George Pacheco

Evolutionary Biologist

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RESEARCHER IDENTIFICATIONS

ORCID | Google Scholar | Web of Science ResearcherID | Scopus Author ID | Lattes

SHORT CAREER SUMMARY

I earned both a BSc and a Full Licensing degree in *Biological Sciences* from the *Federal University of Rio Grande do Norte* in 2011. With funding from the Danish Government, I completed an MSc in *Biology* at the *Natural History Museum of Denmark — University of Copenhagen*. For my MSc thesis, I worked with genomic data of the rock dove (*Columba livia*) from an evolutionary perspective under the supervision of Prof. Tom Gilbert, thesis which I defended in mid-2014. Funded by the Brazilian Government's *Science Without Borders* program, I earned my PhD in 2019 from the same institution and under the same supervision alongside the co-supervision of Dr. Filipe Vieira, where I continued my work on the evolutionary genomics of the rock dove. Later, supported by another European grant (*EMBO Scientific Exchange Grant*), I spent three months as a visiting scientist in the lab of Dr. Miguel Carneiro at the *Research Centre in Biodiversity and Genetic Resources* in Portugal. Upon returning to the Danish capital, I continued as a postdoctoral researcher for a short time in the same group from my MSc and PhD, where I contributed to a project on the evolution of wolves. Thereafter, I held another postdoctoral position for 20 months at *DTU Aqua — Technical University of Denmark* in the Danish countryside, working on the identification of genomic adaptations to the Baltic Sea in five fish species. Today, I am undertaking my third postdoc at the *Centre for Ecological and Evolutionary Synthesis — University of Oslo* in Norway, where I am back to working in the field of avian evolutionary genomics, but this time focused on evolutionary questions revolving around the genomic modifications involved in the recent evolution of the sparrow group (*Passer* spp.).

OUTSTANDING SCIENTIFIC ACHIEVEMENTS

Throughout my career, I have worked on several projects in the vein of animal evolutionary genomics, investigating a variety of taxa — from tiny Collembolans to culturally evolving killer whales. From my involvement in these projects, I have gained much experience in the molecular lab and a fair understanding of a range of bioinformatic analyses. Amongst these projects, I would emphasise (please see below for details): **i)** my leadership in the return to the old question regarding the evolutionary relationships of the so phenotypically diverse pigeon breeds; and **ii)** my relevant participation in the pioneering *B10K Project* — undoubtedly a leading-edge undertaking in the field of *Evolutionary Genomics*.

Moreover, I shall mention that back in 2019, I conceived the foundation of the *Sociedade Brasileira de Biologia Evolutiva* (SBBE). Thus, *together with several other Brazilian evolutionary biologists*, I worked hard not only on the effective establishment of SBBE — where I currently hold the position of councillor — but also on the realisation of the *I Congresso Brasileiro de Biologia Evolutiva* (SBBE24), which was a great inaugural success.

TOP FIVE MOST IMPORTANT PUBLICATIONS

First-author Publications

- **Darwin's Fancy Revised: An Updated Understanding of the Genomic Constitution of Pigeon Breeds.** *Genome Biology and Evolution*. 2020.

  Being a central component of my PhD thesis, I conceived this study together with my supervisors, visited the **Shapiro Lab** (please see below) to process the breed samples, conducted all bioinformatic analyses, and drafted the initial version of the resulting manuscript. To this date, this remains the study revisiting the evolutionary affinities of pigeon breeds — a subject originally proposed and investigated by Darwin himself — to include the largest number of breeds. Moreover, from a technical standpoint, this was among the first studies to successfully merge reduced-representation with whole-genome sequencing data, demonstrating that this integration can be achieved without introducing any significant biases.

Co-author Publications

- **Redefining the Evolutionary History of the Rock Dove, *Columba livia*, Using Whole Genome Sequences.** *Molecular Biology and Evolution*. 2023.

  I conceived this study that was originally meant to be part of my PhD thesis. In addition, I visited the *Natural History Museum* at Tring in England together with one of my advisors to sample the pigeon historical samples. I also conducted, together with one co-author, the lab work necessary for the sequencing screening of these samples, and later on, performed the bioinformatic work on these preliminary data. Having confirmed the viability of this project, I also contributed to the processing of the remaining samples in the lab. Upon common agreement with my chief PhD advisor, this project was passed on to another PhD student after I concluded my doctoral studies, and I thereafter started contributing to it as a senior author. This study was among the first to explore the full potential of avian museumomics, leveraging the tradition of museum collections alongside state-of-the-art sequencing strategies and population genomics analyses.

- **Phylogenomics Reveals Extensive Introgression and a Case of Mito-nuclear Discordance in the Killifish Genus *Kryptolebias*.** *Molecular Phylogenetics and Evolution*. 2022.

  As the second author of this study, I played a role in part of its reasoning, conducted some of its bioinformatic analyses, and contributed to the article writing. By investigating the genus *Kryptolebias*, this study provided corroborating evidence of widespread introgression and mito-nuclear discordance in fish. The recognition of these phenomena calls for a critical reassessment of prevailing models of vertebrate speciation and hybridisation.

- **Dense Sampling of Bird Diversity Increases Power of Comparative Genomics.** *Nature*. 2020.

  I was the main person responsible for this large-scale genomic project in Copenhagen, where most samples were processed. Thus, I not only managed numerous samples alongside their necessary permits but also performed a massive amount of lab work for this study, isolating the genomic DNA extracts used for sequencing as well as performing the required quality checks. Moreover, I also contributed to drafting the article during its final stages. Alongside similar work on mammals, this study was a forerunner in demonstrating that dense taxonomic sampling dramatically enhances the power of comparative genomics. By sequencing and analysing hundreds of avian genomes, it revealed finer patterns of genome evolution, setting new standards not only for avian genomics but for such studies across the entire tree of life.

- **Phylogeny of Neotropical Seirinae (Collembola, Entomobryidae) Based on Mitochondrial Genomes.** *Zoologica Scripta*. 2020.

  Being the second author of this study, I was involved in this project since its conception, namely in securing a visiting PhD scholarship granted to the first author, whom I trained in the molecular techniques at our labs in Copenhagen. Then, I generated part of its data with her, as well as introduced her to bioinformatic analyses and assisted her with these analyses. Moreover, I also contributed to the article writing. This was a pioneering study reconstructing mitogenomes directly from whole-genome sequencing data in a lesser-studied group such as Collembola.

ACADEMIC APPOINTMENTS

Nov 2022 — Present
Post-doc — *University of Oslo* • Norway
EcoEvoGenomics Group • *Centre for Ecological and Evolutionary Synthesis*

Mar 2021 — Oct 2022
Post-doc — *Technical University of Denmark* • Denmark
Section for Population Genetics • *DTU Aqua*

Jan 2020 — Jun 2020
Post-doc — *University of Copenhagen* • Denmark
Section for Population Genetics • *DTU Aqua*

ACADEMIC EDUCATION

Nov 2014 — Apr 2019
PhD in Evolutionary Genomics — *University of Copenhagen* • Denmark
Gilbert Group • *Natural History Museum of Denmark*

Feb 2012 — Aug 2014
MSc in Biology — *University of Copenhagen* • Denmark
Gilbert Group • *Natural History Museum of Denmark*

Aug 2006 — Jul 2011
BSc in Biological Sciences — *Federal University of Rio Grande do Norte* • Brazil
Laboratório de Genética de Recursos Marinhos • Departamento de Biologia Celular e Genética

RELEVANT COURSES

Dec 2015
Supervising BSc & MSc Students — Copenhagen • Denmark
1 ECTS

Oct 2015
University Pedagogy Introduction — Copenhagen • Denmark
1 ECTS

Feb 2015
Workshop on Molecular Evolution — Český Krumlov • Czechia
8 ECTS

Jan 2015
Workshop on Genomics — Český Krumlov • Czechia
8 ECTS

OTHER RELEVANT TRAINING

Aug 2009
Training for the Archipelago of St. Peter and St. Paul — Natal • Brazil

Jul 2008
PADI Open Water Diver — Natal • Brazil

SELECTED SCIENTIFIC EXPEDITIONS

May — Jun 2024
Sparrow Group 2024 Field Season — Mishima • Japan

May — Jun 2023
Sparrow Group 2023 Field Season — Chokpak Station • Kazakhstan

Feb 2016
Collection of Avian Zooarchaeological Samples — Negev Desert • Israel

Feb 2016
Collection of Avian Samples — Rukanga Region • Kenya
As a member of the 10KBird Project

Nov 2015
Collection of Pigeon Samples — Tórshavn Region • Faroe Islands

Nov 2008
Logistics Activities on the Rocas Atoll — Rio Grande do Norte State • Brazil

TOP THREE INVITED TALKS

09 Oct 2018 — **Salzburger Lab** — *University of Basel* • Switzerland
Department of Environmental Sciences

02 Aug 2018 — **Schier Lab** — *Harvard University* • USA
Department of Molecular and Cellular Biology
The lab was at Harvard from 2005 to 2019

20 Jun 2019 — **Huttner Lab** — *Max Planck Institute of Molecular Cell Biology and Genetics* • Germany

RESEARCH VISITS

08 May — 04 Jun 2024 — **Kitano Lab** — *National Institute of Genetics* • Japan

23 Sep — 22 Dec 2019 — **Carneiro Lab** — *CIBIO* • Portugal

20 Apr — 19 May 2015 — **Shapiro Lab** — *The University of Utah* • USA

GRANTS

19 Mar 2024 — **NIG-JOINT (A) Grant — 150.000 Yen** (~ $990 / €916)
National Institute of Genetics • Japan
Together with two other young researcher colleagues

18 Dec 2023 — **UiO:Life Science Internationalisation Support — 31.100 NOK** (~ $2,983 / €2,733)
University of Oslo • Norway

05 Nov 2023 — **SMBE Interdisciplinary & Regional Meetings Grant**
SMBE • USA
Together with five other researcher colleagues

Sep — Dec 2019 — **EMBO Scientific Exchange Grant**
EMBO • Germany

Nov 2014 — Oct 2018 — **Full PhD Abroad Scholarship**
CNPq • Brazil

Feb 2012 — Jan 2014 — **Danish Government Scholarship and Tuition Fee Waiver**
Ministry of Higher Education & Science • Denmark

Mar 2010 — Apr 2011 — **Student Assistant Scholarship**
CNPq • Brazil

Feb 2009 — Jul 2011 — **Scientific Initiation Scholarship**
CNPq • Brazil

ACADEMIC SOCIETIES

Aug 2024 — Present — Society for the Study of Evolution

Jul 2024 — Present — Sociedade Brasileira de Biologia Evolutiva
Founding Member | *Counselor*

Jul 2023 — Present — Sociedade Brasileira de Ornitologia

Apr 2022 — Present — European Society for Evolutionary Biology

TEACHING EXPERIENCE

18 — 22 Mar 2024	**Population Genomics @ Nord 2024** — Programme *Nord University* • Norway
On Multiple Occasions	**Virtual Lecture on *Evolutionary Genomics*** Centro de Ciências Agrárias — *Federal University of Paraíba* • Brazil Upon invitation from Prof. Rosemberg Menezes responsible for the undergrad courses in Ecology
Feb 2014 — July 2018	**Supervision of Several Users of the Molecular Labs** *University of Copenhagen* • Denmark
Mar 2010 — Apr 2011	**Student Assistant of Entomology** *Federal University of Rio Grande do Norte* • Brazil

ORGANISATION OF ACADEMIC EVENTS

Nov 2024	**I Congresso Brasileiro de Biologia Evolutiva** — Curitiba • Brazil Overall Organisation | Student Commission | Scientific Commission
Aug 2008	**59º Congresso Nacional de Botânica** — Natal • Brazil Monitor | Commission of Infrastructure, Lodging & Transportation

SELECTED SCIENTIFIC EVENTS

Fev 2024	**XXXV Congresso Brasileiro de Zoologia** — Porto de Galinhas • Brazil **Poster Presentation:** *A Genomic Reconstruction of the House Sparrow Global Spread*
Nov 2021	**Pangenomes — Evolution and Computation** — Gothenburg • Sweden
Feb 2020	**II B10K Project Workshop** — Copenhagen • Denmark
May 2018	**Adult Neurogenesis 2018** — Dresden • Germany
Aug 2017	**Genome 10K and Genome Science Conference** — Norwich • England
Aug 2017	**European Ornithologists' Union Conference** — Turku • Finland **Flash Presentation:** *Genomic Insights into the Natural and Artificial Histories of the Ubiquitous Pigeon*
Oct 2016	**I B10K Project Workshop** — Beijing • China
Jul 2016	**X FENS Forum of Neuroscience** — Copenhagen • Denmark
Aug 2015	**XV Congress of the European Society for Evolutionary Biology** — Lausanne • Switzerland
Aug 2014	**LX Congresso Brasileiro de Genética** — Guarujá • Brazil **Oral Presentation:** *Insights into the Feral Pigeon Global Community Gained from Population Genomics*
Aug 2008	**59º Congresso Nacional de Botânica** — Natal • Brazil

ACADEMIC VOLUNTEER WORK

Aug 2012 — Dec 2017	**Science Faculty Mentor Programme** — *University of Copenhagen* • Denmark
Apr 2017	**March for Science Copenhagen** • Denmark