

Eva Christine Garrett, Ph.D.

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Sensory Ecology, Olfaction, Vomeronasal Organ, Primate Evolution, Evolutionary Morphology, Primate Paleontology, Genomics.

PROFESSIONAL APPOINTMENTS

2017 **Assistant Professor.** Department of Anthropology, Boston University College of Arts and Sciences. Boston, MA. USA.

2016-2017 **Postdoctoral Research Scholar.** Department of Anthropology & Archaeology, and Cumming School of Medicine, University of Calgary. Calgary, AB, Canada.

2014-2015 **Postdoctoral Research Fellow.** Department of Anthropology, Washington University, St. Louis, MO, USA.

EDUCATION

2015 **Ph.D., Anthropology.** The Graduate Center, City University of New York, New York, NY, USA

2010 **M. Phil., Anthropology.** The Graduate Center, City University of New York.

2005 **B.A., Anthropology,** with honors and special honors in Anthropology. University of Texas, Austin, TX, USA

RESEARCH INTERESTS

I am devoted to collaborative research and am interested in various aspects of primate and mammalian sensory evolution. I am particularly interested in the role of olfaction in primate biology, and how evolution has affected the olfactory sensory organs, particularly the vomeronasal organ. I have collaborated with other scientists to study the variation in the vomeronasal organ in strepsirrhine and platyrhine primates, and how this relates to their biology. I have also identified an osteological feature that is indicative of the vomeronasal organ in primates which can be visualized in fossils, and used to study sensory system evolution in the fossil record. I am currently working with genomic methods to understand variation in genes underlying sensory systems in human and non-human primates, and how morphological traits can be related back to genetics. Additionally I am interested in sexual dimorphism in primates and how this informs us on sexual selection.

PEER-REVIEWED PUBLICATIONS

2019. Melin AD, Nevo O, Williamson RE, **Garrett EC**, Endo M, Sakurai K, Matsushita Y, Touhara K, Kawamura S. Fruit scent and observer colour vision shape food-selection strategies in wild capuchin monkeys. *Nature Communications*: 10(2407).

2014. **Garrett EC** and Steiper ME. Strong links between genomic and anatomical diversity of both mammalian olfactory chemosensory systems. *Proceedings of the Royal Society B: Biological Sciences*: 281(1783).

2013. **Garrett EC**, Dennis JC, Bhatnagar KP, Durham EL, Burrows AM, Bonar CJ, Steckler NK,

Morrison EE, Smith TD. The vomeronasal complex of nocturnal strepsirrhines and implications for the ancestral condition in primates. *The Anatomical Record*: 296(12) 1881-1894.

2011. Smith TD, **Garrett EC**, Bhatnagar KP, Bonar CJ, Bruening A, Dennis JC, Kinzinger JH, Johnson EW, Morrison EE. The vomeronasal organ of New World Monkeys (Platyrrhini). *The Anatomical Record*: 2158-2178.

2011. Smith TD, Dennis JC, Bhatnagar KP, **Garrett EC**, Bonar CJ, Morrison EE. Olfactory marker protein expression in the vomeronasal neuroepithelium of tamarins (*Saguinus* spp). *Brain Research* (1375): 7-18.

RESEARCH FUNDING, AWARDS, and HONORS

2015 Post-Ph.D. Research Grant, The Wenner-Gren Foundation. \$20,000.

2010 Student Poster Award, IGERT Conference, National Science Foundation. \$3,000.

2010 Doctoral Dissertation Improvement Grant, National Science Foundation. \$19,715.

2010- CUNY Writing Fellowship, The Graduate Center, CUNY.

2009 Graduate Student Research Grant, The Graduate Center, CUNY.

2006 Summer Research Fellowship, New York Consortium in Evolutionary Primatology.

2005 Chancellor's Fellowship/Graduate Teaching Fellowship. The Graduate Center, CUNY.

PROFESSIONAL PREPARATION

2014 **Computational and Comparative Genomics Course Participant**. Cold Spring Harbor Lab, Cold Spring Harbor, New York.

2011 **AnthroTree Workshop Participant**. University of Massachusetts, Amherst, Massachusetts.

2010 **Sensory Ecology Short Course Participant**. Lund University, Lund, Sweden

2010-2011 **CUNY Writing Fellow, Borough of Manhattan Community College** - Led workshops and provided individual training with faculty at Borough of Manhattan Community College on integrating writing in course work to promote critical thinking.

2004-2005 **Senior Student Associate, The eSkeletons Project** (www.eskeletons.org) - Took photographs of primate skeletal elements and edited them for presentation on the eSkeletons website.

FIELD EXPERIENCE

2015 **Mindanao, Philippines**. Visited two populations of Mamanwa Hunter-Gatherers to collect anthropomorphic data with N. Dominy, Ph.D.

2009 **The Fayum Research Site, Egypt**. Collected primate and mammalian fossils from several -Oligocene sites in the Fayum Depression. Site directors: E.L. Simons, Ph.D., E. Seiffert, Ph.D.

2006 **The Seneze Research Site, France**. Collected mammalian fossils at the Pliocene site of Senèze, France. Site director: E. Delson, Ph.D.

2005 **The Dalquest Research Site, Texas**. Paleontological research at the Eocene Dalquest Research Site (near Marfa, Texas). Site director: E. C. Kirk, Ph.D.

SCHOLARLY PRESENTATIONS

Published abstracts and conference proceedings

2019. Poindexter SA, DeCamp RM, **Garrett EC**. Navigational demand and how it's linked to olfaction and spatial memory in primates. *American Journal of Physical Anthropology*, 168 (S68):192-193 [abstract]. Presented as a poster at the Annual

Meeting of the American Association of Physical Anthropologists, Cleveland, OH, USA March 2019.

2019. DeCamp RM, **Garrett EC**. Estimating extinct primate vomeronasal traits using maximum likelihood ancestral state reconstruction methods. *American Journal of Physical Anthropology*, 168 (S68):54 [abstract]. Presented as a poster at the Annual Meeting of the American Association of Physical Anthropologists, Cleveland, OH, USA March 2019.

2017. **Garrett EC**, Gonzales, LA, Kirk EC, Seiffert ER. Evolution of the primate vomeronasal system: fossil evidence from the Fayum. *American Journal of Physical Anthropology*, 162 (S64):191 [abstract]. Presented as a talk at the Annual Meeting of the American Association of Physical Anthropologists, New Orleans, LA, USA April 2017.

2017. Veilleux CC, **Garrett EC**, Bankoff RJ, Dominy NJ, Perry GH, Melin AD. Effects of agricultural transitions on the Evolution of human sensory systems. *American Journal of Physical Anthropology*, 162 (S64):393 [abstract]. Presented as a talk at the Annual Meeting of the American Association of Physical Anthropologists, New Orleans, LA, USA April 2017.

2016. **Garrett EC**, Gonzales LA, Kirk EC, Seiffert ER. The vomeronasal groove in fossil primates. *Journal of Vertebrate Paleontology*, Program and Abstracts, 2016:142 [abstract]. Presented as a talk at the Society of Vertebrate Paleontology Meetings, Salt Lake City, UT, USA, October 2016.

2016. **Garrett EC**, Veilleux CC, Bankhoff RJ, Orkin JD, Dominy NJ, Perry GH, Melin AD. Subsistence strategy and the evolution of human olfactory receptor genotypes. Presented as a talk at the International Primatological Society Meetings, Chicago, IL, USA, August 2016.

2016. Veilleux CC, **Garrett EC**, Dominy NJ, Perry GH, Melin AD. The role of local adaptation in the evolution of human taste. Presented as a talk at the International Primatological Society Meetings, Chicago, IL, USA, August 2016.

2016. **Garrett EC** and Melin AD. Effects of sociality on the evolution of olfactory systems in mammals. *American Journal of Physical Anthropology*, 159 (S62):152 [abstract]. Presented as a talk at the Annual Meeting of the American Association of Physical Anthropologists, Atlanta, GA, April 2016.

2015. **Garrett EC** and Melin AD. Effects of sociality on the evolution of olfactory systems in mammals. Presented as a talk at the Midwestern Primate Interest Group Conference, St. Louis, MO, October 2015.

2015. **Garrett EC** and Kirk EC. On the relationship between visual acuity and vomeronasal function in primates. *American Journal of Physical Anthropology*, 156 (S60): 142 [abstract]. Presented as a talk at the Annual Meeting of the American Association of Physical Anthropologists, St. Louis, MO, March 2015.

2014. **Garrett EC**. Effects of mating system and color vision on the primate vomeronasal organ. Presented as a talk at the International Primatological Society Meetings, Hanoi, Vietnam, August 2014.

2014. **Garrett EC**. Life History variables and vomeronasal groove length in primates. *American Journal of Physical Anthropology*. 153 (S58): 124. [abstract]. Presented as a poster at the Annual Meeting of the American Association of Physical Anthropologists, Calgary, AB, April 2014.

2013. **Garrett EC** and Steiper ME. Testing the color vision priority hypothesis in primates: acquisition of trichromatic color vision affects the vomeronasal system and not the main olfactory system. *PaleoAnthropology*. 2013: A13[abstract]. Presented as a talk at the Paleoanthropology Society Meetings, Honolulu, HI, April 2013.

2011. Steiper ME and **Garrett EC**. Testing the correlation between the anatomical

structures of odorant and pheromone perception and their corresponding gene families in primates and other mammals. *American Journal of Physical Anthropology*. 144 (S52): 284-285. [abstract]. Presented as a poster at the Annual Meeting of the American Association of Physical Anthropologists, Minneapolis, MN, April 2011.

2011. Smith TD, **Garrett EC**, Bhatnagar, KP, Bonar CJ, Breuning, AE, Dennis JC. New findings on the vomeronasal complex of platyrhine primates. *American Journal of Physical Anthropology*. 144 (S52): 279. [abstract]. Presented as a poster at the Annual Meeting of the American Association of Physical Anthropologists, Minneapolis, MN, April 2011.

2011. **Garrett EC** and Smith TD. Reconstructing the vomeronasal system of the earliest primates. *American Journal of Physical Anthropology*. 144 (S52): 140. [abstract]. Presented as a poster at the Annual Meeting of the American Association of Physical Anthropologists, Minneapolis, MN, April 2011.

2010. **Garrett EC**. Getting in the groove: indirect observations of the primate vomeronasal system using CT. *American Journal of Physical Anthropology* 141(S50): 109. [abstract]. Presented as a poster at the Annual Meeting of the American Association of Physical Anthropologists, Albuquerque, NM, April 2010.

2009. **Garrett EC**, Smith TD, Burrows AM, Bonar CJ. Osteological correlates of the vomeronasal system in primates. *American Journal of Physical Anthropology* (S48):132.[abstract]. Presented as a poster at the Annual Meeting of the American Association of Physical Anthropologists, Chicago, IL, April 2009.

2008. **Garrett EC** and Delson E. Geometric morphometric analysis of the ontogeny of canine and craniofacial growth in *Colobus guereza*: implications for its lack of canine dimorphism. *American Journal of Physical Anthropology* 135(S46):101.[abstract]. Presented as a poster at the Annual Meeting of the American Association of Physical Anthropologists, Columbus, OH, April 2008.

2008. Steiper ME, Swedell L, Chowdhury S, **Garrett EC**. A comparison of inexpensive methods for obtaining DNA from the feces of baboons. *American Journal of Physical Anthropology* 135(S46):200. [abstract]. Presented as a poster at the Annual Meeting of the American Association of Physical Anthropologists, Columbus, OH, April 2008.

Presentations without published abstracts and invited/guest lectures

2018 The relationship between vomeronasal traits and the navigational demands of social living in primates. DeCamp RM., SA. Poindexter, **EC Garrett**. Poster presented at the fourth annual meeting of the Northeast Evolutionary Primatologists at Canisius College in Buffalo, NY.

2017 Evolution of the vomeronasal system in primates: genes, anatomy, and the fossil record. Keynote address to the third annual meeting of the Northeast Evolutionary Primatologists at Yale University, New Haven, CT.

2015 Target-capture and Next-Generation Sequencing. Invited guest lecture for Dr. Amanda Melin's course "Molecular Methods". Department of Anthropology, Washington University, St. Louis, MO.

2015 The role of olfaction in primate dietary ecology. Invited guest lecture for Dr. Ari Ariel's course "Food and the Senses". Department of Gastronomy, Boston University, Boston MA.

2015 Sniffing out the role of primate olfaction. Invited guest lecture for the Department of Anthropology, Boston University, Boston, MA.

2015 Examining olfaction in human and non-human primate evolution. Talk presented to the Kuwamara Lab at University of Tokyo. University of Tokyo, Tokyo, Japan.

2015 Was there a sensory trade-off in primate evolution. Talk presented to Pennsylvania

State University's Anthropology Department. Pennsylvania State University, State College, PA.

2014 Relationships within and between the mammalian olfactory systems, and applications for studying the sensory trade-off hypothesis in primates. Invited guest lecture for Dr. Amanda Melin's upper division course in anthropological genetics. Washington University, St. Louis, MO.

2014 Variation in the Vomeronasal Complex and Implications for the Sensory Trade-off Hypothesis in Primates. Talk presented to the Washington University's Department of Anthropology Journal Club. Washington University, St. Louis, MO.

2013 Osteological correlates of the primate vomeronasal organ and implications for the Sensory Trade-off Hypothesis. Invited lecture at Rutgers University, NJ.

2013 Color vision, the olfactory subsystems, and implications for primate sensory trade-off. Talk presented to the New York Consortium on Evolutionary Primatology. New York, NY.

2013 Olfaction and Sexual Selection. Invited guest lecture for Margaret Bryer's course on the anthropology of sex. Brooklyn College, NY.

2014 Sensory trade-off in primates. Invited lecture at the American Museum of Natural History. New York, NY.

2012 Relationships within and between the mammalian olfactory systems. Talk presented to the New York Consortium on Evolutionary Primatology. New York, NY.

2011 The vomeronasal groove and what it can tell us about sensory trade-off in primate evolution. Invited lecture for Introduction to Human Evolution, taught by Dr. Jessica Rothman, Hunter College. New York, NY.

2010 Getting in the groove: a method for detecting sensory trade-off in the fossil record. Poster presented at the Lund University Sensory Ecology Short Course, Lund, Sweden.

2010 Getting in the groove: inferring chemical communication in the primate fossil record. Poster presented at the National Science Foundation IGERT 2010 Project Meeting, Washington, DC. Awarded one of ten student poster prizes for excellence in science communication.

2010 An update on the vomeronasal groove and what it can tell us about sensory trade-off in primate evolution. Talk presented to the New York Consortium on Evolutionary Primatology. New York, NY.

2009 Osteological correlates of the vomeronasal system in primates. Talk presented to the New York Consortium on Evolutionary Primatology. New York, NY.

COURSES TAUGHT

2017 – now **Lecture Instructor**, Primate Anatomy and Evolution, The Primate Senses, Human Origins, Primate Biomechanics, Human Biology Behavior and Evolution, Department of Anthropology, Boston University.

2012-2013 **Lecture Instructor**, Introduction to Human Evolution, Department of Anthropology, Hunter College

2012- 2014 **Lab Instructor**, Queens School of Inquiry Summer Session

2010-2014 **Lab Instructor**, Introduction to Human Evolution, Department of Anthropology, Hunter College

2006-2014 **Lecture and Lab Instructor**, Introduction to Human Evolution, Department of Anthropology, Lehman College

2010 **Lecture and Lab Instructor**, Introduction to Human Variation, Department of Anthropology, Lehman College

SERVICE and OUTREACH

Ongoing **Reviewer**, Nature Communications, Journal of Morphology, International Journal of Primatology

2014 Discussed the role of olfaction in primate and mammalian evolution with a public audience in the American Museum of Natural History's Sackler Lab, New York, NY

2014 Interviewed for the documentary "The SkinDeep" on the role of olfaction in mediating sexual selection and relationships in humans.

2010-2011 Co-organizer for a symposium on primate sensory ecology, AAPA

2007 New Student and Orientation Committee, New York Consortium in Evolutionary Primatology

2007-2009 Social Events Committee, New York Consortium in Evolutionary Primatology

2005 Volunteer for NYCEP "Monkeys Old and New" Conference, New York, NY

MANUSCRIPTS IN PREPARATION

1. "The Sensory Trade-off Hypothesis Revisited"

ONGOING RESEARCH ACTIVITIES

1. Relationships between visual characteristics and olfaction in primate and non-primate mammals, collaboration with Dr. E.C. Kirk (University of Texas at Austin).
2. Effects of foraging strategy on sensory systems of human agriculturalists and hunter-gatherers, collaboration with Dr. A. Melin (University of Calgary), Dr. N. Dominy (Dartmouth University), Dr. G. Perry (Pennsylvania State University), and Dr. C. Veilleux (University of Texas at Austin).
3. Olfaction in *Saguinus* tamarins, collaboration with Dr. M. Watsa (Washington University, Field Projects International), Dr. A. Melin (University of Calgary), Dr. T. Smith (Slippery Rock University).
4. Reconstructing the vomeronasal system of fossil primates.

PROFESSIONAL AFFILIATIONS

American Association of Physical Anthropology (current), Paleoanthropology Society (current), International Primatological Society (current), American Association of Anthropological Genetics (current), American Association of University Women (current), Society for Vertebrate Paleontology (current)