

Continued from the previous page


experts identified and validated fourteen core principles in evolutionary medicine, and thirteen sub-principles. These principles can help guide curricular development.

 Gunz, P, et al., including **Enard, W, Hublin, JJ, Pääbo, S, Fisher, SE.** Neandertal Introgression Sheds Light on Modern Human Endocranial Globularity. *Current Biology*. 2019; 29(1):120-127.e5.


The unique globular shape of the *Homo sapiens* braincase may partly reflect changes in underlying neural architecture. We developed a new approach to study biology of this trait, integrating fossil data, archaic genomes, neuroimaging and gene expression. We uncovered introgressed Neandertal DNA fragments associated with reduced globularity, implicating genes linked to neurogenesis and myelination.

 **Hawkes, K, Finlay, BL.** Mammalian brain development and our grandmothering life history. *Physiol Behav*. 2018; 193(Pt A):55-68.

Mammalian brain size and composition vary with longevity. If *human* longevity increased as ancestral grandmothers' subsidies allowed mothers to shorten birth intervals, then *our* big brains are tied to early weaning. As ancestral infant dependence on engaging support wired their maturing brains to social cues, lifelong appetites for shared intentionality evolved with our grandmothering life history.

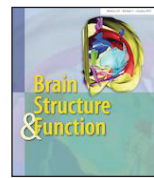
 Kissel, M, **Fuentes, A.** 'Behavioral modernity' as a process, not an event, in the human niche. *Time and Mind*. 2018;11(2):163-183.

The possible examples of meaning making in early and mid Pleistocene human evolution are few and far apart. Here we review the available data of such occurrences and demonstrate that early humans had the capacity to create meaning; and although the context, the right set of circumstances and abilities, for shared and sustained meaning making was not yet present, they were just around the corner.

 Landig, CS, et al., **Varki, N, Varki, A.** Evolution of the exclusively human pathogen *Neisseria gonorrhoeae*: Human-specific engagement of immunoregulatory Siglecs. *Evol Appl*. 2019;12(2):337-349.

Gonococcus bacteria causing the uniquely-


human sexually transmitted disease Gonorrhoea steal sialic acid molecules from host cells to cloak themselves, a disguise that avoids host recognition by engaging Siglecs on immune cells. But gonococcus doesn't need a sialic acid coat to bind Siglecs, instead using a bacterial protein. Chimpanzee Siglecs bound less well, likely contributing to human specificity, and human Siglec variations affect individual susceptibility.

 Lew, CH, et al., including **Bellugi, U, Semendeferi, K.** A postmortem stereological study of the amygdala in Williams syndrome. *Brain Struct Funct*. 2018;223(4):1897-1907.

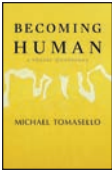
The amygdala is a brain structure critically implicated in social behavior. This study found perturbations to the amygdala in Williams syndrome, a human neurodevelopmental disorder characterized by hypersociality, in the same subdivision that demonstrates unique features in humans compared to apes, suggesting that these novel alterations may contribute to social behavior in human evolution.

 Marchetto, MC, et al., **Muotri, AR, Semendeferi, K, Gage, FH.** Species-specific maturation profiles of human, chimpanzee and bonobo neural cells. *eLife*. 2019;8:e37527.

In this article we used induced pluripotent stem cell (iPSC) technology to study neuronal developmental differences between humans, chimpanzees and bonobos. We report changes in neuronal migration and functional maturation timing in human neurons compared to nonhuman primates. Our strategy lays the groundwork for understanding unique aspects of human brain evolution using live brain cells.

 **Patel, AD.** Evolutionary music cognition: Cross-species studies. In: Rentfrow, PJ, Levitin, DJ, eds. *Foundations of Music Psychology: Theory and Research*. Cambridge, MA: MIT Press; 2019:459-501.

This chapter introduces readers to modern work on cross-species studies of music processing. This line of work provides a powerful method for studying the evolutionary history of specific components of music cognition, and has already produced several surprising results. The chapter is part of a new edited volume on the psychology of music, with chapters on a wide variety of topics.



Tomasello, M. *Becoming Human: A Theory of Ontogeny.* Cambridge, MA: Harvard University Press; 2019.

Virtually all theories of how humans have become such a distinctive species focus on evolution. Based on nearly three decades of experimental work with great apes and

human children, Michael Tomasello proposes a complementary theory of human uniqueness focusing on development. *Becoming Human* places human sociocultural activity within the framework of modern evolutionary theory, and shows how biology creates the conditions under which culture does its work.

The following awards and honors were received by CARTA members during the past year.



Jean-Jacques Hublin (Max Planck Institute for Evolutionary Anthropology):

Received the “Chevalier de la Legion d’Honneur,” the highest French order of merit for military and civil merits, 2019.



Randolph Nesse (Arizona State University):

Elected Member of the American College of Psychiatry, 2019



Palmer Taylor (UC San Diego):

Received the Robert R. Ruffolo Career Award in Pharmacology from the American Society for Pharmacology & Experimental Therapeutics, 2019.



John West (UC San Diego):

Received the Revelle Medal, 2019.

AWARDS & HONORS

CARTA Symposia Schedule

CARTA 10th Anniversary: Revisiting the Agenda

Saturday, March 23, 2019 at the Conrad T. Prebys Auditorium, The Salk Institute

Anthropogeny: The Perspective from Africa

Friday, May 31, 2019 at the Conrad T. Prebys Auditorium, The Salk Institute

Impact of Early Life Deprivation on Cognition: Implications for the Evolutionary Origins of the Human Mind

Friday, October 11, 2019 at the Conrad T. Prebys Auditorium, The Salk Institute

Find past CARTA symposia at



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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>

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:

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