

# Caleb D. Phillips, Ph.D.

## CONTACT INFORMATION

Texas Tech University  
Department of Biological Sciences  
Lubbock, Texas 79424  
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Email: caleb.phillips@ttu.edu

Google Scholar Link  
<http://scholar.google.com/citations?user=kCqavJOAAAAJ&hl=en>

Natural Science Research Laboratory Link  
<http://www.nsrll.ttu.edu/personnel/CalebPhillips/index.htm>

## EDUCATION

Ph.D. in Genetics- 2009 Purdue University  
Department of Forestry and Natural Resources, advised by John W. Bickham

M.S. in Biology- 2006 Tarleton State University  
Department of Biological Sciences, advised by Russell S. Pfau

B.S. in Biology- 2003 Tarleton State University  
Department of Biological Sciences

## PRESENT POSITIONS

Curator of Genetic Resources Collection, Natural Science Research Laboratory  
Museum of Texas Tech University, Lubbock, TX, 79409

Assistant Professor, Department of Biological Sciences  
Texas Tech University, Lubbock, Tx, 79409 (as of September 1, 2015)

## PROFESSIONAL EXPERIENCE

Adjunct Faculty (2014-2015)  
Department of Biological Sciences, Texas Tech University, Lubbock, Tx, 79409

Principal Scientist (2014-2015)  
Bioinformatics Team, Research and Testing Laboratory, Lubbock, TX, 79407

Postdoctoral Fellow (2009-2014)  
Department of Biological Sciences, Texas Tech University, Lubbock, TX 79424

Research Assistant (2006-2009)  
Center for the Environment, Purdue University, West Lafayette, IN 47904

Genetics Laboratory Technician (2006)  
Biology Department, Tarleton State University, Stephenville, TX 76042

Graduate Assistant (2003-2006)  
Biology Department, Tarleton State University, Stephenville, TX 76042

Laboratory Technician (2001-2003)  
Pioneer Dairy Laboratory, Stephenville, TX 76041

## **INVITED LECTURES**

Society for Integrative and Comparative Biology  
Microbiome Workshop, January 6, 2017  
"Metagenomic Challenges and Approaches"

Society for Integrative and Comparative Biology  
Metagenomics Symposium, January 6, 2017  
"Microbiome Structural and Functional Interactions Across Bat Dietary Niche Space"

Texas Tech University  
Department of Biological Sciences, Undergraduate Introduction to Biology, April 12 2016  
"Genomics of Mammalian Adaptation"

University of New Mexico  
Department of Biology Seminar Series, October 2015  
"Genome Evolution and Adaptations for Dietary Success"

American Society of Mammalogy  
Recent Advances in Mammalogy Symposium, June 2014  
"Bat Salivary Gland Transcriptomes and Inferences on Adaptation"

Department of Immunology and Molecular Microbiology  
Texas Tech University Health Sciences Center, February 2014  
"Recruitment of alternative splicing in the remarkable evolution of vampire bats"

University of Texas at Arlington  
Genome Biology Group Seminar Series, October 2012  
"A model for Musashi-mediated translational regulation in development and morphological evolution"

## **PROFESSIONAL RECOGNITION**

Howard Hughes Medical Institute  
Summer Postdoctoral Teaching Scholar at Texas Tech University- Summer 2010

Texas Genetics Society  
Outstanding Postdoctoral Fellow Platform Presentation- March 2012

## **SOCIETY MEMBERSHIPS**

American Society of Mammalogist- Life Member  
Texas Genetics Society- Member  
Texas Society of Mammalogists - Member  
Society for Integrative and Comparative Biology - Member

## **TEACHING EXPERIENCES**

Metagenomics - Graduate  
Biological Informatics - Graduate  
Advanced Statistical Phylogeography - Graduate  
Molecular Systematics and Evolution - Graduate  
Host-parasite Co-evolution - Undergraduate  
Animal Biology - Undergraduate  
Cell and Molecular Biology for Teachers - Graduate

## **MENTORSHIP**

### *GRADUATE STUDENT COMMITTEE MEMBERSHIP*

Jeremy Wilkinson, Ph.D. Student - Major Advisor: Greg Mayer - Current  
Texas Tech University, The Institute of Environmental and Human Health

Kelsey Thompson, Ph.D. Student - Major Advisor: Greg Mayer - Current  
Texas Tech University, The Institute of Environmental and Human Health

Jaspreet Kaur, Ph.D. Student - Major Advisor: Dr. Jyotsna Sharma - Current  
Texas Tech University, Plant and Soil Sciences

Emma Roberts, Ph.D. Student - Major Advisor: Robert Bradley - Current  
Texas Tech University, Biological Sciences

Taylor Soniat, Masters Student -Major Advisor: Robert Bradley - Current  
Texas Tech University, Biological Sciences

Meijun Dong, Ph.D. Student- Major Advisor: Deborah Carr- Current  
Texas Tech University, Biological Sciences

Anisha Navlekar, Ph.D. Student- Major Advisor: Deborah Carr- Current  
Texas Tech University, Biological Sciences

Christopher Dunn, MS Student- Major Advisor: Robert Bradley- Completed (Fall 2016)  
Texas Tech University, Biological Sciences

Heidi Stevens, MS Student-Major Advisor: Robert Bradley- Current  
Texas Tech University, Biological Sciences

Laura Blanco-Berdug, Ph.D. Student- Major Advisor: David Ray- Current  
Texas Tech University, Biological Sciences

Austin Osmansk, Ph.D. Student- Major Advisor: David Ray- Current  
Texas Tech University, Biological Sciences

Arnab Ghosh, MS Student- Major Advisor: David Ray- Current  
Texas Tech University, Biological Sciences

Kevin Sullivan, Ph.D. Student- Major Advisor: David Ray- Current  
Texas Tech University, Biological Sciences

Iroro Tanshi, Ph.D. Student- Major Advisor: Tigga Kingston- Current  
Texas Tech University, Biological Sciences

Amie Sommers, MS Student- Major Advisor: Liam McGuire- Current  
Texas Tech University, Biological Sciences

Saba Nafees, Ph.D. Student- Major Advisor: Sean Rice- Current  
Texas Tech University, Biological Sciences

Arnab Ghosh, Ph.D. Student- Major Advisor: David Ray- Current  
Texas Tech University, Biological Sciences

Jordan Brown, Ph.D. Student- Major Advisor: Deborah Carr- Current  
Texas Tech University, Biological Sciences

Mark Lee, Ph.D. Student- Major Advisor: Lou Densmore- Current  
Texas Tech University, Biological Sciences

Beth Rogers, Ph.D. Student- Major Advisor: Liam McGuire- Current  
Texas Tech University, Biological Sciences

Moamen Elmassry, Ph.D. Student- Major Advisors: Hamood Abdul, Michael San Francisco- Current  
Texas Tech University, Health Sciences Center, Biological Sciences

#### *GRADUATE STUDENT COMMITTEE CHAIRS*

Oscar Sandate, Masters Student - Current  
Texas Tech University, Biological Sciences

Jack Francis, Masters Student - Co-chair: Robert Bradley - Current  
Texas Tech University, Biological Sciences

Laramie Lindsey, Ph.D. Student - Co-chair: Robert Bradley - Current  
Texas Tech University, Biological Sciences

Howard Huynh, Ph.D. Student - Current  
Texas Tech University, Biological Sciences

Craig Tipton, Ph.D. Student - Current  
Texas Tech University, Biological Sciences

Matthew Fox, Ph.D. Student - Current  
Texas Tech University, Biological Sciences

#### *UNDERGRADUATE MENTORSHIP*

Marilyn Mathew, Honors Student; TTU CISER Scholar - Current  
Texas Tech University Biological Sciences

Gregory Knox - Current  
Texas Tech University Biological Sciences

## STUDENT PRESENTATIONS

Lindsey Laramie, Platt Neal, Phillips Caleb, Ray David, Bradley Robert. Evaluating the Lineage diversification of *Peromyscus* using a phylogenomic approach.  
8th Texas Tech Annual Biological Science Symposium Meeting. April 8th, 2017.  
Second Place Oral Presentation in Evolutionary Biology Category.

Soniat Taylor, Phillips Caleb, MacDonald Kathy, Wilkinson Jeremy, Bradley Robert. Assessing levels of DNA and RNA degradation in frozen tissues archived in natural history collections.  
8th Texas Tech Annual Biological Science Symposium Meeting. April 8th, 2017.  
First place for Oral Presentation in the category of Museum Science.

Francis James, Platt Roy, Phillips C, Bradley Robert. Resolving the Phylogenetic variation in *Peromyscus maniculatus*; Possible evidence for multiple species.  
8th Texas Tech Annual Biological Science Symposium Meeting. 2017. Oral Presentation. April 8th, 2017.

Mathew, Marilyn, Tipton Craig, Wolcott Randy, Wolcott Rick, Kingston Tigga, Phillips Caleb, Temporal community variance and relative abundance of chronic wound microbiota.  
CALUE Undergraduate Research Conference, 28-29 March, 2017. Poster Presentation.

Knox Gregory, Sandate Oscar, Mathew Marilyn, Tipton Craig, Fox Matthew, Phillips Caleb, Microbiome and physiological responses to pregnancy.  
CALUE Undergraduate Research Conference, 28-29 March, 2017. Poster Presentation.

Lindsey, Laramie L., Roy Neal Platt, David Ray, Caleb Phillips, and Robert D. Bradley. The lineage diversification of *Peromyscus*: evidence from a transcriptomic dataset.  
Texas Society of Mammalogist, Junction, Texas. 10-12 February 2017. Oral Presentation.

Sandate, Oscar, Matthew Fox, Gregory Knox, Marylin Mathew, Craig Tipton, Caleb Phillips. Gut microbiome analysis during pregnancy in *Tadarida brasiliensis*.  
Texas Society of Mammalogist, Junction, Texas. 10-12 February 2017. Poster Presentation.

Soniat, Taylor J, Caleb D. Phillips, Kathy MacDonald, Jeremy Wilkinson, Robert D. Bradley. Assessing levels of DNA and RNA degradation in frozen museum tissues.  
Texas Society of Mammalogist, Junction, Texas. 10-12 February 2017. Poster Presentation.

Francis, James Q., Roy N. Platt II, Caleb D Phillips, Robert D. Bradley. Resolving the phylogeography and phylogenetic variation in *Peromyscus maniculatus* based on Cytochrome-b.  
Texas Society of Mammalogist, Junction, Texas. 10-12 February 2017. Oral Presentation.

Wilkinson, J. E., J. D. Hanson, C. D. Phillips, M. R. Wages, E. J. Rees, G. D. Mayer. Effects of two polyphenols on the gut microbiome and associated weight gain in mice.  
7th Texas Tech Annual Biological Sciences Symposium. Texas Tech University, Lubbock, Texas. 1-2 April 2016.  
Second Place, Oral Category, Microbiology Section, \$250 Award.

Lindsey, Laramie L., Roy Neal Platt, David Ray, Caleb Phillips, and Robert D. Bradley. Addressing the adaptive radiation in *Peromyscus* using transcriptome data.

7th Texas Tech Annual Biological Sciences Symposium. Texas Tech University, Lubbock, Texas. 1-2 April 2016. First Place, Oral Category, Evolutionary Biology Section, \$250 Award.

Francis, James Q., Caleb D. Phillips, and Robert D. Bradley. Resolving the phylogeography and phylogenetic variation in *Peromyscus maniculatus* using molecular systematics and next gene sequencing.

7th Texas Tech Annual Biological Sciences Symposium. Texas Tech University, Lubbock, Texas. 1-2 April 2016. First Place, Oral Category, Proposals Section, \$250 Award.

Lindsey, Laramie L., Roy Neal Platt, David Ray, Caleb Phillips, and Robert D. Bradley. Addressing the adaptive radiation in *Peromyscus* using transcriptome data.

Annual meeting of the Texas Society of Mammalogists. 12-13 February 2016. Oral Presentation.

Francis, James Q., Caleb D. Phillips, and Robert D. Bradley. Phylogenetics of *Peromyscus maniculatus* based on the mitochondrial gene cytochrome-b.

Annual meeting of the Texas Society of Mammalogists. 12-13 February 2016. Poster Presentation.

## REVIEWER ACTIVITY

Genome Biology and Evolution<sup>1</sup>, Molecular Ecology<sup>2</sup>, Molecular Phylogenetics and Evolution<sup>3</sup>, Journal of Biogeography<sup>4</sup>, Canadian Journal of Zoology<sup>5</sup>, Genetica<sup>6</sup>, Comparative Biochemistry and Physiology<sup>7</sup>, Marine Mammal Science<sup>8</sup>, GENE<sup>9</sup>, Oikos<sup>10</sup>, PLoS One<sup>11</sup>, Journal of Mammalian Evolution<sup>12</sup>, Zoological Studies<sup>13</sup>, BMC Research Notes<sup>14</sup>

## RESEARCH FOCUS

Thematic Interest: Functional Genomics, Genome Evolution, Adaptation, Molecular Evolution

### *Metagenomics*

We are studying the evolution of microbiome community composition and associated metagenomic functional capabilities. Understanding how host phylogeny, co-evolution, colonization, functional redundancy, and environmental factors shape microbial communities and corresponding metagenome functions are central themes. Exploiting host systems with convergent life history characteristics that are globally distributed.

### *Comparative transcriptomics, evolution of gene expression*

We are exploring the evolution of derived tissue function using different RNAseq approaches; motivation to understand functional evolution of expression by recruitment and regulatory/structural evolution; Chiroptera as a study system.

## BIOLOGICAL CONSULTING

1. Genetic advisor to Permian Basin Oil Drillers Association. Diagnosis of population genetics and demographics using existing genetic data for the Dune Sagebrush Lizard (*Sceloporus arenicolus*) in 2012. Advisement regarding proposed listing as Endangered under the Endangered Species Act.
2. Biostatistical lead at Research and Testing Laboratory. Advisement on experimental design and analysis of metagenomic and genomic studies for cliental from academic and private institutions.
3. Analytical and experimental role in assessing species-status and distribution of endangered eyeless cave spiders, genus *Cicurina*, contracted by TxDOT.
4. Contractor, Battelle Memorial Institute, bioinformatic and biostatistical roles in environmental DNA studies.

## PUBLICATIONS

**PHILLIPS, CD**, HANSON JD, WILKINSON J, KOENIG L, REES E, WEBALA P, KINGSTON T (in press) Microbiome Structural and Functional Interactions across Host Dietary Niche Space. *Integrative and Comparative Biology*.

BAKER RJ, DICKINS B, WICKLIFFE JK, KHAN FA, GASCHAK S, MAKOVA K, **PHILLIPS, CD** (in press) Elevated mitochondrial genome variation after 50 generations of radiation exposure in a wild rodent. *Evolutionary Applications*.

LEE S, KANAAN A, **PHILLIPS CD**, ROWAN N, WILLIAMS J (in press) Respiratory Viral Detection in the Paranasal Sinuses of Patients with Cystic Fibrosis. *American Journal of Rhinology and Allergy*.

LARSEN RJ, LARSEN PA, **PHILLIPS, CD**, GENOWAYS HH, KWIECINSKI GG, PEDERSEN SC, PHILLIPS CJ, BAKER RJ (2017) Patterns of Morphological and Molecular Evolution in the Antillean Tree Bat, *Ardops nichollsi* (Chiroptera: Phyllostomidae). *Occasional Papers Museum Texas Tech University*, No. 345.

KUSHAK RI, WINTER HS, BUIE TM, COX SB, **PHILLIPS CD**, WARD NL (in press) Analysis of the duodenal microbiome in autistic individuals: associations with carbohydrate digestions. *Journal of Pediatric Gastroenterology & Nutrition*.

WARD NL, **PHILLIPS CD**, NGUYEN D, SHANMUGAM NKN, SONG Y, HODIN R, SHI HN, CHERAYIL BJ, GOLDSTEIN AM (2016) Antibiotic treatment induces long-lasting changes in the fecal microbiota that protect against colitis. *Inflammatory Bowel Diseases*, 10:2328-2340.

SAGOT M, **PHILLIPS CD**, BAKER RJ, STEVENS, R (2016) Human-modified habitats change patterns of population genetic structure and group cohesion in Peters tent-roosting bats. *Ecology and Evolution*, doi: 10.1002/ece3.2255.

KONSTANTINOS EP, WARD NL, **PHILLIPS CD**, TESHAGER A, PATEL P, MOHAMED MMR, HAKIMIAN S, COX SB, AHMED R, MOAVEN O, KALIANNAN K, ALAM SN, HALLER JF, GOLDSTEIN AM, BHAN AK, MALO MS, HODIN RA (2016) Prevention of antibiotic-associated metabolic syndrome in mice by intestinal alkaline phosphatase. *Diabetes, Obesity and Metabolism*. DOI: 10.1111/dom.12645

WOLCOTT RD, HANSON JD, REES E, KOENIG L, **PHILLIPS CD**, WOLCOTT R, COX SB, WHITE J (2015) Analysis of the Chronic Wound Microbiota of 2963 Patients by 16S rDNA Pyrosequencing. *Wound Repair and Regeneration*, DOI:10.1111/wrr.12370.

\***PHILLIPS CD**, BAKER RJ (2015) Gene Recruitment by Alternative Splicing Underlies Vampire Bat Salivary Adaptations and Convergences with Sanguivorous Leeches, *Frontiers in Ecology and Evolution*, DOI:10.3389/fevo.2015.00122

\*Press Coverage: See below

MCDONOUGH MM, UMBERA R, MAZOCH V, FERGUSON AW, **PHILLIPS CD**, BRYJA J (2015) Multilocus phylogeography of a widespread savanna-woodland adapted rodent reveals the influence of Pleistocene geomorphology and climate change in Africa's Zambezi region. *Molecular Ecology*. 24:5248-5266.

ROWAN, N, LEE S, SAHO N, KANAAN A, COX SB, **PHILLIPS CD**, WANG E (2015) The role of viruses in the clinical presentation of chronic rhinosinusitis. *International Forum of Allergy and Rhinology*. 29(6):197-200.

\***PHILLIPS CD** (2015) Life history, ecology, and status of fur seals and sea lions of Australia and New Zealand. (Book Review of *Fur Seals and Sea Lions*, By Roger Kirkwood and Simon Goldsworthy; CSIRO Publishing) *Journal of Mammalian Evolution*. 22(4):597-597.

\*Book Review- i.e. not peer-reviewed

THOMAS J, **PHILLIPS CD**, BAKER RJ, PRITHAM EJ (2014) Rolling-circle transposons catalyze genomic innovation in a mammalian lineage. *Genome Biology and Evolution*, 6, 2595-2610.

KLIMOVA A, **PHILLIPS CD**, FIETZ K, OLSEN M, HARWOOD J, AMOS W, HOFFMAN J (2014) Global population structure and demographic history of the grey seal. *Molecular Ecology*, 16, 3999-4017.

PHILLIPS CJ, **PHILLIPS CD**, GOECKS J, LESSA EP, SOTERO-CAIO CG, TANDLER B, GANNON MR, BAKER RJ (2014) Dietary and flight energetic adaptations in a salivary gland transcriptome of an insectivorous bat. *PLoS One*, e83512.

KHAN FAA, **PHILLIPS CD**, BAKER RJ (2014) Timeframes of speciation, reticulation, and hybridization in the Bulldog bat explained through phylogenetic analysis of all genetic transmission elements. *Systematic Biology*, 63, 96-110.

SAGOT M, **PHILLIPS CD**, STEVENS RD, BAKER RJ (2013) Development and characterization of seventeen microsatellite loci for the Peters tent-roosting bat (*Uroderma bilobatum*). *Conservation Genetics Resources*, DOI 10.1007.

**PHILLIPS CD**, BUTLER B, FONDON JW, MANTILLA-MELUK H, BAKER RJ (2013) Contrasting evolutionary dynamics of the developmental regulator PAX9, among bats, with evidence for a novel post-transcriptional regulatory mechanism. *PLoS One*, e57649.

**PHILLIPS CD**, HOFFMAN JI, GEORGE JC, SUYDAM RS, HUEBINGER RM, PATTON JC, BICKHAM JW (2012) Molecular insights into the historical demography of bowhead whales: understanding the evolutionary basis of contemporary management practices. *Ecology and Evolution*, doi: 10.1002/ece3.374

**PHILLIPS CD**, PHELAN G, DOWD SE, MCDONOUGH MM, FERGUSON AW, HANSON JD, SILES L, ORDEZ-GARZA N, SANFRANCISCO M, BAKER RJ (2012) Microbiome analysis among bats describes influences of host phylogeny, life history, physiology and geography. *Molecular Ecology*, 11, 2617-2627.

HOFFMAN JI, GRANT SM, FORCADA J, **PHILLIPS CD** (2011) Bayesian inference of historical bottleneck in a heavily exploited marine mammal. *Molecular Ecology*, 20, 3989-4008.

\***PHILLIPS CD**, GELATT TS, PATTON JC, BICKHAM JW (2011) Phylogeography of Steller sea lions: relationships among climate change, effective population size, and genetic diversity. *Journal of Mammalogy*. 92, 1091-1104.

\* Cover Article

HOFFMAN JI, DASMAHAPATRA KK, AMOS W, **PHILLIPS CD**, GELATT TS, BICKHAM JW (2009) Contrasting patterns of genetic diversity at three different genetic markers in a marine mammal metapopulation. *Molecular Ecology*, 18, 2961-2978.

**PHILLIPS CD**, PATTON JC, TRUJILLO R, GELATT TS, BICKHAM JW (2009) Assessing patterns, rates, and homoplasmy at HVRI in Steller sea lions, *Eumetopias jubatus*. *Molecular Ecology*, 18, 3379-3393.

**PHILLIPS CD**, BICKHAM JW, PATTON JC, GELATT TS (2009) Systematics of Steller sea lions (*Eumetopias jubatus*): subspecies recognition based on concordance of genetics and morphometrics. *Occasional Papers of the Museum of Texas Tech University*, 283.

**PHILLIPS CD**, HENARD CA, PFAU RS (2007) Amplified Fragment Length Polymorphism and mtDNA analyses reveal patterns of divergence and hybridization in the cotton rat, *Sigmodon hispidus*. *Journal of Mammalogy*, 88, 351-359.



## PRESS COVERAGE

<http://www.sciencedaily.com/releases/2015/10/151030220837.html>

<http://phys.org/news/2015-11-vampire-saliva-specially-evolved-blood-feeding.html>

<http://gizmodo.com/the-genetic-basis-for-vampirism-may-be-buried-across-th-1739793378>

<http://today.ttu.edu/posts/2015/10/vampire-bats-saliva-specially-evolved-for-blood-feeding>

<http://esciencenews.com/sources/newswise.scinews/2015/10/30/researchers.find.vampire.bats.saliva.specially.evolved.for.blood.f>

<http://pirman.es/videos/la-saliva-de-murcielagos-vampiro-evoluciono-para-alimentarlos-de-sangre/>

<http://today.ttu.edu/posts/2015/10/vampire-bats-saliva-specially-evolved-for-blood-feeding>

<http://www.newswise.com/articles/view/642374/?sc=rsla>

<http://www.depts.ttu.edu/vpr/discoveries/features/a-design-for-blood.html>

<http://today.ttu.edu/posts/2017/01/nsrl-2>

<https://www.youtube.com/watch?v=6bd9iqq12Vs>

## FUNDING ACTIVITY

1. Proposal Title: Gut microbial compositions of ecologically diversified Chiropteran species  
Organization: RTL Genomics  
Program/solicitation: Cost-sharing grant program for 454-sequencing and data processing  
Award: \$12,000
2. Title: Understanding the genetic consequences of multigenerational exposure to low-dose radiation  
Organization: Private Donation from Jim Sowell  
Award: \$57,000
3. Proposal Title: Endangered Eyeless *Cicurina* (Araneae: Dictynidae): Species Identification with Genetic Applications  
Organization: TxDOT  
Co-PIs: Robert Baker, James Cokendolpher  
Award: \$89,717
4. Title: Development of the Wolcott Wound Care Research Collection in the Genetic Resources Collection of the NSRL  
Organization: Private Donation from Randy Wolcott  
Award: \$100,000