

Paula Ramos-Silva, PhD

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I am a versatile bioinformatician and molecular biologist passionate about **research** and **education**. Over the years, I have approached a large diversity of topics ranging from proteomics of mineralized tissues, transcriptomics, bacterial comparative genomics and, more recently, single cell and spatial biology. In my teaching and research, I have combined laboratory work with large-scale computational analyses of omics data and therefore, I see myself as a combination of an experimental and a computational biologist.

EMPLOYMENT HISTORY

- 06/03/2023 - Present **Technical Application Scientist**
Affiliation: NanoString Technologies, Amsterdam, Netherlands
Role: Resolve complex customer issues and provide technical consultation for instruments and multi-omics data analysis in spatial biology post-sales. Improve internal processes and technical documentation, including internal notes, knowledge base and customer-facing documents.
- 01/07/2019 - 31/08/2022 **Marie Skłodowska-Curie Postdoctoral Fellow**
Affiliations: Plankton Diversity and Evolution Group, Naturalis Biodiversity Center & Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam (last 6 months), Netherlands
Project: ‘Evolution of planktonic gastropod calcification’ (**EPIC**)
Advisor: Dr. Katja Peijnenburg
- 01/11/2019 - 30/04/2020 **Maternity Leave** (6 months)
- 01/07/2018 - 30/06/2019 **Postdoctoral Researcher/Bioinformatician**
Affiliations: Marine Biodiversity Group, Naturalis Biodiversity Center, Leiden, Netherlands
Role/Project: Conduct bioinformatics analyses for ‘Evolution of planktonic gastropods in an acidifying ocean’ (**PLANKGAS**).
Advisor: Dr. Katja Peijnenburg
- 01/02/2014 - 31/05/2018 **Postdoctoral Fellow in Comparative Genomics**
Affiliation: Computational Genomics Group, Instituto Gulbenkian de Ciência, Portugal
Project: ‘Understanding the evolutionary history and the diversity of bacterial endosporulation’ (**EvoSpore**)
Advisors: Dr. José Pereira-Leal and Dr. Adriano O. Henriques
- 09/01/2009 - 19/12/2013 **PhD Candidate**
Affiliations: Computational Science Section, University of Amsterdam, Netherlands & Biogéosciences, University of Burgundy, France

Project: Marie Curie ITN ‘Biom mineralization: understanding of basic mechanisms for the design of novel strategies in nanobiotechnology’ (BIOMINTEC)

Promotor: Prof. Peter Slood

Supervisors: Dr. Jaap Kaandorp and Dr. Frédéric Marin

01/11/2007 - 30/11/2008

Research Analyst

Affiliation: Centre of Biological and Chemical Engineering, Instituto Superior Técnico, University of Lisbon, Portugal

Role: Conduct assays in bioreactors for degradation of organic waste and data analyses.

Supervisors: Dr. Carla Carvalho

EDUCATION

09/01/2009 - 19/12/2013

PhD in Biology - Bioinformatics

Informatics Institute, University of Amsterdam, Netherlands

Thesis: Biocalcification of mollusk shells and coral skeletons. Integrating molecular, proteomics and bioinformatics methods

[Link](#)

01/09/2001 - 10/10/2007

Integrated MSc (BSc + MSc) in Biological Engineering

Instituto Superior Técnico, University of Lisbon, Portugal & Faculty of Engineering, Lund University, Sweden

Thesis: Removal of 17 β -estradiol from water using molecularly imprinted polyethersulfone microspheres [Link](#)

PUBLICATIONS

Peer-reviewed articles

1. Checa AG, Pimentel C, Berent K, [Ramos-Silva P](#), Rodríguez-Navarro AB, Cartwright JHE, Sainz-Díaz CI. Evidence for helical microstructure of aragonite fibers in pteropod shells. **MRS Bulletin** 2023; 48(5):459–466. <https://doi.org/10.1557/s43577-022-00418-y>
2. Berent K, Cartwright JHE, Checa AG, Pimentel C, [Ramos-Silva P](#), Sainz-Díaz CI. Helical microstructures in molluscan biomineralization are a biological example of close packed helices that may form from a colloidal liquid crystal precursor in a twist–bend nematic phase. **Physical Review Materials** 2022; 6(10):105601. <https://doi.org/10.1103/PhysRevMaterials.6.105601>
3. [Ramos-Silva P*](#), Odendaal M-L*, Wall-Palmer D, Mekkes L, Peijnenburg KTCA. Transcriptomic responses of adult versus juvenile atlantids to ocean acidification. **Frontiers in Marine Science**, 2022; 9:801458. (*co-authors) <https://doi.org/10.3389/fmars.2022.801458>
4. [Ramos-Silva P](#), Wall-Palmer D, Marlétaz F, Marin F, Peijnenburg KTCA. Evolution and biomineralization of pteropod shells. **Journal of Structural Biology**, 2021; 213(4):107779. <https://doi.org/10.1016/j.jsb.2021.107779>
5. Wall-Palmer D, Mekkes L, [Ramos-Silva P](#), Dämmer LK, Goetze E, Bakker K, Duijm E, Peijnenburg, KTCA. The impacts of past, present and future ocean chemistry on predatory planktonic snails. **Royal Society Open Science**, 2021; 8:202265. <https://doi.org/10.1098/rsos.202265>

6. Choo LQ, Bal TMP, Choquet M, Smolina I, Ramos-Silva P, Marlétaz F, Kopp, M, Hoarau G, Peijnenburg KTCA. Novel genomic resources for shelled pteropods: a draft genome and target capture probes for *Limacina bulimoides*, tested for cross-species relevance. **BMC Genomics**, 2020; 21(1):11. <https://doi.org/10.1186/s12864-019-6372-z>
7. Ramos-Silva P, Serrano M, Henriques AO. From root to tips: sporulation evolution and specialization in *Bacillus subtilis* and the intestinal pathogen *Clostridioides difficile*. **Molecular Biology and Evolution**, 2019; 36(12):2714-36. <https://doi.org/10.1093/molbev/msz175>
8. Le Roy N, Jackson D, Marie B, Ramos-Silva P, Marin F. The evolution of metazoan alpha-carbonic anhydrases and their roles in calcium carbonate biomineralization. **Frontiers in Zoology**, 2014; 11(1):75. <https://doi.org/10.1186/s12983-014-0075-8>
9. Ramos-Silva P, Kaandorp J, Herbst F, Plasseraud L, Alcaraz G, Stern C, Corneillat M, Guichard N, Durllet C, Luquet G, Marin F. The skeleton of the staghorn coral *Acropora millepora*: molecular and structural characterization. **PLoS One**, 2014; 9(6):e97454. <https://doi.org/10.1371/journal.pone.0097454>
10. Marin F, Le Roy N, Marie B, Ramos-Silva P, Bundeleva I, Guichard N, Immel F. Metazoan calcium carbonate biomineralizations: macroevolutionary trends—challenges for the coming decade. **Bulletin de la Société Géologique de France**, 2014; 185(4):217-32. <https://doi.org/10.2113/gssgfbull.185.4.217>
11. Marie B, Ramos-Silva P, Marin F, Marie A. Proteomics of CaCO₃ biomineral-associated proteins: how to properly address their analysis. **Proteomics**, 2013; 13(21):3109-16. <https://doi.org/10.1002/pmic.201300162>
12. Ramos-Silva P, Kaandorp J, Huisman L, Marie B, Zanella-Cléon I, Guichard N, Miller DJ, Marin F. The skeletal proteome of the coral *Acropora millepora*: the evolution of calcification by co-option and domain shuffling. **Molecular Biology and Evolution**, 2013; 30(9):2099-112. <https://doi.org/10.1093/molbev/mst109>
13. Marie B, Jackson DJ, Ramos-Silva P, Zanella-Cléon I, Guichard N, Marin F. The shell-forming proteome of *Lottia gigantea* reveals both deep conservations and lineage-specific novelties. **The FEBS Journal**, 2013; 280(1):214-32. <https://doi.org/10.1111/febs.12062>
14. Ramos-Silva P, Benhamada S, Le Roy N, Marie B, Guichard N, Zanella-Cléon I, Plasseraud L, Corneillat M, Alcaraz G, Kaandorp J, Marin F. Novel molluscan biomineralization proteins retrieved from proteomics: a case study with Upsalin. **ChemBioChem**, 2012; 13(7):1067-78. <https://doi.org/10.1002/cbic.201100708>

Letters and reports

15. Ramos-Silva P, Brito PH, Serrano M, Henriques AO, Pereira-Leal JB. Rethinking the niche of upper-atmosphere bacteria: draft genome sequences of *Bacillus aryabhatai* C765 and *Bacillus aerophilus* C772, isolated from rice fields. **Genome Announcements**, 2015; 3(2): e00094-15. PubMed <https://doi.org/10.1128/genomeA.00094-15>
16. Ramos-Silva P, Marin F, Kaandorp J, Marie B. Biomineralization toolkit: the importance of sample cleaning prior to the characterization of biomineral proteomes. **Proceedings of the National Academy of Sciences USA**, 2013; 110(24):E2144-6. <https://doi.org/10.1073/pnas.1303657110>

Book chapters & conference papers

17. Deutekom ES, Konglerd P, Ramos-Silva P, Kaandorp JA. From Molecules to Morphologies, a Multiscale Modelling Approach to Unravel the Complex System of Coral Calcification. The Cnidaria, Past Present and Future, Springer, 2016; pp 223-36.
https://doi.org/10.1007/978-3-319-31305-4_14
18. Ramos-Silva P, Marin F. Proteins as functional units of biocalcification - an overview. Biomineralization: From Fundamentals to Biomaterials and Environmental Issues, Key Engineering Materials, 2016; 672:183-90.
<https://doi.org/10.4028/www.scientific.net/KEM.672.183>
19. Le Roy N, Jackson DJ, Marie B, Ramos-Silva P, Marin F. Carbonic anhydrase and metazoan biocalcification: a focus on molluscs. Biomineralization: From Fundamentals to Biomaterials and Environmental Issues, Key Engineering Materials, 2016; 672:151-157.
<https://doi.org/10.4028/www.scientific.net/KEM.672.151>
20. Marin F, Le Roy N, Marie B, Ramos-Silva P, Wolf S, Benhamada S, Guichard N, Immel F. Synthesis of Calcium Carbonate Biological Materials: How Many Proteins are Needed? Bioceramics 25, Key Engineering Materials, 2014; 614:52-61.
<https://doi.org/10.4028/www.scientific.net/KEM.614.52>
21. Marin F, Marie B, Benhamada S, Ramos-Silva P, Le Roy N, Guichard N, Wolf S, Montagnani C, Joubert C, Piquemal D, Saulnier D, Gueguen Y. ‘Shellome’: proteins involved in mollusc shell biomineralization - diversity, functions. International Symposium on Pearl Research, Terrapub, 2013; pp 149–16. <https://hal.archives-ouvertes.fr/hal-00793668>

TEACHING

11/2020 – 11/2022	Guest lecturer in bioinformatics for the course Biological Oceanography , MSc level, University of Amsterdam, Netherlands (~6 hours)
11/2020 – 11/2022	Teaching assistant in laboratory practicals for the course Biological Oceanography , MSc level, University of Amsterdam, Netherlands (24 hours)
10/2018	Lecturer of the module Computational Biology and Bioinformatics at the Tirana Mathematical and Computational Biology Workshop, Albania (4 hours)
07/2014 - 07/2015	Guest lecturer, journal club coordinator and evaluator of final presentations for the course Research in Bioinformatics , MSc level, University of Lisbon, Portugal (12 hours)
01/2014 - 03/2015	Lecturer of Applied Genetics and Statistics , BSc level, University of the Nouvelle Grand’Anse, Haiti. This teaching was part of a program organized by the NGO Haitian Connection (haitianconnection.org). (140 hours)

SUPERVISION & MENTORING

03/2021 - 06/2022	Gloria Casas Canales MSc Freshwater & Marine Biology, University of Amsterdam Project: Transcriptomic responses of the sub-Antarctic pteropod <i>Limacina retroversa</i> to ocean acidification: adults vs juveniles
09/2021 - 10/2021	Héloïse Ribot MSc Science Education and Communication, Utrecht University Project: “Seashells inspire CO ₂ storage” - popular science article

- 05/2020 - 11/2020 Mari-Lee Odendaal
MSc Biology, Wageningen University & Research
Project: Transcriptomic responses of juvenile versus adult shelled heteropods under decreasing ocean pH
- 01/2019 - 09/2019 Jack Smith
MSc Biology, Leiden University
Project: Screening for fast-evolving genes in pteropod species

INVITED TALKS & SEMINARS

- 11/2023 *'Pteropod shell proteomes reveal distinct biomineralization toolkits in the formation of crossed lamellar and helical microstructures'* 33rd Annual Meeting of the Dutch Society for Calcium and Bone Metabolism, Zeist, Netherlands
- 03/2022 *'Biomineralization in holoplanktonic gastropods: from genes to shells'* Colloquium Live at Tribune, Naturalis Biodiversity Center, Leiden, Netherlands
- 03/2022 *'Pteropod biomineralization – from shell microstructures to proteins'* Marine Genomics & Evolution Symposium, Naturalis Biodiversity Center, Leiden, Netherlands
- 07/2019 *'Evolution of planktonic gastropod biomineralization'* Meeting: Understanding biomineralization and the impact of global change in marine organisms, Institute for Advanced Study, Amsterdam, Netherlands
- 10/2018 *'Sporulation from root to tips: evolution in Bacillus subtilis and Clostridioides difficile'* Tirana Mathematical and Computational Biology Workshop, Tirana, Albania
- 10/2013 *'On biomineralization of mollusk shells and coral skeletons'* Research Seminar, Thomas E. Starzl Transplantation Institute, University of Pittsburgh, USA

CONFERENCE PRESENTATIONS

- 06/2022 Meeting of the Netherlands Society for Evolutionary Biology, Ede, Netherlands
- 03/2022 Ocean Sciences Meeting, Hawaii
- 09/2019 15th International Symposium on Biomineralization, Munich, Germany
- 04/2019 Poster pitch at The Conference of the Netherlands Society for Evolutionary Biology, Ede, Netherlands
- 08/2013 12th International Symposium on Biomineralization, Freiberg, Germany
- 08/2013 5th Meeting - COST Action Biomineralix, Bologna, Italy
- 09/2012 4th Meeting - COST Action Biomineralix, Aarhus, Denmark
- 02/2011 Biomintec International Workshop - Molecular Biomineralization in Marine Organisms: Nanobiotechnology and Biomedical Applications, Palermo, Italy,
- 06/2010 French Conference on Biology of the Mineralized Tissues (12^{èmes} JFBTM), Saint Étienne, France
- 04/2010 7th International Symposium on Networks in Bioinformatics (ISNB 2010), Amsterdam, Netherlands

CONFERENCE POSTERS

- 09/2019 Pearls of Wisdom: synergising leadership and expertise in molluscan genomics, Kavli Royal Society Centre, Chicheley Hall, UK
- 05/2019 NWO Life Congress, Bunnik, Netherlands
- 04/2019 Meeting of the Netherlands Society for Evolutionary Biology, Ede, Netherlands
- 08/2017 16th Congress of the European Society for Evolutionary Biology, Groningen, Netherlands
- 12/2010 Euro ISRS symposium, Wageningen, Netherlands
- 07/2010 French Conference on Biology, Computer Science and Mathematics Montpellier, France

PERSONAL GRANTS

- 02/2019 Marie Skłodowska-Curie Individual Fellowship
Project: **EPIC** - Evolution of planktonic gastropod calcification,
Grant No.: 844345
Funding Source: European Commission
Amount and duration: 176k €, 2.5 years
Host: Naturalis Biodiversity Center
- 02/2015 FCT Postdoctoral Fellowship
Project: **EvoSpore** - Understanding the evolutionary history and the diversity of bacterial endospore formation
Funding Source: Portuguese Foundation for Science and Technology – FCT
Grant No.: SFRH/BPD/103171/2014
Amount and duration: 55k €, 3 years
Host: Instituto Gulbenkian de Ciência

AWARDS

- 09/2023 EMEA region Outstanding Contribution Award for **Technical Support**, NanoString Technologies, USA
- 01/2019 Travel Award by the Malacological Society of London for the project ‘**Shell structures of three pelagic mollusks**’, UK
- 05/2017 2nd Martin Fellowship by Naturalis Biodiversity Center for the project ‘**Shell proteomes in planktonic gastropods**’, Netherlands
- 02/2017 Award by The Society of Molecular Biology and Evolution for the SMBE 2017 with the presentation ‘**Tracing endospore evolution: the ancestral genes and lineage specific novelties**’, USA (declined)
- 10/2016 1st Martin Fellowship by Naturalis Biodiversity Center for the project ‘**Biomining genes in planktonic gastropods**’, Netherlands
- 07/2013 Scholarship Award from the National Institutes of Health & Howard Hughes Institute for the course ‘**Frontiers in Stem Cells & Regeneration**’, USA
- 02/2007 ERASMUS Scholarship by the University of Lisbon for **MSc research project in Bioremediation** at the Faculty of Engineering, Lund University, Sweden

PROFESSIONAL DEVELOPEMENT

In bioinformatics

- 11/2022 Introduction to NextFlow, physalia-courses.org
- 03/2022 Genome Assembly and Annotation, physalia-courses.org
- 11/2021 Ecological and Evolutionary Studies on DNA Methylation in Plants and Animals, physalia-courses.org

I participated in six intensive courses organized by The Gulbenkian Training Program in Bioinformatics (gtpb.igc.gulbenkian.pt):

- 04/2018 Analysis of Differential Expression with RNAseq
- 04/2017 Advanced Biostatistics for Bioinformatics Tool Users using R
- 03/2017 Population Genetics and Demographic History: model-based approaches
- 03/2016 NGS Data Analysis, RNAseq, ChIPseq
- 11/2014 Bioinformatics using Python for Biologists
- 10/2014 Transcriptome Analysis, Automatic Function Annotation and Data Mining

Others

- 10/2023 EMEA Applications Scientist Onboarding Training on nCounter, GeoMx Digital Spatial Profiler and CosMx Spatial Molecular Imager

04/2023	GeoMx Digital Spatial Profiler hands-on training
04/2022	Didactical modules 1-3 and 6, Teaching and Learning Centre FNWI, University of Amsterdam
11/2020	EMBO Lab Leadership course for Postdocs by embo.org
07/2016	eLife Workshop on Peer Review
08/2015	PADI Open Water Diver
04/2014	Biosafety Levels 2 and 3, Instituto Gulbenkian de Ciência
09/2013	Frontiers in Stem Cells & Regeneration, Marine Biological Laboratory, Woods Hole, MA, USA

PEER-REVIEW

Scientific Reports, Frontiers in Genetics, Genome Biology and Evolution, Journal of Proteome Research, Plos One, F1000Research

SOCIETY MEMBERSHIPS

2017-2023	Society for Molecular Biology and Evolution (SMBE)
2019-2022	Netherlands Society for Evolutionary Biology (NLSEB)

OUTREACH

09/2022	Spotlight: ‘The amazing shells of sea butterflies’ in the LiveScience showroom at Naturalis Biodiversity Center
09/2021	Promotional video of the publication <i>Evolution and biomineralization of pteropod shells</i> in collaboration with VJs from Studio de Maan
08/2019	“Shell microstructures of planktonic gastropods” in the Bulletin of The Malacological Society of London Nr 73, The Malacologist (ISSN 1759-1406)
2014-17	I participated in several microscope demonstrations, science games and one-on-one speed dates about computational biology, bioinformatics, genes and evolution at the annual NOS Alive Music Festival, Lisbon, Portugal
10/2016	Open Day at the Instituto Gulbenkian de Ciência - I participated in this event by creating an interactive game introducing evolutionary thinking to children and teenagers named “How are animals related?”, Oeiras, Portugal
01/2015	I presented ‘A mobility experience’ to share my experience living and working abroad as a PhD candidate to the students of the University of Trás-os-Montes and Alto Douro (UTAD), during the EURAXESS Roadshow in Vila Real, Portugal
09/2012	Radio interview for the programme “Portuguese in the World”, Antena 1, to share my experience in France and the Netherlands and explain my research in biomineralization.

ACADEMIC SERVICES

09/2022-Present	Expert Evaluator and Rapporteur of Marie Skłodowska-Curie postdoctoral proposals for the European Commission
05/2021-Present	Manager of the high memory server for the Plankton Diversity and Evolution group at Naturalis. Tasks: bridge between researchers and IT unit, maintain system up to date, write documentation install/update software, manage user accounts, technical support to users

- 05/2017-05/2018 Manager of the high memory server from the Computational Genomics Laboratory at Instituto Gulbenkian de Ciência. Tasks: maintain system up to date, install software, manage user accounts, technical support to users, install and manage a graphical interface to access the server
- 11/2014-10/2015 Postdoc Committee member, Instituto Gulbenkian de Ciência, Portugal
Main roles:
- Organizer of the monthly Careers in Science Seminar Series.
 - Organizer of 2nd Annual Joint Postdoctoral Meeting, Setúbal, Portugal, November 4-6, 2015 with approx. 100 participants
 - Postdocs' spokesperson

LANGUAGES

Portuguese (native), English (full - C2*), French (full – C2*), Dutch (intermediate – B1*)

* Levels according to the Common European Framework of Reference