

Sangeet Lamichhaney

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RESEARCH INTEREST

My research focus on the application of genomics to understand genetic basis of adaptive traits in vertebrates, both at micro and macro-evolutionary scales, and build an integrative research program that combines in-depth knowledge of natural history and organismal biology with latest developments in genomics and related high-throughput molecular techniques.

PROFESSIONAL EXPERIENCE

2017 - Post-doctoral fellow, Department of Organismic and Evolutionary Biology and Museum of Comparative Zoology (MCZ), Harvard University

Advisor: Scott Edwards, Professor in Zoology and Curator of Ornithology (MCZ)

EDUCATION

2012-2016 PhD in Evolutionary Genomics, Uppsala University, Sweden

Thesis: Genetic basis of adaptation in natural populations (Darwin's Finches, Ruff and Atlantic herring)

Advisor: Leif Andersson, Professor in Functional Genomics

2009-2011 Sandwich European Master Program in Animal Breeding and Genetics,

Year 1: Wageningen University, The Netherlands

Year 2: Uppsala University, Sweden

Thesis:

Year 1: Molecular characterization of bantam phenotype in chicken

Year 2: Population genetics of Atlantic herring

Advisor:

Year 1: Richard Crooijmans, Assistant Professor in Molecular Genetics, Wageningen University, The Netherlands

Year 2: Leif Andersson, Professor in Functional Genomics, Uppsala University, Sweden

2003-2008 Doctor of Veterinary Medicine (DVM), Tribhuvan University, Nepal

PUBLICATIONS

Selected

1. **Sangeet Lamichhane**y, Fan Han, Matthew T Webster, Leif Andersson, B Rosemary Grant & Peter R Grant (2018), *Rapid hybrid speciation in Darwin's finches*, **Science**, 359 (6372):224-228
2. **Sangeet Lamichhane**y, Fan Han, Jonas Berglund, Chao Wang, Markus Sällman Almén, Matthew T Webster, B Rosemary Grant, Peter R Grant, Leif Andersson (2016) *A beak size locus in Darwin's finches facilitated character displacement during a drought*, **Science** 352 (6284), 470-474
3. **Sangeet Lamichhane**y*, Jonas Berglund*, Markus Sällman Almén, Khurram Maqbool, Manfred Grabherr, Alvaro Martinez-Barrio, Marta Promerová, Carl-Johan Rubin, Chao Wang, Neda Zamani, B Rosemary Grant, Peter R Grant, Matthew T Webster, Leif Andersson (2015) *Evolution of Darwin's finches and their beaks revealed by genome sequencing*, **Nature** 518 (7539), 371-375
4. **Sangeet Lamichhane**y*, Guangyi Fan*, Fredrik Widemo*, Ulrika Gunnarsson, Doreen Schwochow Thalmann, Marc P Hoepfner, Susanne Kerje, Ulla Gustafson, Chengcheng Shi, He Zhang, Wenbin Chen, Xinming Liang, Leihuan Huang, Jiahao Wang, Enjing Liang, Qiong Wu, Simon Ming-Yuen Lee, Xun Xu, Jacob Höglund, Xin Liu, Leif Andersson (2015) *Structural genomic changes underlie alternative reproductive strategies in the ruff (*Philomachus pugnax*)*, **Nature Genetics** 48, 84–88
5. **Sangeet Lamichhane**y*, Angela P Fuentes-Pardo*, Nima Rafati, Nils Ryman, Gregory R McCracken, Christina Bourne, Rabindra Singh, Daniel E Ruzzante, Leif Andersson (2017) *Parallel adaptive evolution of geographically distant herring populations on both sides of the North Atlantic Ocean*, **PNAS** 114 (17) E3452-E3461
6. Alvaro Martinez Barrio*, **Sangeet Lamichhane**y*, Guangyi Fan*, Nima Rafati*, Mats Pettersson, He Zhang, Jacques Dainat, Diana Ekman, Marc Höppner, Patric Jern, Marcel Martin, Björn Nystedt, Xin Liu, Wenbin Chen, Xinming Liang, Chengcheng Shi, Yuanyuan Fu, Kailong Ma, Xiao Zhan, Chungang Feng, Ulla Gustafson, Carl-Johan Rubin, Markus Sällman Almén, Martina Blass, Michele Casini, Arild Folkvord, Linda Laikre, Nils Ryman, Simon Ming-Yuen Lee, Xun Xu, Leif Andersson (2016) *The genetic basis for ecological adaptation of the Atlantic herring revealed by genome sequencing*, **eLife** 5, e12081
7. **Sangeet Lamichhane**y*, Alvaro Martinez Barrio*, Nima Rafati*, Görel Sundström*, Carl Johan Rubin, Elizabeth R Gilbert, Jonas Berglund, Anna Wetterbom, Linda Laikre, Matthew T Webster, Manfred Grabherr, Nils Ryman, Leif Andersson (2012) *Population-scale sequencing reveals genetic differentiation due to local adaptation in Atlantic herring*, **PNAS** 109 (47), 19345-19350
8. Chungang Feng*, Mats Pettersson*, **Sangeet Lamichhane**y*, Carl-Johan Rubin, Nima Rafati, Michele Casini, Arild Folkvord & Leif Andersson (2017) *Moderate nucleotide diversity in the Atlantic herring is associated with a low mutation rate*, **eLife** 6, e23907

* equal contribution

Other publications

9. Gustavo A Bravo, Alexandre Antonelli, Christine D Bacon, Krzysztof Bartoszek, Mozes PK Blom, Stella Huynh, Graham Jones, L Lacey Knowles, **Sangeet Lamichhaney**, Thomas Marcussen, Hélène Morlon, Luay K Nakhleh, Bengt Oxelman, Bernard Pfeil, Alexander Schliep, Niklas Wahlberg, Fernanda P Werneck, John Wiedenhoeft, Sandi Willows-Munro, Scott V Edwards (2019) *Embracing heterogeneity: coalescing the Tree of Life and the future of phylogenomics*, **PeerJ** 7:e6399
10. Leif Andersson, Peter R. Grant, B. Rosemary Grant and **Lamichhaney, Sangeet** (2017) *Genes controlling beak size and shape in Darwin's finches*, **AccessScience**, McGraw Hill Education
11. Fan Han, **Sangeet Lamichhaney**, B Rosemary Grant, Peter R Grant, Leif Andersson, Matthew T Webster (2017) *Gene flow, ancient polymorphism, and ecological adaptation shape the genomic landscape of divergence among Darwin's finches*, **Genome Research** 27 (6), 1004-1015
12. Mats Pettersson, Marcin Kierczak, Markus Sällman Almén, **Sangeet Lamichhaney** and Leif Andersson (2017) A Model-Free Approach For Detecting Genomic Regions Of Deep Divergence Using The Distribution Of Haplotype Distances, bioRxiv, p. 144394
13. Markus Sällman Almén, **Sangeet Lamichhaney**, Jonas Berglund, B Rosemary Grant, Peter R Grant, Matthew T Webster, Leif Andersson (2016) *Adaptive radiation of Darwin's finches revisited using whole genome sequencing*, **BioEssays** 38 (1), 14-20
14. Suzanne V Saenko, **Sangeet Lamichhaney**, Alvaro Martinez Barrio, Nima Rafati, Leif Andersson, Michel C Milinkovitch (2015) *Amelanism in the corn snake is associated with the insertion of an LTR-retrotransposon in the OCA2 gene*, **Scientific Reports**, 5-17118

Manuscript in press

15. **Sangeet Lamichhaney**, Daren C. Card, Phil Grayson, João F.R. Tonini, Gustavo A. Bravo, Kathrin Näpflin, Flavia Termignoni-Garcia, Christopher Torres, Frank Burbrink, Julia A. Clarke, Timothy B. Sackton and Scott V. Edwards (2019) *Integrating natural history-derived phenomics with comparative genomics to study the genetic architecture of convergent evolution*
16. **Sangeet Lamichhaney** and Leif Andersson (2019) *A comparison of the association between large haplotype blocks under selection and the presence/absence of inversions*

AWARDS & GRANTS

Grants

2018 Putnam expedition grant to do fieldwork and on-site genome sequencing in Brazil

Fellowships

2017 Wenner-Gren postdoctoral fellowship from Wenner-Gren foundation, Sweden

2009 Erasmus Mundus fellowship from the European Union to pursue European master program in Animal breeding and genetics

2003 Nepal government fellowship to pursue Doctor of Veterinary Medicine program

Academic Recognition

2017 Young Investigator Award for Evolutionary studies (Royal Society of Sciences, Uppsala, Sweden)

2017 SciLifeLab scientific excellence award for being nominated among the top ten scientific highlights of the year 2016 in Sweden

2016 Hwasser Prize for the best PhD thesis from Faculty of Medicine at Uppsala University, Sweden

2016 SciLifeLab scientific excellence award for being nominated among the top ten scientific highlights of the year 2015 in Sweden

Travel awards

Received in total of nine travel grants (\$500 - \$2500) during graduate program for travelling abroad to attend international conferences and summer/winter schools

SELECTED MEDIA COVERAGE

<u>National Audubon Society</u>	Galapagos Finches are proving to be the poster birds of evolution again
<u>BBC News</u>	Galapagos finches caught in act of becoming new species
<u>The Washington Post</u>	200 years after Darwin, this is how the iconic Galapagos finches are still evolving
<u>Nature News</u>	Evolution of Darwin's finches tracked at genetic level
<u>The Washington Post</u>	A 'supergene' turns these male birds into female impersonators or sneaky mate thieves — for life
<u>National Geographic</u>	DNA Reveals How Darwin's Finches Evolved
<u>BBC News</u>	Genomes reveal Darwin finches' messy family tree
<u>Nature News</u>	Darwin's iconic finches join genome club
<u>The American Scholar</u>	Darwin's Voyage Continues
<u>Science Daily</u>	The herring genome provides new insight on how species adapt to their environment

SELECTED INVITED TALKS

- 2018 *Genomic basis of convergent limb loss evolution in squamates*, Joint Congress on Evolutionary Biology, Montpellier, France
- 2017 *Exploring Elusive Questions in Evolutionary Biology Using Modern Genomics Tools*, Gordon Research Conference "Ecological & Evolutionary Genomics", University of New England, Maine
- 2017 *Next Generation Phylogenomics—Case study of Darwin's Finches*, Workshop on Phylogenomics and Phylogeography, Gothenburg, Sweden
- 2017 *Power of genomics to find adaptive loci*, Hopi Hoekstra laboratory, Harvard University,
- 2017 *Comparative genomics: methods and application*, American Museum of Natural history, New York
- 2016 *The genetic basis for beak diversification and adaptive evolution in Darwin's finches*, Society of Molecular Biology and Evolution (SMBE) conference, Gold Coast, Australia
- 2016 *Genomics of adaptation*, Friedrich Miescher Laboratory of Max Plank Society, Tubingen, Germany
- 2016 *Role of structural variants in trait diversification*, Department of Ecology, Swedish University of Agricultural Science, Uppsala, Sweden
- 2014 *The evolutionary history of Darwin's finches revealed by genome sequencing*, The Biology of Genomes, Cold Spring Harbor Laboratory, New York

TEACHING & ADVISING EXPERIENCE

Teaching assistant

Major responsibilities included curriculum development, lecturing, planning and leading discussion groups, preparing class assignments and examining exam papers.

- Undergraduate level course in Molecular Genetics, Microbiology and Biochemistry
- Graduate level course in Genomics and Bioinformatics

Dry/Wet Laboratory assistant

Major responsibility included lab-exercise demonstration and assistance, planning and leading discussion groups and lab assignments grading

- Undergraduate level course in Protein Biochemistry and Molecular cloning
- Master level course in Bioinformatics
- Graduate level course in Perl programming language

Mentoring/Advising Experience

Co-supervised six undergraduate and three graduate students till date. My responsibilities included teaching/demonstrating laboratory/bioinformatics techniques, supervising the data analysis, interpretation and presentation of the results.

PROFESSIONAL SERVICE

- Reviewer for scientific journals (Science, Nature – Ecology and Evolution, Proceedings of the Royal Society B: Biological Sciences, Proceedings of the National Academy of Sciences (PNAS), Scientific reports, Molecular Ecology, Molecular Ecology Resources, American Naturalists, PLOS ONE, Proceedings B, Emu-Austral Ornithology, Pigment Cell & Melanoma Research, Molecular Reproduction and Development)
- Life time member, Nepal Veterinary association
- Country representative for Erasmus Mundus Student Association for the term 2010-2012