

## **Julie E. Horvath, PhD**

Director, Genomics & Microbiology Research Laboratory  
Nature Research Center, NC Museum of Natural Sciences  
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Biology Department, North Carolina Central University

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### **EDUCATION**

- 2004                      PhD in Human Genetics, Case Western Reserve University  
                                 Advisor: Evan E. Eichler, PhD, Professor of Genome Sciences  
                                 Dissertation Title: “An Evolutionary Analysis of Pericentromeric Duplications  
                                 on Human 2p11”
- 1996                      BS in Zoology with a concentration in genetics, Michigan State University  
                                 *Cum laude*

### **POSITIONS HELD**

- 2011-Present            Director, Genomics & Microbiology Research Laboratory  
                                 Nature Research Center, NC Museum of Natural Sciences
- 2011-Present            Research Associate Professor  
                                 Biology Department, North Carolina Central University
- 2012-Present            Adjunct Assistant Research Professor of Evolutionary Anthropology  
                                 Duke University
- 2015                      Triangle Sabbatical Scholar, National Evolutionary Synthesis Center at  
                                 Duke University
- 2011                      Assistant Research Professor of Evolutionary Anthropology  
                                 Duke University
- 2008-Present            Research Director, Primate Genomics Initiative, Duke University  
                                 Department of Evolutionary Anthropology and Center for Evolutionary  
                                 Genomics, Institute for Genome Sciences & Policy (IGSP)
- 2004-2008                Postdoctoral Fellow, Institute for Genome Sciences & Policy,  
                                 Duke University  
                                 Advisor: Huntington F. Willard, PhD, Director, IGSP, Nanaline H. Duke  
                                 Professor of Genome Sciences
- 2004                      Postdoctoral Scholar, Department of Genetics and the Center for Human  
                                 Genetics, Case Western Reserve University  
                                 Advisor: Evan E. Eichler, PhD, Professor of Genome Sciences
- 1997                      Laboratory Technician, Department of Pathology, Michigan State University

Supervisor: Karen Friderici, PhD, Professor

### **HONORS AND AWARDS**

- 2014 Genomes Environments Traits (GET) Lab award, Boston MA
- 2005-2007 Postdoctoral Fellowship in Evolutionary Genomics and Molecular Evolution, Institute for Genome Sciences & Policy, Duke University
- 2007 One of 27 selected for internationally competitive two-week interactive course in conservation genetics led by Professor Steve O'Brien and taught by renowned international conservation genetics faculty, Kane'ohe, HI
- 2006 Poster Presentation Award, Institute for Genome Sciences & Policy Retreat Duke University
- 2003 Poster Presentation Award, Genetics Graduate Student Colloquium Case Western Reserve University
- 1998-2001 Trainee, Human Genetics Training Grant, NIH grant GM08613 Case Western Reserve University
- 1998-1999 Elected Member, Genetics Graduate Student Committee, Case Western Reserve University
- 1998 Department of Genetics Director's Award for Speaking at the American Society of Human Genetics, Case Western Reserve University

### **CURRENT RESEARCH SUPPORT**

- 10/2013 – 9/2018 NSF-MSP: Students Discover: Improving Middle School STEM Outcomes through Scaling Citizen Science Projects to Rob Dunn (PI), Role (Senior Scientist), \$7,764,481
- 9/2014-8/2017 NSF: MRI: Acquisition of a next-generation sequencing instrument for interdisciplinary research in the NC Museum of Natural Sciences to Juliann Horvath Roth (PI), \$272,440
- 6/2012-4/2017 NIH/NIMH (R01-1MH096875-01A1) Collaborative research: "Animal model of genetics and social behavior in Autism Spectrum Disorders" to Michael Platt (PI), Role (Advisor, Other Significant Contributor), \$3,454,213
- 10/2013-9/2014\* Institute of Museum and Library Services: Friends of the North Carolina Museum of Natural Sciences' Proposal to Enhance the Visitor Experience at the Nature Research Center to Julie Horvath (PI), \$144,145 \*one year no cost extension

### **PAST RESEARCH SUPPORT**

- 10/2008-9/2014\* NSF HOMINID BCS-0827552 Collaborative research: "Genetic bases for the evolution of human diet" to Gregory Wray (PI), Role (Key Personnel), \$1,624,825 \*one year no cost extension

- 4/2013-4/2014 NC Biotech Center: Acquiring an Automated Pipetting System to Advance Interdisciplinary Research in the Genomics and Microbiology Laboratory of the NC Museum of Natural Sciences Nature Research Center to Julie Horvath (PI), \$110,941
- 9/2009-8/2012\* NIH/NIMH 1R01 MH089484-01 Collaborative research: "A macaque model of social behavior heterogeneity in autism spectrum disorders" to Michael Platt (PI), Role (Co-Inv), \$2,255,984  
\*including a one year no-cost extension
- 1/2011-6/2012 Wenner-Gren Foundation #3832395 Collaborative research: "Evolutionary genomics of enamel thickness in humans" to Christine Wall (PI), Role (Co-Inv), \$19,969

## PUBLICATIONS

- Horvath, J.E.**, Ramachandran, G.L., Fedrigo, O., Nielsen, W.J., Babbitt, C.C., St. Clair, E.M., Pfefferle, L.W., Jernvall, J., Wray, G.A., Wall, C.E. (2014) Genetic comparisons yield insight into the evolution of enamel thickness during human evolution. *Journal of Human Evolution*. 73: 75-87.
- Muntané G., **Horvath J.E.**, Hof P.R., Ely J.J., Hopkins, W.D., Raghanti, M.A., Lewandowski, A.H., Wray, G.A., Sherwood, C.C. (2014) Analysis of Synaptic Gene Expression in the Neocortex of Primates Reveals Evolutionary Changes in Glutamatergic Neurotransmission. *Cereb Cortex*. Jan 9 [Epub ahead of print]
- Brent, L.J.N, Heilbronner, S.R., **Horvath, J.E.**, Gonzalez-Martinez, J., Ruiz-Lambides, A., Robinson, A.G., Skene, J.H.P., Platt, M.L. (2013). Genetic origins of social networks in rhesus macaques. *Sci Rep*. 3, 1042.
- Horvath, J.E.**, Sheedy, C.B., Merrett, S.L., Diallo, A.B., Swofford, D.L., NISC Comparative Sequencing Program, Green, E.D., Willard, H.F. (2011). Comparative analysis of the primate X inactivation center region and reconstruction of the ancestral primate *XIST* locus. *Genome Res*. 21: 850-62.
- Perelman, P., Johnson, W., Roos, C., Seuanez, H.N., **Horvath, J.E.**, Moreira, M.A.M., Kessing, B., Pontius, J., Roelke, M., Rumpler, Y. et al. (2011). A Molecular Phylogeny of Living Primates. *PLoS Genet*. 7: e1001342.
- Babbitt, C.C., Fedrigo, O., Pfefferle, A.D., Boyle, A.P., **Horvath, J.E.**, Furey, T.S., Wray, G.A. (2010). Both noncoding and protein-coding RNAs contribute to gene expression evolution in the primate brain. *Genome Biol. and Evol*. 2: 67-79.
- Horvath, J.E.**, Weisrock, D.W., Embry, S.L., Fiorentino, I., Balhoff, J.P., Kappeler, P., Wray, G.A., Willard, H.F., Yoder, A.D. (2008). Development and application of a phylogenomic toolkit: resolving the evolutionary history of Madagascar's lemurs. *Genome Res*. 18: 489-499.
- Horvath, J.E.**, Willard, H.F. (2007). Primate comparative genomics: lemur biology and evolution. *Trends Genet*. 23: 173-82.

**Horvath, J.E.**, Gulden, C.L., Vallente, R.U., Eichler, M.Y., Ventura, M., McPherson, J.D., Graves, T.A., Wilson, R.K., Schwartz, S., Rocchi, M., Eichler, E.E. (2005). Punctuated duplication seeding events during the evolution of human chromosome 2p11. *Genome Res.* 15: 914-27.

**Horvath J.E.\***, She X.\*, Jiang Z., Liu G., Furey T.S., Christ L., Clark R., Graves T., Gulden C.L., Alkan C., Bailey J.A., Sahinalp C., Rocchi M., Haussler D., Wilson R.K., Miller W., Schwartz S., Eichler E.E. (2004). The structure and evolution of centromeric transition regions within the human genome. *Nature* 430: 857-64. \*contributed equally

Locke, D.P., **Horvath, J.E.**, and Eichler, E.E. (2003). Mapping pericentromeric regions. In *Genome Mapping and Sequencing* (ed. I. Dunham), pp. 237-255. Horizon Scientific Press, Norfolk, VA.

**Horvath, J.E.**, Gulden, C.L., Bailey, J. A., Yohn, C., Mcpherson, J., Bruce Roe, B., de Jong, P. J., Schwartz, S., Viggiano, L., Archidiacono, N., Zhao, S., Rocchi, M., and Eichler, E. E. (2003). Using a pericentromeric interspersed repeat to recapitulate the phylogeny and expansion of human pericentromeric DNA. *Mol. Biol. Evol.* 20: 1463-1470.

Guy, J., Hearn, T., Crosier, M., Mudge, J., Viggiano, L., Kocsan, D., Thiesen, H-J., Bailey, J., **Horvath, J.E.**, Eichler, E.E., Deloukas, P., French, L., Rogers, J., Bentley, D. and Jackson, M.S. (2003). Genomic sequence and transcriptional profile of the boundary between pericentromeric satellites and genes on human chromosome arm 10p. *Genome Res.* 13: 159-172.

Bailey, J.A., Yavor, A.M., Viggiano, L., Miscio, D., **Horvath, J.E.**, Archidiacono, N., Schwartz, S., Rocchi, M., Eichler, E.E. (2002). Human-specific duplication and mosaic transcripts: the recent paralogous structure of chromosome 22. *Am. J. Hum. Genet.* 70: 83-100.

**Horvath, J.E.**, Bailey, J.A., Locke, D.P., Eichler, E.E. (2001). Lessons from the human genome: transitions between euchromatin and heterochromatin. *Hum. Mol. Genet.* 10: 2215-23.

**Horvath, J.E.**, Schwartz, S., Eichler, E.E. (2000). The mosaic structure of human pericentromeric DNA: a strategy for characterizing complex regions of the human genome. *Genome Res.* 10: 839-52.

**Horvath, J.E.**, Viggiano, L., Loftus, B. J., Adams, M.D., Archidiacono, N., Rocchi, M. and Eichler, E.E. (2000). Molecular structure and evolution of an alpha satellite/non-alpha satellite junction at 16p11. *Hum. Mol. Genet.* 9: 113-123.

Leipprandt, J.R., Chen, H., **Horvath, J.E.**, Qiao, X.T., Jones, M.Z., Friderici, K.H. (1999). Identification of a bovine  $\beta$ -mannosidosis mutation and detection of two  $\beta$ -mannosidase pseudogenes. *Mammalian Genome* 10: 1137-1141.

#### INVITED ORAL PRESENTATIONS

- September 2014 "Science and the story" Postdoc Association, NC Central University, Durham, NC
- June 2014 "The diversity and evolution of the primate skin microbiome: how different are humans from our closest relatives?" Evolution Conference, Raleigh, NC

- May 2013 “The Primate Armpit Microbiome Project” Laboratory Corporation of America, Burlington, NC
- April 2013 “Research and Outreach at the Nature Research Center: What Can We Learn About Human Health from Primate Genomics and Armpit Microbes?” NC Academy of Sciences, UNC Pembroke, Pembroke, NC
- March 2013 “Armpits and Belly Buttons—Microbiome Biodiversity” Scaling STEM: Strategies that engage minds Conference, Interactive Video presentation to Sheraton Imperial Hotel and Conference Center, Durham, NC
- October 2012 “Research and Internship Opportunities at the Nature Research Center,” Collegiate Academy North Carolina Academy of Science Workshop, Bennett College, NC
- May 2012 “The Nature Research Center: New Connections and Synergistic Opportunities,” Department of Evolutionary Anthropology, Duke University, Durham, NC
- April 2011 “Gene discovery in a hibernating primate,” American Association of Physical Anthropologists Conference, Minneapolis, MN
- February 2011 “Bridging disciplines through primate genomics in order to understand evolution, variation and disease,” Emory University, Atlanta, GA
- April 2008 “Lemur comparative genomics and beyond,” Primate Genomics and Human Disease Conference, Seattle, WA
- July 2007 “Lemur phylogeny reconstruction and creation of a genomic toolkit,” Gordon Conference: Ecology, Evolution and Functional Genomics, Newport, RI
- May 2001 “Characterizing pericentromeric duplications: an expanded analysis of 2p11,” Genetics Graduate Student Colloquium, Case Western Reserve University, Cleveland, OH
- October 1999 “Molecular characterization of an alpha-satellite junction,” American Society of Human Genetics Conference, San Francisco, CA
- May 1999 “Paralogous human genome evolution: mapping and sequencing pitfalls,” Genome Sequencing and Biology Conference, Cold Spring Harbor, NY
- October 1997 Topic: Human pericentromeric duplications, American Society of Human Genetics Conference, Denver, CO

### **MENTORSHIP EXPERIENCE**

- Summer 2014 Christopher Bardo, undergraduate at NC Central University  
Project: “Engaging the public in genetic and microbiology research”
- Summer 2013 Meghana Hologadde, High School Intern from East Chapel Hill High School  
Project: “Primate Armpit Biodiversity Project”
- Summer 2013 Nishika Campbell, undergraduate at NC Central University  
Project: “Identifying Fungal Species Living on Primate Skin”
- 2012-2013 Megan Ehlers, undergraduate at NC State University  
Project: “Exploring Armpit Microbial Biodiversity”
- Summer 2012 Ashley Schick, Pre-vet intern  
Project: “Characterizing Human Armpit Microbes”
- 2011-2012 Gowri Ramachandran, Research Technician I  
Project: “Evolutionary genomics of enamel thickness in humans”
- Summer 2010 Maxx Toler, Duke Primate Genomics Initiative Graduate Fellow  
Project: “The comparative genomics of convergence on continuously

Summer 2010	growing banded incisors” Kathleen Grogan, Duke Primate Genomics Initiative Graduate Fellow Project: “MHC genetic variation and the relationship with semiochemical variation in <i>Lemur catta</i> ”
2010	Bryan Gibson, Non-Duke Student/Intern Project: “Anatomical dissection and RNA isolation for primate transcriptomics”
2009	Kristin Maloney, Technician Project: “Organizing and isolating lemur DNA samples”
Spring 2009	Courtney Hunter, Duke Undergraduate Student Independent Study Project Title: “Exploring the evolution of human diet”
2005-2008	Stephanie Embry, Research Analyst I Projects: “Lemur phylogenetic comparisons” and “Using comparative genomics to understand the evolution of lemur X chromosomes”
2005-2006	Tara Mandalywala, Duke Undergraduate Student Independent Study Project Title: “Using comparative genomics to understand X inactivation”
2006	Kimberly Cocce, Duke Undergraduate Student Independent Study Project Title: “Genetic assessment of the lemur radiation”

### TEACHING EXPERIENCE

Fall 2014	“Seminar in Biology” (BIOG 5700), NC Central University, Durham, NC
Fall 2014	“Graduate Seminar in Integrated Biosciences II” (INBS 8710), NC Central University, Durham, NC
Spring 2014	“Seminar in Biology” (BIOG 5700), NC Central University, Durham, NC
Spring 2014	“Graduate Seminar in Integrated Biosciences I” (INBS 8700), NC Central University, Durham, NC
Spring 2013	“Graduate Seminar in Integrated Biosciences II” (INBS 8710), NC Central University, Durham, NC
Spring 2013	“Seminar in Biology” (BIOG 5700), NC Central University, Durham, NC
Fall 2012	“Graduate Seminar in Integrated Biosciences I” (INBS 8700), NC Central University, Durham, NC
Fall 2012	“Seminar in Biology” (BIOG 5700), NC Central University, Durham, NC
Fall 2011	New Course Development: EVANTH/FOCUS 128FCS: “Introduction to Evolutionary Genomics and Analysis Methods,” Duke University, Durham, NC
Spring 2011	Guest Lecturer/Discussion Leader to Human Embryology (EvAnth/Bio 208S) “X inactivation analyses,” Duke University, Durham, NC

2007-08, 2010-12 Course instructor on comparative genomics, Duke Bioinformatics Workshop, Lecture to students from biotechnology, medical and graduate schools, Duke University, Durham, NC

### SERVICE

2012-Present Regular lecturer (monthly) to public in the NC Museum of Natural Sciences, Nature Research Center, "Primates: from traits to DNA," "Primate Genome Sequencing: What Have We Learned?," "The Primate Armpit Microbiome Project" Raleigh, NC

2012-Present North Carolina Academy of Science, Member, Board of Directors, Raleigh, NC

2012-Present Co-Advisor, Undergraduate Biology Society, North Carolina Central University, Durham, NC

2012-Present Member, Internship Committee, North Carolina Central University, Durham, NC

2014 Member, Transition Committee, Triangle Center for Evolutionary Medicine, (TriCEM), Durham-Raleigh-Chapel Hill, NC

2013-2014 North Carolina Academy of Science, Chair, Local Arrangements Committee; Member, Annual Meeting Committee, Raleigh, NC

2012-2013 North Carolina Academy of Science, Ad Hoc Member, Raleigh, NC

2012 Community Presentation: "The Nature Research Center: Engaging You in Science That Affects Your Daily Life," Sunshine Seniors Group, Raleigh, NC

2011 Guest Lecturer to IGSP Summer Fellows Program, "Bridging disciplines using primate genomics," Duke University, Durham, NC

2010 Participant in the Duke University, Institute for Genome Science & Policy "Genome Diner" program to learn what the community (middle school students and their parents or guardians) and genome scientists think about each other and genome related research topics

2010 Guest Lecturer to Talent Identification Program (TIP) high school students "Lemur biology and evolution," Duke University, Durham, NC

Reviewer Editorial advisor to: *Gene*, *Genome Research*, *Chromosome Research*, *Evolutionary Bioinformatics*, *Journal of Heredity*, *Cell*, *Human Molecular Genetics*, *Human Genetics*, *PLoSOne*

Grant Reviewer Leakey Foundation

Committees Graduate Committee Member: Joshua Hughey, NC Central University, 2014-Present

Senior Undergraduate Thesis Committee Member: “ Ring-tailed lemur resistance to human disease as reflected by MHC divergence” by Wendy McGinnis, Duke University, April 2012

Senior Undergraduate Thesis Committee Member: “Impacts of natural hybridization on the fitness of large-bodied African primates” by Rubayet Hossain, Duke University, April, 2011

**PROFESSIONAL MEMBERSHIPS**

The Honor Society of Phi Kappa Phi

Women in Biology-RTP Chapter

American Association for the Advancement of Science

North Carolina Academy of Science (NCAS)