

NICOLE CREANZA

Position: Assistant Professor of Biological Sciences, Vanderbilt University
Address: Department of Biological Sciences, Vanderbilt University
Medical Research Building III
465 21st Ave. South
Nashville, TN 37212
Phone: (615) 875-8139
Email: nicole.creanza@vanderbilt.edu

PROFESSIONAL APPOINTMENT

2016–Present Assistant Professor of Biological Sciences, Vanderbilt University
2011–2016 Stanford University, Department of Biology, Ecology and Evolution Group
Postdoctoral Fellow with Marcus W. Feldman

EDUCATION

2005–2011 The Rockefeller University
Ph.D. in Biological Sciences awarded June 2011
Committee: Fernando Nottebohm (advisor), Jim Hudspeth, Joel Cohen
2000–2004 Harvard University
A.B. *summa cum laude* in Biology
Thesis advisor: Christine Queitsch; Faculty mentor: David Haig

FELLOWSHIPS AND GRANTS

2017 Vanderbilt Music Mind & Society seed grant to study the interactions between stress and learning in a songbird model system (\$10,000)
2017 Vanderbilt Microbiome Initiative pilot grant for theoretical and empirical comparisons between the microbiome and learned behaviors (\$3,000)
2014–2017 Collaborative Research Grant with PI Marcus Feldman, John Templeton Foundation (\$312,425)
2013–2016 Individual Research Grant, Ruth Landes Memorial Research Fund, The Reed Foundation (\$42,000)
2013–2016 Individual Research Grant, Stanford Center for Computational Evolutionary and Human Genetics (\$15,000)
2006–2009 National Science Foundation Graduate Research Fellowship (\$120,000)

- 2005–2010 Rockefeller University Women & Science Initiative Graduate Fellowship (\$30,000)
- 2003 Harvard University Bauer Center for Genomics Research summer undergraduate research fellowship (\$3,600)
- 2000–2004 Harvard Faculty Scholarship (\$37,750)

PUBLICATIONS

- Creanza N.** Signals of evolutionary history in a learned behavior: song reflects phylogeny in sparrows. *Under review.*
- Kolodny O, Feldman MW, **Creanza N.** Bridging cultural gaps: the interdisciplinary nature of cultural evolution. *Under review.*
- Sherriah AC, Thomas EAC, Devonish H, **Creanza N.** Using features of a Creole language to reconstruct population history: tracing the English origins of Sranan in Suriname. *Under review.*
- Kolodny O, Feldman MW, **Creanza N.** Integrative studies of cultural evolution: crossing disciplinary boundaries to produce new insights. *Under review.*
- Kolodny O, Mattison SM, **Creanza N.** An economic solution for the matrilineal puzzle. *Under review.*
- Fogarty L, **Creanza N,** Feldman MW. How and when people learn: subsistence strategy, age-structured social learning, and cultural niche construction. *Under review.*
- Fogarty L, **Creanza N** (2017). The niche construction of cultural complexity: interactions between innovations, population size, and the environment. *Philosophical Transactions of the Royal Society of London. In press.*
- Rathmann H, Reyes-Centeno H, Ghirotto S, **Creanza N,** Hanihara T, Harvati K (2017). Reconstructing human population history from dental phenotypes. *Scientific Reports.* 7(1): 12495.
- Creanza N***, Kolodny O*, Feldman MW (2017). Cultural evolutionary theory: how culture evolves and why it matters. *Proceedings of the National Academy of Sciences.* 114(30): 7782-7789. *Contributed equally.
- Archuleta TL, Frazier MN, Monken AE, Kendall AK, Harp J, McCoy AJ, **Creanza N,** Jackson LP (2017). Structure and evolution of ENTH and VHS/ENTH-like domains in trypsin. *Traffic.* 18:590-603.
- Creanza N***, Kolodny O*, Feldman MW (2017). Greater than the sum of its parts? Modeling population contact and interaction of cultural repertoires. *Journal of The Royal Society Interface,* 14(130): 20170171. *Contributed equally.
- Kolodny O*, **Creanza N***, Feldman MW (2016). Game-changing innovations: how culture can

change the parameters of its own evolution, inducing abrupt cultural shifts. *PLoS Computational Biology* 12(12), e1005302. *Contributed equally.

Creanza N, Feldman MW (2016). Worldwide genetic and cultural change in human evolution. *Current Opinion in Genetics and Development* 41:85-92.

Creanza N, Fogarty L, Feldman MW (2016). Cultural niche construction of repertoire size and learning strategies in songbirds. *Evolutionary Ecology* 30:285–305.

Kolodny O*, **Creanza N***, Feldman MW (2015). Evolution in leaps: the punctuated accumulation and loss of cultural innovations. *Contributed equally. *Proceedings of the National Academy of Sciences*: 112 (49): E6762-E6769.

Fogarty L, **Creanza N**, Feldman MW (2015). Cultural evolutionary perspectives on creativity and human innovation. *Trends in Ecology and Evolution* 30:736-754.

Creanza N, Ruhlen M, Pemberton TJ, Rosenberg NA, Feldman MW, Ramachandran S (2015). A comparison of worldwide phonemic and genetic variation in human populations. *Proceedings of the National Academy of Sciences* 112:1265–1272.

Online press: The Atlantic, Smithsonian, Quartz.com, Serious Science, Ars Technica, Generation Anthropocene podcast (links at nicolecreanza.com)

Academic press: Hunley K (2015). Reassessment of global gene-language coevolution. *PNAS* 112(7), 1919–1920.

Research Highlight, *Nature Reviews Genetics* (2015) 16:128–129.

“In this Issue” (2015) *PNAS* 112(5):1239–1240.

Creanza N, Feldman MW (2014). Complexity in models of cultural niche construction with selection and homophily. *Proceedings of the National Academy of Sciences* 111:10830–10837.

Creanza N, Fogarty L, Feldman MW (2013). Exploring Cultural Niche Construction from the Paleolithic to Modern Hunter-Gatherers. In *Dynamics of Learning in Neanderthals and Modern Humans* Volume 1 (pp. 211–228). Springer Japan.

Fogarty L, **Creanza N**, Feldman MW (2013). The role of cultural transmission in human demographic change: an age-structured model. *Theoretical Population Biology* 88: 68–77.

Press M, Li H, **Creanza N**, Kramer G, Queitsch C, Sourjik V, Borenstein E (2013). Genome-scale co-evolutionary inference identifies functions and clients of bacterial Hsp90. *PLoS Genetics* 9: e1003631.

Creanza N*, Fogarty L*, Feldman, MW (2012). Models of niche construction with selection and assortative mating. *PLoS ONE* 7: e42722. *Contributed equally.

Creanza N*, Schwarz JS*, Cohen JE (2010). Intraseasonal dynamics and dominant sequences in H3N2 influenza. *PLoS ONE* 5: e8544. *Contributed equally.

TEACHING AND MENTORSHIP EXPERIENCE

- 2016–Present Current advisor for 3 graduate students, 6 undergraduates; co-mentor for 1 graduate student
- 2017–Present BSCI 2205: Evolution (Fall semesters)
- 2017–Present BSCI 3861, 3961, 7390, 8999: Research mentorship courses for undergraduate and graduate students
- 2017 BSCI 6320: Graduate seminar on research design and scientific presentation
- 2017 Guest lecture, BSCI 3239: Evolution of Behavior
- 2015 Theoretical Population Genetics, Stanford University: Lectured on merging cultural data with genetic analyses and on demographic modeling
- 2014 Modeling Cultural Evolution, Stanford University: Lectured on phylogenetic inference, Bayesian modeling, and the evolution of languages
- 2013 Organized and led workshop for graduate students and postdocs: Improving scientific figures with Adobe Illustrator and other graphic design software
- 2013–2015 Advised a Stanford University student on genetic data analysis and modeling in R
- 2011–2012 Co-advised a Brown University student on analysis of linguistic and genetic data
- 2009–Present Advised a Hunter College High School student on evolutionary genetic analyses
- 2010–2011 Advised a Vassar College student on audiovisual recording of avian behavior
- 2009–2010 Advised a Vassar College student on mate choice experiments in finches
- 2009–2010 Advised a Bronx High School for Medical Science student on behavioral analysis; student awarded Edith C. Blum Foundation Fellow of the Science Outreach Program
- 2008–2009 Advised a Hunter College student on generating and analyzing behavioral data
- 2007–2008 Visiting Faculty, Bard College. Designed and taught an advanced seminar course (Biology 416: An organismal approach to behavioral neuroscience)

INVITED PRESENTATIONS

- 2018 “Linguistic and genetic variation in Asia and the Americas”
Upcoming invited presentation at the joint meeting of American Association of Anthropological Genetics and American Association of Physical Anthropologists

- 2017 “Extending the learning window: the evolution of open-ended learning in songbirds”
Upcoming invited presentation at Stanford University
- 2017 “Mother tongues? A global study of sex-biased cultural transmission of language”
Invited presentation at the Cultural Evolution Society Conference, Jena, Germany
- 2017 “Patterns of global linguistic diversity”
Invited presentation at Societas Linguistica Europaea, Zurich, Switzerland
- 2017 “Signals of evolutionary history in a learned behavior: song reflects phylogeny in sparrows”
Invited presentation at Society for Molecular Biology and Evolution Conference (SMBE), Austin, TX
- 2017 “Migration patterns, human language, and genetic variation”
Systems Biology seminar, Vanderbilt University Medical Center
- 2016 “Large-scale cultural change as a feature of cultural evolution itself”
Invited presentation at the New Directions in the Evolutionary Social Sciences Conference, Cambridge, UK
- 2016 “Large-scale cultural change in models of cultural evolution”
New Perspectives in Cultural Evolution workshop, Stanford University
- 2016 “Evolution of learned behaviors: empirical and theoretical approaches”
Institute for Theoretical Sciences, City University of New York
- 2016 “Evolution of learned behaviors: insights from birds and humans”
Evolution and Ecology seminar, University of Tennessee Knoxville
- 2016 “Evolution of learned behaviors: insights from birds and humans”
Biological Sciences seminar, Vanderbilt University
- 2016 “Evolution of learned behaviors: empirical and theoretical approaches”
Biological Anthropology seminar, University of California, Santa Cruz
- 2016 “Evolution of learned behaviors: empirical and theoretical approaches”
Molecular Anthropology seminar, University of California, Davis
- 2016 “Evolution of learned behaviors: a genomic and computational perspective”
Bioinformatics seminar, California Institute of Technology
- 2015 “Correlated evolution of repertoire size, mate choice, and learning mode”
Association for the Study of Animal Behaviour (ASAB) Winter Meeting, London
- 2015 “Human linguistic and genetic variation”
University of Tübingen, Center for Advanced Studies
Symposium: Words, Bones, Genes, Tools: Tracking Linguistic, Cultural and Biological Trajectories of the Human Past

- 2015 “A comparison of worldwide linguistic and genetic variation in human populations”
Presentation at the Human Behavior and Evolution Society Conference, Columbia, Missouri. **Postdoctoral Award for best presentation**
- 2015 “Evolution of learned behaviors: insights from birdsong and human languages”
Presentation at Arizona State University
Evolution of Social Complexity Seminar Series
- 2015 “Fast and slow changes in birdsong evolution: quantifying the phylogenetic and cultural content of learned song”
Presentation at the Joint meeting of the American Ornithologists’ Union and the Cooper Ornithological Society (AOU/COS)
- 2015 “Evolution of learned behaviors: insights from birds and humans”
Presentation at AOU/COS (Early Professionals Symposium)
- 2015 “Evolution of learned behaviors: insights from birds and humans”
Presentation at the Evolution Conference, Guarujá, Brazil
- 2015 “Comparisons of cultural and genetic evolutionary dynamics”
Hosted by Joshua Plotkin, University of Pennsylvania
- 2014 “The construction of learning niches by subsistence strategy”
Presentation at the Frontiers in Niche Construction Workshop at the Santa Fe Institute, Santa Fe, New Mexico
- 2014 “Worldwide linguistic and genetic variation”
Invited presentation at the Society for Molecular Biology and Evolution Conference (SMBE), San Juan, Puerto Rico
- 2014 “Worldwide linguistic and genetic variation”
Presentation at the Stanford Center for Computational Evolutionary and Human Genomics Winter Symposium
- 2013 “Worldwide phonemic variation: evolutionary analysis and genomic comparisons”
Presentation at the Evolution Conference, Snowbird, Utah
- 2012 “Debating the serial founder effect model in human languages”
Hosted by Dr. Sohini Ramachandran, Brown University
- 2010 “A phylogenetic and cultural analysis of learned song”
Hosted by Dr. Carl Hopkins and the Macaulay Library of Natural Sounds, Cornell University
- 2009 “An evolutionary analysis of birdsong”
Hosted by Dr. Ofer Tchernichovski, City College of New York

- 2009 “A search for quantifiable song features that discriminate phylogenetic distance, sound environment, and natural history”
Birdsong Conference, Millbrook NY

POSTER PRESENTATIONS

- 2015 “Detailed signatures of human evolutionary history in linguistic and genetic data”
Poster presentation at SMCBE, Vienna, Austria
- 2015 “Correlated evolution of song repertoire size, mate choice, and learning modes in songbirds”
Poster presentation at the Evolution Conference, Guarujá, Brazil
- 2013 “Phylogenetic and cultural content of learned birdsong”
Poster presentation at the Evolution Conference, Snowbird, Utah

ACADEMIC HONORS AND AWARDS

- 2015 Postdoctoral award: named best postdoctoral talk at the Human Behavior and Evolution Society conference (\$500)
- 2015 Postdoctoral travel award from the American Ornithologists’ Union (\$450)
- 2013 Named Stanford Computational Evolutionary and Human Genetics Fellow
- 2013 Named Ruth Landes Memorial Research Fellow
- 2006–2009 National Science Foundation Graduate Research Fellowship Award
- 2004 Bachelor of Arts (A.B.) *summa cum laude* in Biology with a language citation in Spanish.
- 2004 *Summa cum laude* on undergraduate senior thesis.
- 2004 Phi Beta Kappa
- 2001 Detur Book Prize (top 5% of first-year students)
- 2000–2004 John Harvard Scholarship (top 5%) each term.
- 2000–2004 Elizabeth Cary Agassiz Scholar (women with at least an A– average) each term.
- 2000–2004 Undergraduate scholarship awards: National Merit Scholar, Central Florida Mensa Scholar, National Beta Club Scholar, Robert C. Byrd Honors Scholar

SERVICE AND ACTIVITIES

- 2017 Symposium organizer (invited), “Network-based approaches in evolutionary biology and medicine,” European Society for Evolutionary Biology Conference, Groningen, the Netherlands
- 2017–Present Organizer, Vanderbilt Biological Sciences Seminar Series
- 2016–Present Faculty mentor, Women of Biological Sciences, Vanderbilt University
- 2016–Present Faculty mentor, Inequality in the Biosciences Association, Vanderbilt University
- 2016 Organizer, New Perspectives on Cultural Evolution workshop, Stanford University
- 2015–Present Organizer, Stanford lecture series: “Cultural Evolution and Human Studies”
- 2015–2016 Organizer, Women in Science Club, Stanford
- 2015 Symposium organizer (invited), “Cancer as a Darwinian process,” Society for Molecular Biology and Evolution Conference, Vienna, Austria
- 2015 Judge of Student Presentation Awards, American Ornithologists’ Union
- 2014 Symposium organizer (invited), “Joint analyses of cultural and genetic data,” Society for Molecular Biology and Evolution Conference, San Juan, Puerto Rico
- 2013–2016 Founding member of the Women in Science Club, Stanford
- 2005–2010 Rockefeller Women in Science Initiative
- 2005–2009 Founding member of Research Club, a weekly meeting designed to give graduate students more opportunities to make formal presentations about their research
- 2007–2008 Organizer, Student- and Postdoc-Sponsored Seminar Series, Rockefeller University
- 2006–2007 Rockefeller Student Retreat Planning Committee
- 2005–2006 Rockefeller Graduate Student Recruitment Planning Committee
- 2000–2004 Women in Science at Harvard-Radcliffe
- 2001–2004 CONTACT peer-counseling group. Co-director 2002-2003.

PROGRAMMING LANGUAGES

MATLAB, R, Perl, Mathematica, MySQL