Luis Mijangos

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Profiles

Google Scholar

ResearchGate

GitHub

ORCID

Profile

I am a researcher developing methods and tools to analyse genetic data that scientists and practitioners use to conserve and restore biodiversity and ecosystems. I have a combination of experience and mentoring in conservation biology, molecular ecology, mathematics, computing, geographic information systems, and bioinformatics that has given me a thorough understanding of population genetics and its diverse uses so that I can apply this productively to many fields.

Appointments

- **Software developer dartR (full time)** Jan/21 – present
  - University of Canberra, Centre for Conservation Ecology and Genomics.

dartR is an accessible genetic analysis platform for conservation, ecology, and agriculture that has been cited 293 times, downloaded more than 100,000 times and has thousands of users worldwide. I have had a transformational impact on the functionality of the software dartR and its uptake by a large and growing community. My work resulted in the release of the second version of dartR. In this version, we added 99 functions; we improved and extended our tutorials and function documentation; we extensively tested, debugged and standardised all the functions; we improved the graphical outputs by standardising their format, increasing readability, and extending their scope for customisation. I also support PhD students with their analyses.

- **Research assistant (casual)** Jan/21 – present
  - University of Sydney, School of Veterinary Science.

I provide technical assistance and administration for A/Prof Gongora's research projects and support to his PhD and Master's students. I am analysing several genome-wide datasets using computing clusters, such as Gadi, Australia's largest. Datasets include captive populations of Arabian oryx from Qatar and Oman, Australian saltwater crocodile populations and platypus populations.

Skills

- **Problem-solver**
- **Spatial analyses using Geographic information systems**
- **Programming languages**

R (advanced), Python (intermediate), C++ (intermediate), Unix shell (intermediate), Julia (familiar)

- **Git version control**
- **Cloud computing (Amazon Web Service)**
- **Developing Web Apps in R using Shiny**
- **Analytical skills**
- **Data science research methods**
- **Experimental design & analysis**
- **Mathematics (statistics and probability)**
- **Experience developing bioinformatics pipelines to analyse Whole Genome Sequencing data.**
- **Creative thinking**
- **Building collaborations**
- **Languages**

Spanish (native), English (fluent)

Academic Qualifications

- **Doctor of Philosophy** Mar/17 - Dec/21
  - UNSW Canberra, Australia
  - Thesis: Genetic differentiation: from theory to practice

My PhD constitutes one of the most comprehensive studies of associative overdominance, an underappreciated driver of genetic variation in small populations. I developed new methods to detect linked selection and a powerful computer-simulation model to explore theoretical and applied questions. I investigated how dams affect connectivity between platypus populations and the genetic diversity of the Arabian oryx, the first species to be rescued from extinction in the wild. My work on these species has been used to inform their conservation. Examiners of my thesis marked it as outstanding and a significant and original contribution to knowledge to the highest standard (the top mark in UNSW's examination criteria).

- **Master of Philosophy** Jan/11 - Dec/13
  - Murdoch University, Australia
  - Thesis: Characterising the post-restoration recolonisation of small vertebrates and its genetic implications in a production forest landscape

I investigated whether restoration practices can contribute to restoring the genetic diversity of recolonising populations. We published a review article (145 citations) that has contributed to a better understanding of how and where genetics can be used to inform ecological restoration.

- **Bachelor of Veterinary Science** Aug/01 - Jun/07
  - Universidad Autonoma de Nuevo Leon, Mexico
  - Thesis: Estimation of population size of American black bear in northern Mexico using non-invasive samples

Estimating wildlife populations with non-invasive samples is a resource with many advantages over comparable field methods. However, mistakes and viability issues in the method, such as the small DNA quantity contained in the samples and the expensiveness of the study, have limited its implementation. To confront these difficulties, I used a Whole Genome Amplification, a systematic amplification and the optimisation of the whole process with the most recent advances. I liaised with the local police department to perform my research in their laboratories where I taught myself PCR and DNA sequencing.

Publications

1. **Mijangos JL**, Bino G, Hawke T, Kolomyjec SH, Kingsford RT, Sidhu H, Grant T, Day J, Dias KN, Gongora J and Sherwin WB (2022) Fragmentation by major dams and implications for the future viability of platypus populations. Communications Biology (accepted 26 May 2022; IF = 6.268). Research Square. https://doi.org/10.21203/rs.3.rs-1406456/v1
2. **Mijangos JL**, Gruber B, Berry O, Pacioni C and Georges A (2022) dartR v2: an accessible genetic analysis platform for conservation, ecology, and agriculture. Methods in Ecology and Evolution (IF = 7.780). https://doi.org/10.1111/2041-210X.13918
3. Al Rawahi Q, **Mijangos JL**, Khatkar MS, Al Abri MA, AlJahdhami MH, Kaden J, Senn H, Brittain K and Gongora J (2022) Rescued back from extinction in the wild: past, present and future of the genetics of the Arabian oryx in Oman. Royal Society Open Science 9 (3), 210558 (IF = 2.963). https://doi.org/10.1098/rsos.210558. Number of citations: 1 (Google scholar).
4. Bino G, Kingsford RT, Archer M, Connolly JH, Day J, Dias K, Goldney D, Gongora J, Grant T, Griffiths J, Hawke T, Klamt M, Lunney D, **Mijangos JL**, Munks S, Sherwin W, Serena M, Temple-Smith P, Thomas J, Williams G and Whittington C (2019) The platypus: evolutionary history, biology, and an uncertain future. Journal of Mammalogy 100 (2), 308-327 (IF = 2.416). https://doi.org/10.1093/jmammal/gyz058. Number of citations: 19 (Google scholar).
5. **Mijangos JL**, Pacioni C, Spencer PBS, Hillyer M and Craig MD (2017) Characterizing the post-recolonization of Antechinus flavipes and its genetic implications in a production forest landscape. Restoration Ecology 25 (5), 738-748 (IF = 3.404). https://doi.org/10.1111/rec.12493. Number of citations: 4 (Google scholar).
6. **Mijangos JL**, Pacioni C, Spencer P and Craig MD (2015) Contribution of genetics to ecological restoration. Molecular Ecology 24 (1), 22-37 (IF = 6.185). https://doi.org/10.1111/mec.12995. Number of citations: 145 (Google scholar).
7. Ávalos-Ramírez R, **Mijangos JL**, Zarate-Ramos JJ, Martinez-Muñoz A, Salinas-Meléndez JA, De Chávez-Briones LM and Riojas-Valdés MV (2013) DNA-based population density estimation of black bear at northern Mexico: A preliminary study. African Journal of Biotechnology 12(2), 103-108 (IF = 0.573). https://doi.org/10.5897/AJB11.4209
8. **Mijangos JL**, Holleley CE, Nichols RA, Towers I, Jovanoski Z, Sidhu H, Watt S, Adamack A and Sherwin W (2017) Genetic linkage to explain genetic variation. In: 22nd International Congress on Modelling and Simulation, Hobart, Australia. http://dx.doi.org/10.36334/modsim.2017.A4.Mijangos
9. **Mijangos JL** (2015) Master Thesis: Characterising the post-restoration recolonisation of small vertebrates and its genetic implications in a production forest landscape. Research Gate. http://dx.doi.org/10.13140/RG.2.1.4656.6244
10. **Mijangos JL** (2009) Undergraduate Thesis: Estimation of population size of American black bear (Ursus americanus) in northern Mexico using non-invasive samples. Research Gate. http://dx.doi.org/10.13140/RG.2.1.4027.8565. Number of citations: 2 (Google scholar).

Awards and Scholarships

- DAAD-UANL Scholarship. EUR 3,664.
- The first place of class 2002-2007. Faculty of Veterinary Science, UANL.
- AusAID Scholarship. $176,318 AU.
- Organization for Tropical Studies Tuition Fee Scholarship. $500 US.
- Murdoch University Conference Travel award. $2,100 AU.
- Holsworth Wildlife Research Endowment 2011. $5,000 AU.
- Holsworth Wildlife Research Endowment 2012. $5,000 AU.
- UNSW Tuition Fee Scholarship. $126,000 AU.
- University College Postgraduate Research Scholarship. $107,800 AU.
- UNSW Establishment Scholarship. $1,000 AU.
- UNSW Postgraduate Research Student Support. $2,600 AU.

Courses

- GIS for Environmental Management and Planning. Murdoch University, Australia.
- Conservation and Restoration Genetics. Organization of Tropical Studies. Costa Rica. Lecturers: Prof. James Hamrick, Prof. Paul Leberg and Prof. Eric Fuchs.
- Nationally recognised 4WD training course.

Presentations

- Genetics and the Restoration of Ecosystems a Masterclass by Prof. Allendorf. UWA. Oct/13.
- Platypus Risk Assessment Workshop. Taronga Zoo. May/17.
- Shannon Information in Molecular Ecology and Evolution. UNSW Canberra. Nov/17.
- 22nd International Congress on Modelling and Simulation. Hobart, Tasmania. Dec/17.
- Conference of the Genetics Society of Australasia. University of Canberra. Jul/18.
- II Joint Congress on Evolutionary Biology. Montpellier, France. Aug/18.
- Centre for Biodiversity Analysis workshops. What Simulations Can Reveal about Linked Selection. Canberra, Australia. Mar/21.
- Conference of the Genetics Society of Australasia. Fragmentation by large dams and implications for the future viability of small platypus populations. Oct/21.
- Conference of the Genetics Society of Australasia. Rescued back from extinction in the wild: past, present and future of the genetics of the Arabian oryx in Oman. Oct/21.
- Conference of the Australian Mammal Society. Fragmentation by large dams and implications for the future viability of small platypus populations. Sep/21.
- Annual Science Meeting of the Environomics Future Science Platform. Virtual conference. dartR: an accessible platform to analyse genetic data. Nov/21.