PETER A. LARSEN, PhD

Duke University
Department of Biology
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Education

2010 Texas Tech University, Lubbock, TX
Ph.D. Zoology (Evolutionary Genetics)

2005 Texas Tech University, Lubbock, TX
M.S. Biology

2002 South Dakota State University, Brookings, SD
B.S. Biology

Employment and Appointments

2015 – present Senior Research Scientist
Origin of neurodegenerative disease, primate genomics, next-generation pathogen discovery and surveillance.
Yoder Lab, Department of Biology, Duke University, Durham, NC

2017 – present Research Associate
Duke Lemur Center, Durham, NC

2012 – present Research Associate
Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX

2012 – 2015 Postdoctoral Research Associate and Laboratory Manager
Genome evolution and comparative primate genomics
PI: Anne Yoder
Duke University, Durham, NC

2011 – 2012 Postdoctoral Research Geneticist
Single-molecule sequencing of expressed antibody repertoires
PI: Timothy P. L. Smith
USDA, Clay Center, NE

2003 –2010 Research Assistant
Evolutionary genetics of Neotropical, Palearctic, and Oriental mammals.
Texas Tech University, Lubbock, TX

Professional Interests

Mammalian evolution, comparative genomics, One Health, origin of neurodegenerative disease, ecoimmunology.

Publications

Submitted

Qurollo, B. A.*, **P. A. Larsen***, H. Rakotondrainibe, K. Mahefarisoa, T. Rajaonarivelo, J. Razagindramanana, R. E. Junge, E. B. Breitschwerdt, and C. V. Williams. Molecular surveillance of novel tick-borne pathogens in Madagascar's lemurs. Ticks and Tick-borne Diseases. *equal authorship.

In press

Larsen, P. A.*, R. Alan Harris*, Y. Liu, S. C. Murali, C. R. Campbell, A. D. Brown, B. A. Sullivan, J. Shelton, S. J. Brown, M. Raveendran, O. Dudchenko, I. Machol, N. C. Durand, M. S. Shamim, E. Lieberman Aiden, D. M. Muzny, R. A. Gibbs, A. D. Yoder, J. Rogers and K. C. Worley. Hybrid *de novo* genome assembly and centromere characterization of the gray mouse lemur (*Microcebus murinus*). BMC Biology. *equal authorship.

Peer reviewed

2017 **Larsen, P. A.**, M. W. Lutz, K. E. Hunnicutt, M. Mihovilovic, A. M. Saunders, A. D. Yoder, and A. D. Roses. The *Alu* neurodegeneration hypothesis: a primate-specific mechanism for neuronal transcription noise, mitochondrial dysfunction, and manifestation of neurodegenerative disease. Alzheimer's & Dementia, 13:828-838.

2017 Larsen, R. J., **P. A. Larsen**, C. D. Phillips, H. H. Genoways, G. G. Kwiecinski, S. C. Pedersen, C. J. Phillips, and R. J. Baker. Patterns of morphological and molecular evolution in the Antillean tree bat, *Ardops nichollsi* (Chiroptera: Phyllostomidae). Occasional Papers of the Museum of Texas Tech University, 345:1-32.

2016 Yoder, A. D., C. R. Campbell, M. Blanco, J. U. Ganzhorn, S. M. Goodman, K. E. Hunnicutt, **P. A. Larsen**, P. M. Kappeler, R. M. Rasoloarison, J. M. Ralison, D. Swofford, and D. W. Weisrock. Geogenetic patterns in mouse lemurs (genus *Microcebus*) reveal the ghosts of Madagascar's forests past. Proceedings of the National Academy of Sciences, 113: 8048-8056.

2016 **Larsen, P. A.**, C. Hayes*, C. E. Williams, R. Junge, and A. D. Yoder. Blood transcriptomes reveal novel parasitic zoonoses circulating in Madagascar's lemurs. Biology Letters, 12: 20150829. *undergraduate coauthor

2015 Faherty, S. L., C. R. Campbell, **P. A. Larsen**, and A. D. Yoder. Evaluating whole transcriptome amplification for gene profiling experiments using RNA-seq. BMC Biotechnology, 15:65.

2014 **Larsen, P.A.**, C. Hayes*, A. Wilkens*, Y. Gommard, R. Sookhareea, A. D. Yoder, and S. M. Goodman. Population genetics of the Mauritian Flying Fox (*Pteropus niger*). Acta Chiropterologica, 16:293-300. *undergraduate coauthors

2014 Yoder, A. D. and **P. A. Larsen**. The molecular evolutionary dynamics of the vomeronasal receptor (Class 1) genes in primates: a gene family on the verge of a functional breakdown. Frontiers in Neuroanatomy, 8:153.

2014 **Larsen, P. A.**, A. M. Heilman, and A. D. Yoder. The utility of PacBio circular consensus sequencing for characterizing complex gene families in non-model organisms. BMC Genomics, 15: 720. Highly accessed.

2014 **Larsen, P. A.***, C. R. Campbell*, and A. D. Yoder. Next-generation approaches to advancing eco-immunogenomic research in critically endangered primates. Molecular Ecology Resources, 14:1198-1209 *equal authorship. Cover image. Research highlighted in National Geographic interview.

2014 Yoder*, A. D., L. M. Chan*, M. dos Reis*, **P. A. Larsen***, C. R. Campbell, R. Rasolarison, M. Barrett, C. Roos, P. Kappeler, J. P. Bielawski, and Z. Yang. Molecular evolutionary characterization of a novel V1R subfamily in strepsirrhine primates. Genome Biology and Evolution, 6:213-227. *equal authorship. Cover image.

2012 Larsen, R. J., M. C. Knapp, H. H. Genoways, F. A. A. Khan, **P. A. Larsen**, D. E. Wilson, and R. J. Baker. Genetic diversity of Neotropical *Myotis* (Chiroptera: Vespertilionidae) with an emphasis on South American species. PLoS One 7(10): e46578.

2012 **Larsen, P. A.** and T. P. L. Smith. Application of circular consensus sequencing and network analysis to characterize the bovine IgG repertoire. BMC Immunology, 13:41. Highly accessed.

2012 Genoways, H. H., R. J. Larsen, S. C. Pedersen, G. G. Kwiecinski, and **P. A. Larsen**. Bats of Barbados. Chiroptera Neotropical, 17:1029–1054.

2012 Larsen, R. J., **P. A. Larsen**, H. H. Genoways, F. M. Catzeflis, K. Geluso, G. G. Kwiecinski, S. C. Pedersen, F. Simal, and R. J. Baker. Evolutionary history of Caribbean species of *Myotis*, with evidence of a third Lesser Antillean endemic. Mammalian Biology, 77:124–134.

2012 Marchán-Rivadeneira, M. R., **P. A. Larsen**, C. J. Phillips, R. E. Strauss, and R. J. Baker. On the association between environmental gradients and skull size variation in the great fruit-eating bat, *Artibeus lituratus* (Chiroptera: Phyllostomidae). Biological Journal of the Linnean Society, 105:623–634.

2011 **Larsen, P. A.**, L. Siles, S. C. Pedersen, and G. G. Kwiecinski. A new species of *Micronycteris* (Chiroptera: Phyllostomidae) from Saint Vincent, Lesser Antilles. Mammalian Biology, 76:687–700.

2011 Briggs, B. J., D. M. Czechowski, **P. A. Larsen**, H. N. Meeks, J. P. Carrera, R. M. Duplechin, B. Atkinson, R. Hewson, A. T. Junushov, O. N. Gavrilova, I. Breininger, C. J. Phillips, R. J. Baker, and J. Hay. Tick-Borne Encephalitis Virus in the Kyrgyz Republic. Emerging Infectious Diseases, 17:876–879.

2010 **Larsen, P. A.**, M. R. Marchán-Rivadeneira, and R. J. Baker. Natural hybridization generates mammalian lineage with species characteristics. Proceedings of the National Academy of Sciences, 107:11447–11452.

2010 **Larsen, P. A.**, M. R. Marchán-Rivadeneira, and R. J. Baker. Taxonomic status of Andersen's fruit-eating bat (*Artibeus jamaicensis aequatorialis*) and revised classification of *Artibeus* (Chiroptera: Phyllostomidae). Zootaxa, 2648:45–60.

2010 Khan, F. A., S. Solari, V. J. Swier, **P. A. Larsen**, M. T. Abdullah, and R. J. Baker. Systematics of Malaysian woolly bats (Vespertilionidae: *Kerivoula*) inferred from mitochondrial, nuclear, karyotypic, and morphological data. Journal of Mammalogy, 91:1058–1072.

2010 Genoways, H. H., G. G. Kwiecinski, **P. A. Larsen**, S. C. Pedersen, R. J. Larsen, J. D. Hoffman, M. de Silva, C. J. Phillips, and R. J. Baker. Bats of the Grenadine Islands, West Indies, and placement of Koopman's Line. Chiroptera Neotropical, 16:501–521.

2010 Carrera, J. P., S. Solari, **P. A. Larsen**, D. F. Alvarado, A. D. Brown, C. Carrion B., J. S. Tello, and R. J. Baker. Bats of the Tropical Lowlands of Western Ecuador. Special Publications of the Museum of Texas Tech University, 57:i+1–37.

2009 Solari, S., S. R. Hoofer, **P. A. Larsen**, A. D. Brown, R. J. Bull, J. A. Guerrero, J. Ortega, J. P. Carrera, R. D. Bradley, and R. J. Baker. Operational criteria for genetically defined species: analysis of the diversification of the small fruit-eating bats, *Dermanura* (Phyllostomidae: Stenodermatinae). Acta Chiropterologica, 11:279–288.

2009 E. K. Howell, R. M. Duplechin, **P. A. Larsen**, J. D. Hanson, F. A. Khan, R. J. Larsen, R. R. Chambers, and R. D. Bradley. Mammal records from Briscoe, Dickens, Hall, and Motley Counties, Texas. Occasional Papers, Museum of Texas Tech University, 288:1–10.

2009 Baker, R. J., M. M. McDonough, V. J. Swier, **P. A. Larsen**, J. P. Carrera, and L. K. Ammerman. New species of bonneted bat, genus *Eumops* (Chiroptera: Molossidae) from the lowlands of western Ecuador and Peru. Acta Chiropterologica, 11:1–13.

2008 McDonough, M. M., L. K. Ammerman, R. M. Timm, H. H. Genoways, **P. A. Larsen**, and R. J. Baker. Speciation within Bonneted Bats (genus *Eumops*): the complexity of morphological, mitochondrial, and nuclear datasets in systematics. Journal of Mammalogy, 89:1306–1315.

2008 Hoofer, S. R., S. Solari, **P. A. Larsen**, R. D. Bradley, and R. J. Baker. Phylogenetics of the fruit-eating bats (Phyllostomidae: Artibeina) inferred from mitochondrial DNA sequences. Occasional Papers, Museum of Texas Tech University, 276:1–15.

2008 Khan, F. A., V. J. Swier, **P. A. Larsen**, S. Solari, B. Ketol, W. Marni, S. Ellagupillay, M. Lakim, M. T. Abdullah, and R. J. Baker. Using genetics and morphology to examine species boundaries of old world bats: report of a recent collection from Malaysia. Occasional Papers, Museum of Texas Tech University, 281:1–28.

2007 Genoways, H. H., S. C. Pedersen, **P. A. Larsen**, G. G. Kwiecinski, and J. J. Huebschman. Bats of Saint Martin, French West Indies/Sint Maarten, Netherlands Antilles. Mastozoologia Neotropical, 14:169–188.

2007 **Larsen, P. A.**, S. R. Hoofer, M. C. Bozeman, H. H. Genoways, C. J. Phillips, D. E. Pumo, and R. J. Baker. Phylogenetics and phylogeography of the *Artibeus jamaicensis* complex based on cytochrome-b DNA sequences. Journal of Mammalogy, 88:712–727.

2007 Genoways, H. H., **P. A. Larsen**, S. C. Pedersen, and J. J. Huebschman. Bats of Saba, Netherlands Antilles: a zoogeographic perspective. Acta Chiropterologica, 9:97–114.

2007 Pedersen, S. C., **P. A. Larsen**, H. H. Genoways, M. N. Morton, K. C. Lindsay, and J. Cindric. Bats of Barbuda, Northern Lesser Antilles. Occasional Papers, Museum of Texas Tech University, 271:1–20.

2006 **Larsen, P. A.**, H. H. Genoways, and S. C. Pedersen. New Records of Bats from Saint Barthélemy, French West Indies. Mammalia, 70:321–325.

2006 Pedersen, S. C., H. H. Genoways, M. N. Morton, V. J. Swier, **P. A. Larsen**, K. C. Lindsay, R. A. Adams, and J. D. Appino. Bats of Antigua, Northern Lesser Antilles. Occasional Papers, Museum of Texas Tech University, 249:1–18.

2004 Carstens, B. C., J. Sullivan, L. M. Davalos, **P. A. Larsen**, and S. C. Pedersen. Exploring population and genetic structure in three species of Lesser Antillean Bats. Molecular Ecology, 13:2557–2566.

Book chapters and symposia contributions

2013 **Larsen, P. A.**, M. R. Marchán-Rivadeneira, and R. J. Baker. Speciation dynamics of the fruit-eating bats (genus Artibeus): with evidence of ecological divergence in Central American populations. In Bat Evolution, Ecology, and Conservation (R. A. Adams and S. C. Pedersen, eds.), pp. 315–339: Springer New York.

2013 Pedersen, S. C., H. H. Genoways, G. G. Kwiecinski, **P. A. Larsen**, and R. J. Larsen. Biodiversity, Biogeography, and Conservation of Bats in the Lesser Antilles. In Island Biodiversity: Flora, Fauna, and Humans in the Lesser Antilles. Contributions to the International Symposium on the Terrestrial Biodiversity of the Lesser Antilles. Pp. 62–73.

2010 Pedersen, S. C., G. G. Kwiecinski, **P. A. Larsen**, M. N. Morton, R. A. Adams, H. H. Genoways, and V. J. Swier. Bats of Montserrat - population fluctuations in response to hurricanes and volcanoes: 1978-2005. In Ecology, Evolution, and Conservation of Island Bats (T. H. Fleming and P. Racey, eds.) pp. 302–340: University of Chicago Press, Chicago.

Grants and Fellowships

- Foundation grant (Ann Saunders). Funds to support ongoing research focused on neurodegenerative and emerging infectious disease. 2017. **$350,000**
- Foundation grant (Walter Korman and Google Inc.). The utility of third-generation nanopore sequencing for disease surveillance and conservation of the lemurs of Madagascar. 2017. **$20,000**
- Triangle Center for Evolutionary Medicine. Emerging tick-borne pathogens in Madagascar: real-time discovery and surveillance. 2016. **$20,000**
- Duke Core Facility Voucher Program. Whole transcriptome analysis following hypoxia, a comparative study between lemur and human. 2016. **$10,000**
- Sherritt International Corporation: Ambatovy Joint Venture, Madagascar. Next-generation solutions for monitoring immune capacity and disease as indicators of lemur health at Ambatovy, Madagascar. 2013. **$5,270**

- National Science Foundation. Species tree reconstruction using neutral and non-neutral phylogenomic data. PIs: David Weisrock and Anne Yoder. (PAL contributed to the development of this grant). **$597,224**
- American Society of Mammalogists Fellowship in Mammalogy, American Society of Mammalogists. 2010. **$10,000**
- Ministry of Defense, United Kingdom. Zoonotic Agents and their Mammalian Reservoirs in the Kyrgyz Republic. PIs: C. J. Phillips and Robert J. Baker. (PAL contributed to the development of this grant). 2009. **$75,000**
- Research Grant, Texas Tech University Association of Biologists. Phylogeography of Caribbean bats. 2008. **$1,800**

Patents

Provisional patent entitled "System and method of disrupting the molecular mechanisms associated with neuronal mitochondrial dysfunction and neurodegenerative disease." Duke University Office of Licensing and Ventures. 2017. U.S. Provisional Pat. No. 62/445,279.

Teaching Experience

Instructor

- Fundamentals of next-generation sequencing and genomic informatics. Biology 590S. Spring 2016, Department of Biology, Duke University.

Mentor for undergraduate researchers, Duke University and Texas Tech University

- Isabelle Clark (molecular biology techniques, nematode phylogenetics), 2016-present
- Corinne Hays (ecoimmunology, population genetics), 2012–2016
- Lauriane Pinto (molecular phylogenetics), 2015–2016
- Kellie Levine (molecular biology techniques), 2014
- Alex Wilkens (molecular biology techniques, population genetics), 2013
- Robert Bull (molecular systematics), 2007–2009
- William Flannery (molecular systematics), 2007–2008

Guest Lecturer, Texas Tech University

- Genetics (Next-generation sequencing technologies and human genetics), S 2011
- Evolution (Speciation), F 2010

Teaching Assistant, Texas Tech University, Lubbock, TX

- Natural History of Vertebrates, S 2008

Honors and Awards

- Duke University Postdoctoral Award for Professional Development. 2015.
- American Society of Mammalogists Fellowship in Mammalogy, American Society of Mammalogists. 2010.

- Best overall paper presentation for studies pertaining to evolution at the Texas Tech University Association of Biologists Graduate Student Forum. 2007.
- Texas Society of Mammalogists Clyde Jones Award for best poster presentation on studies pertaining to mammalian cytology, evolution, and systematics, Texas Society of Mammalogists Meeting. 2007.
- Texas Society of Mammalogists Robert L. Packard Award for best overall paper presentation, Texas Society of Mammalogists Meeting. 2006.
- Helen Hodges Scholarship. 2005.
- J Knox Jones, Jr. Memorial Endowed Scholarship. 2005.

International Experience

Fieldwork: organized and participated in research expeditions focused on the biodiversity, disease surveillance, and evolutionary genetics of small mammals (bats and rodents) and primates (lemurs).

- 2017 Madagascar
- 2008 Mexico
- 2007 Kyrgyz Republic (Central Asia)
- 2006 Malaysia (Peninsular Malaysia and Borneo)
- 2006 Saint Vincent, Union, Carriacou (Caribbean)
- 2005 Saint Vincent (Caribbean)
- 2004 Ecuador; Montserrat, Saint Barthélemy, Sint Eustatius, Saint Martin, Saba (Caribbean)
- 2003 Antigua, Barbuda, Sint Eustatius, Saint Martin, Saba (Caribbean)
- 2002 Montserrat, Sint Eustatius, Saint Martin, Saba (Caribbean)

Science Diplomacy: assisted with the United States Department of State Iraq Nuclear Facilities Dismantlement and Disposal Project. Traveled to Baghdad and developed MOU between Ministry of Higher Education and Scientific research of Iraq and Center for Environmental Radiation Studies of Texas Tech University. *Position required Secret Security Clearance.*

- 2011 Baghdad, Iraq

Professional Service

- NSF Evolutionary Processes Panel Member: Doctoral Dissertation Improvement Grants. 2016
- Associate Editor, Acta Chiropterologica. 2012 – 2015. (60+ manuscripts handled).
- Peer Reviewer (Acta Chiropterologica, Alzheimer's & Dementia, Biological Journal of the Linnean Society, BioTechniques, BMC Evolutionary Biology, Genetica, Journal of Animal Science, Journal of Mammalogy, Journal of Genetics, Journal of Genetics and Genome Research, Mammalia, Mammalian Species, Molecular Phylogenetics and Evolution, Nature: Scientific Reports, Occasional Papers of the Museum of Texas Tech University, PLoS One, Trends in Genetics)
- Grant Reviewer (US-Israel Binational Science Foundation, Poland National Science Centre)

- Elected Director (graduate student representative), American Society of Mammalogists (2010-2013)
- Program Committee, American Society of Mammalogists (2007–2011)
- Grants in Aid of Research, American Society of Mammalogists (2013–present)
- Board of Directors, Texas Tech University Association of Biologists (2008–2010)
- Vice President, Texas Tech University Association of Biologists (2006–2007)

Professional Memberships

- American Institute of Biological Sciences, American Society of Mammalogists, Society of Systematic Biologists, Society for the Study of Evolution

Selected Presentations (from 70+)

P. A. Larsen. Novel vector-borne parasites in Madagascar: implications for One Health. *Invited Speaker*. Department of Veterinary and Biomedical Sciences. University of Minnesota, Saint Paul, MN. 2017.

P. A. Larsen. Next-generation Pathogen Discovery and Surveillance in Madagascar. *Invited Speaker*. Department of Veterinary Population Medicine. University of Minnesota, Saint Paul, MN. 2017.

P. A. Larsen. The double-edged sword: human evolution and the origin of neurodegenerative disease. *Invited Speaker*. Preventing Alzheimer's Disease: Opportunities & Challenges in Scientific Discovery and Health Care. Duke University, Durham, NC. 2017.

P. A. Larsen. The utility of next-generation disease surveillance for lemur conservation. *Invited Speaker*. Duke Lemur Center 50th Anniversary Symposium, Duke University, Durham, NC. 2016.

P. A. Larsen. Developing a genomic toolkit for the lemurs of Madagascar. *Invited Speaker*. Department of Biology and Microbiology, South Dakota State University, Brookings, SD. 2016.

P. A. Larsen, C. R. Campbell, *et al.* Improving non-model mammalian genome assemblies using optical mapping technology. *Invited Speaker*. The Mouse Lemur: a new model organism for physiology, behavior and conservation biology: Second annual Mouse Lemur Workshop, Paris, France. 2015.

P. A. Larsen, C. R. Campbell, and A. D. Yoder. Immunogenomics of non-model species: what can Ig-seq tell us about the evolution of the adaptive immune system? Evolution, Raleigh, NC. 2014.

P. A. Larsen, M. R. Marchán-Rivadeneira, C. R. Campbell, and R. J. Baker. Shedding light on speciation processes in bats using phylogenomics: where do we start? *Invited Speaker*. International Bat Research Conference, San Jose, Costa Rica. 2013.

P. A. Larsen and T. P. L. Smith. Application of circular consensus sequencing and network analysis to characterize the bovine IgG repertoire. Sequencing, Finishing, Analysis in the Future, Santa Fe, NM. 2012.