

Robert R. Fitak, PhD

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[Google Scholar Profile](#)

[Personal website](#)

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[GitHub Site](#)

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher; May 2015 – present

Department of Biology, Duke University

PI: Dr. Sönke Johnsen

Postdoctoral Researcher; October 2013 – April 2015

Institute for Population Genetics, University of Veterinary Medicine Vienna (Austria)

PI: Dr. Pamela Burger

EDUCATION

PhD **University of Arizona**, 2013 (Genetics) - PI: Dr. Melanie Culver

BS **The Ohio State University**, 2006 (with distinction in Molecular Genetics) - PI: Dr. Paul Fuerst

PUBLICATIONS (* student mentee of R. Fitak)

Fitak RR, Brothers JR, and Johnsen S. (in prep). The geomagnetic biogeography of navigating species. *Functional Ecology*.

Ernst DA, **Fitak RR**, Schmidt M, Derby CD, Johnsen S, and Lohmann KJ. (in prep) *De novo* assembly and annotation of a Caribbean spiny lobster central nervous system transcriptome. *Marine Genomics*.

Schweikert LE, **Fitak RR**, Caves EM, Sutton TT, and Johnsen S. (in review) Spectral sensitivity among ray-finned fishes: ecology, diversity, and shared descent. *Journal of Experimental Biology*.

Ritschard EA, **Fitak RR**, Simakov O, and Johnsen S. (in review) Genomic signatures of GPCR expansions reveal step-wise functional evolution of cephalopod sensory transduction. *Proceedings of the Royal Society of London. Series B, Biological sciences*.

Fitak RR, Wheeler BR, and Johnsen S. (in revision) Magnetoreception in the rainbow trout *Oncorhynchus mykiss*: does solar activity confound results? *Journal of Fish Biology*.

Fitak RR, ... Pecon-Slaterry, J. (in revision) The expectations and challenges of wildlife disease research in the era of genomics: forecasting with a horizon scan. *Journal of Heredity*.

Fitak RR, Caves EM, and Johnsen S. (in press) Orientation in pill bugs: an interdisciplinary activity to engage students in concepts of biology, physics, and circular statistics. *American Biology Teacher*.

Fitak RR and Johnsen S. (2018) Green sea turtle (*Chelonia mydas*) population history indicates important demographic changes near the mid-Pleistocene transition. *Marine Biology*. 165(7):110.

Fitak RR, Schweikert LE, Wheeler BR, Ernst DA, Lohmann KJ, and Johnsen S. (2018) Near absence of differential gene expression in the retina of rainbow trout after exposure to a magnetic pulse: Implications for magnetoreception. *Biology Letters*. 14(6): 20180209.

Schweikert LE, **Fitak RR**, Johnsen S. (2018) De novo transcriptomics reveal distinct phototransduction signaling components in the retina and skin of the color changing vertebrate, *Lachnolaimus maximus*. *Journal of Comparative Physiology A*. 204(5): 475-485.

Fitak RR, Rinkevich S, and Culver M. (2018) Genome-wide analyses of SNPs is consistent with no domestic dog ancestry in the endangered Mexican wolf (*Canis lupus baileyi*). *Journal of Heredity*. 109(4): 373-383.

*Arniella MB, **Fitak RR**, and Johnsen S. (2018) Unmapped sequencing reads identify additional candidate genes linked to magnetoreception in rainbow trout. *Environmental Biology of Fishes* 101(5): 711-721.

- Fitak RR** and Johnsen S. (2017) Bringing the statistical analysis of animal orientation full circle: model-based approaches with maximum likelihood. *Journal of Experimental Biology*. 220(21): 3878-38882.
- See associated R package '[CircMLE](#)' available in CRAN
- Mohandesan E, **Fitak RR**, Corander J, Yadamsuren A, Chuluunbat B, Abdelhadi O, Raziq A, Nagy P, Stalder G, Walzer C, Faye B, and Burger PA. (2017) Mitogenome sequencing in the genus *Camelus* reveals evidence for purifying selection and long-term divergence between wild and domestic Bactrian camels. *Scientific Reports* 7(1): 9970.
- Ohkura M, **Fitak RR**, Wisecaver JH, DeBlasio D, Niazi F, Egholm M, Rounsley SD, Kodira CD, and Orbach MJ. (2017) Genome sequence of *Ophidiomyces ophiodiicola*, an emerging fungal pathogen of snakes. *Genome Announcements* 5(30): e00677-17.
- Fitak RR**, Wheeler BR, Ernst DA, Lohmann KJ, and Johnsen S. (2017) Candidate genes mediating magnetoreception in rainbow trout (*Oncorhynchus mykiss*). *Biology Letters* 13(4): 20170142.
- Featured in *Nature* in the Research Highlights section (*Nature* 545:7652, April 26, 2017)
- Ochoa A, Onorato DP, **Fitak RR**, Roelke-Parker ME, and Culver M. (2017) Evolutionary and functional mitogenomics: presence of potential deleterious SNPs in Florida panthers prior to and as a consequence of the introduction of Texas pumas. *Journal of Heredity* 108(4): 449-455.
- *Erwin JA, **Fitak RR**, Dwyer JF, and Culver M. (2016) Molecular detection of bacteria in the families Rickettsiaceae and Anaplasmataceae in northern crested caracaras (*Caracara cheriway*). *Ticks and Tick-Borne Diseases* 7(3): 470-474.
- Plasil M, Mohandesan E, **Fitak RR**, Musilova P, Kubickova S, Burger PA, and Horin P. (2016) The major histocompatibility complex in Old World camelids and low polymorphism of its class II genes. *BMC Genomics* 17(1): 167.
- Fitak, RR**. (2016) Wild felid genomics: where are we now? *Wild Felid Monitor* 9(1): 13.
- Fitak RR**, Mohandesan E, Corander J, and Burger PA. (2016) The de novo genome assembly and annotation of a female domestic dromedary of North African origin. *Molecular Ecology Resources* 16(1): 314-324.
- Fitak RR**, Naidu A, Thompson R, and Culver M. (2016) A new panel of SNP markers for the individual identification of North American pumas (*Puma concolor*). *Journal of Fish and Wildlife Management* 7(1): 13-27.
- Bruford MW, ... **Fitak R**, et al. (2015) Prospects and challenges for the conservation of farm animal genomic resources, 2015-2025. *Frontiers in Genetics* 6: 314.
- Ruiz E, Mohandesan E, **Fitak RR**, and Burger P. (2015) Diagnostic single nucleotide polymorphism markers to identify hybridization between dromedary and Bactrian camels. *Conservation Genetics Resources* 7(2): 329-332.
- Muzzachi S, Burger P, **Fitak R**, Oulmouden A, Cherifi Y, Yahyaoui H, Zayed MA, Lacalandra GM, Faye B, and Ciani E. (2015). Combined Sanger and NGS sequence analysis of the myostatin gene (*mstn*) in the *Camelus dromedarius* species. *Special Issue of the Scientific and Practical Journal Veterinariya* 42(2): 353-355.
- Antonacci R, **Fitak R**, Burger P, Castelli V, Ciani E, and Ciccarese S. (2015) Functional genomics and evolution of the gamma/delta T cell receptor loci in old world camels. *Special Issue of the Scientific and Practical Journal Veterinariya* 42(2): 344-346.
- Fitak RR**, Mohandesan E, and Burger PA. (2015) Complete genome re-sequencing reveals patterns of domestication in old world camelids. *Special Issue of the Scientific and Practical Journal Veterinariya* 42(2): 346-348.
- Fitak RR**, Kelly DJ, Fuerst PA, et al. (2014) The prevalence of rickettsial and ehrlichial organisms in *Amblyomma americanum* ticks collected from Ohio and surrounding areas between 2000 and 2010. *Ticks and Tick-Borne Diseases* 5(6): 797-800.

- Fitak RR**, Koprowski JL, and Culver M (2013) Severe reduction in genetic variation in a montane isolate: the endangered Mount Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*). *Conservation Genetics* 14(6): 1233-1241.
- Andrew DR, **Fitak RR**, Munguia-Vega A, Racolta A, Martinson V, and Dontsova K. (2012) Abiotic factors shape microbial diversity in Sonoran Desert soils. *Applied Environmental Microbiology* 78(21): 7527.
- Naidu A, **Fitak RR**, Munguia-Vega A, and Culver M. (2012) Novel PCR primers for complete mitochondrial cytochrome b gene sequencing in mammals. *Molecular Ecology Resources* 12: 191-196.
- Culver M, **Fitak RR**, and Herrmann H. (2010) Genetic Methods for Biodiversity Assessment. In Anne Magurran and Brian McGill (Eds.), *Biological Diversity: frontiers in measurement and assessment*. Oxford University Press: USA, 2011, p208-218.
- Loftis AD, Mixson TR, Stromdahl EY, Yabsley MJ, Garrison LE, Williamson PC, **Fitak RR**, Fuerst PA, and Blount KB. (2008) Geographic distribution and genetic diversity of the Ehrlichia sp. from Panola Mountain. *BMC Infectious Diseases* 8:54.

TECHNICAL DOCUMENTS AND REPORTS

- Erwin JA, **Fitak RR**, Meyers T, and Culver M. (2016) Genetic analysis of *Anodonta californiensis* from the Rio Bavispe: a recommendation for reintroduction into the San Bernardino River subbasin. Final report for the Arizona Game and Fish Department, Tucson, AZ.
- Naidu A, **Fitak R**, and Culver M. (2014) Landscape genetics of mountain lions (*Puma concolor*) in southwestern Arizona. Final report to the Arizona Game and Fish Department Habitat Partnership Committee, Project number HPC-09-406, Tucson, AZ.
- Naidu A, **Fitak R**, and Culver M. (2014) Data sharing for wildlife management: the puma genetic database. Final report to the Arizona Game and Fish Department Habitat Partnership Committee, Project number HPC- 10-705, Tucson, AZ.
- Fitak RR**, Rinkevich S, and Culver M. (2013) The effects of extirpation and reintroduction on the Mexican wolf (*Canis lupus baileyi*) through genome-wide association. Final report for the U.S. Fish and Wildlife Service, Albuquerque, NM.
- Culver M, **Fitak RR**, and Meyers T. (2011) California Floater Genetics. Final report for the Arizona Game and Fish Department Heritage Program. Tucson, AZ.
- Fitak RR** and Culver M. (2009) Mount Graham red squirrel genetic analysis to aid in formation of a captive breeding population. Final report for the U.S. Fish and Wildlife Service, Tucson, AZ.

AWARDS/FELLOWSHIPS/GRANTS

- Duke Postdoctoral Professional Development Award (\$1000)**2018
To attend the 4th Annual Summer Institute in Statistics for Big Data workshop for training in "Supervised Methods for Statistical Machine Learning"
- Duke Center for Genomic and Computational Biology Voucher Award (\$5,547)**2018
Awarded sequencing costs for a pilot project to sequence and assemble the American shad (*Alosa sapidissima*) genome as a resource for sensory biologists
- European Science Foundation Exchange Grant (€3500)**.....2014
A researcher exchange grant to visit the lab of Dr. Michael Bruford, Cardiff University, UK, as part of the Farm Animal Genomic Resources Program
- Arizona Game and Fish Department Heritage Fund (\$50,000)**.....2013
A grant to use high-throughput DNA capture techniques for a phylogeographic analysis of current and museum samples of black-tailed prairie dogs in the southwestern U.S.
- NSF-IGERT Fellowship in Comparative Genomics, U. of Arizona (\$30,000/year stipend)**2008 – 2012
Four-time recipient of the competitive NSF training fellowship in genomics
- Arizona Game and Fish Dept. Habitat Partnership Program (\$15,000)**2010
A grant to develop SNPs and a genetic database for pumas
- U.S. Fish and Wildlife Service Science Support Partnership (\$29,869)**2009

Research on Mexican wolf genomics
Science Foundation Arizona Fellowship, U. of Arizona (\$30,000/year stipend)..... 2008 – 2009
 A competitive fellowship in the sciences for Arizona graduate students

TEACHING & MENTORING EXPERIENCE

Instructor: Genomics of Diseases in Wildlife, Colorado State University 2017 – 2018
 Invited instructor and organizer for the workshop sponsored by CSU and the Smithsonian Conservation Biology Institute (workshop website: <http://gdwworkshop.colostate.edu/>). Taught course concepts in computational genomics through lectures, hands-on activities and training tutorials (see workshop materials co-authored at https://github.com/stenglein-lab/2017_GDW).
Guest Instructor: Bio180S (Sensory Biology), Duke University 2017
 Introduced undergraduate students to magnetoreception and developed a laboratory exercise to examine magnetoreception in pill bugs
Mentor for Monica Arniella in the MUSER Program 2016 – 2017
 Mentored this undergraduate student in a computational genomics project for the Matching Undergraduates to Science and Engineering Research (MUSER) program.
Teaching Associate: Bio181L (Biology Laboratory), U. of Arizona 2012
 Introductory laboratory for biology students which includes short lectures followed by laboratory experiments. Taught 2 sections, ~22 students each
Mentor for Sergio Redondo in the McNair Scholars Program 2012
 Mentored this undergraduate student as part of the McNair Scholars Program.
Guest Instructor: WFSC 444 (Wildlife Management – Mammals) 2009 – 2012
 Taught a one day lab in conservation genetics for wildlife management
Mentor for Bianca Judy in the City High Internship Program 2011 – 2012
 A program for high school seniors to complete a research project
Mentor for Connor Davey in the KEYS Research Internship Program 2011
 An opportunity for motivated Arizona high school students with a strong interest in the biosciences to work with top researchers in University of Arizona laboratories.
Invited Lecturer: GENE 570 (Conservation Genetics), U. of Arizona 2010, 2011
 Taught the sections “*Conservation and Population Genomics*”
Invited Lecturer: MCB 304 (Molecular Genetics), U. of Arizona 2011
 Taught “*Conservation Genetics and Genomics: an Example Using the Mexican Wolf*”
Invited Lecturer: 9th Grade Biology, Flowing Wells High School, Tucson, AZ 2010
 Taught “*Evolution and Herpetology*”

FIRST-AUTHOR PRESENTATIONS AT PROFESSIONAL CONFERENCES

The Duke UPE/TriCEM Symposium on Disease and Health (Durham, NC) 2018
Invited (Plenary) Speaker: Genetics IDP Annual Retreat at the University of Arizona (Tucson, AZ) 2018
Society for Integrative & Comparative Biology, National Meeting (San Francisco, CA) 2018
Society for Integrative & Comparative Biology, Southeast Regional Meeting (Durham, NC) 2016
Duke Biology Department Retreat (Beaufort, NC) 2016
Plant & Animal Genome Conference XXIV (San Diego, CA) 2016
2014 Mexican Wolf SSP Annual Meeting (St. Louis, MO) 2014
European Science Foundation: Livestock Genomic Resources in a Changing World (Cardiff, UK) 2014
Society for Molecular Biology and Evolution Annual Meeting (San Juan, PR) 2014
46th Joint Annual Meeting of the AZ/NM Chapters of the Wildlife Society (Albuquerque, NM) 2013
The Wildlife Society Annual Conference (Portland, OR) 2012
25th Meeting of the American Society for Rickettsiology (Park City, UT) 2012
American Genetic Association Annual Symposium: Recombination (Durham, NC) 2012
American Genetic Association Annual Symposium: Genomics and Biodiversity (Guanajuato, MX) 2011
44th Joint Annual Meeting of the AZ/NM Chapters of the Wildlife Society (Pinetop, AZ) 2011
American Genetic Association Annual Symposium: Conservation Genomics (Hilo, HI) 2010

University of Arizona Genetics Core Graduate Student Research Symposium (Tucson, AZ)	2010
42nd Joint Annual Meeting of the AZ/NM Chapters of the Wildlife Society (Gallup, NM)	2009
21st Meeting of the American Society for Rickettsiology (Colorado Springs, CO).....	2007

REVIEWED FOR:

<i>Conservation Genetics</i>	<i>Environmental Health Insights</i>
<i>Graduate Women in Science</i>	<i>U.S. Fish and Wildlife Service</i>
<i>Mammalian Biology</i>	<i>Vector-Borne and Zoonotic Diseases</i>
<i>Marine Mammal Science</i>	<i>American Biology Teacher</i>
<i>Ticks and Tick-Borne Diseases</i>	<i>Behavioral Ecology and Sociobiology</i>
<i>Journal of Threatened Taxa</i>	

OTHER RESEARCH EXPERIENCE and TRAINING

Summer Institute in Statistical Genetics; U. of Washington	2010, 2018
Workshop, participated in modules: MCMC for Genetics, Coalescent Theory, Inferences of Relatedness and Relationships, and most recently, Supervised Methods for Machine Learning	
Field Assistant/Volunteer for Matt Goode	2008 – 2013
Assisted with several field research projects, including lizard surveys in the Peloncillo Mtns. Of New Mexico, and a study of urban effects on tiger rattlesnakes (<i>Crotalus tigris</i>) in Oro Valley, AZ.	
Field Assistant/Volunteer at Agumbe Rainforest Research Station	2009
Assisted for a week with a king cobra (<i>Ophiophagus hannah</i>) radio telemetry project in Agumbe, India.	
Mathematical Biosciences Institute; The Ohio State University	2008
Summer Graduate Fellowship for training in mathematical biosciences; Trained in R-programming and microarray data analysis	
Research Associate; University of Hyderabad, Hyderabad, India	2007
“The role of the N-terminal domain of Yku80 in silencing telomere-proximal genes in <i>Saccharomyces cerevisiae</i> ” PI: Dr. Krishnaveni Mishra	
Research Technician; The Ohio State University, Columbus, OH	2004 – 2007
Performed ordinary laboratory procedures in a BSL-2 setting studying the bacterial agents <i>Rickettsia sp.</i> and <i>Ehrlichia sp.</i> , and minor experience with eukaryotic <i>Acanthamoeba</i> , and <i>Balamuthia</i> . PI: Dr. Paul Fuerst	

SERVICE ACTIVITIES

Mexican wolf Species Survival Plan contributor	2014
Genetics consultant for the Mexican wolf SSP team	
Contributor/Section Editor for the Wild Felid Monitor	2013 – present
Prepare the “Recent Publications” section for the <i>Wild Felid Monitor</i>	
Southern Arizona Regional Science and Engineering Fair	2008 – 2013
Competition judge for 6 th -8 th grade life sciences	
Academic Program Review (APR) student representative, U. of Arizona	2011
Represented the students of the Genetics Graduate Interdisciplinary Program.	
Earth Day Speaker, Tucson, AZ	2009 – 2012
Taught herpetology and conservation to children at Borton Primary Magnet School.	