

## Miguel Méndez Sandín, Ph.D.

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**Born** 1990/09/07, in Gijón, Asturias, Spain  
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**Other websites** Google Scholar: [Miguel Mendez Sandin](https://scholar.google.com/citations?user=...) GitHub: [MiguelMSandin](https://github.com/MiguelMSandin)  
Lead organizer of “The Life of Retaria Seminar Series”: [thelifeofretaria.github.io/](https://thelifeofretaria.github.io/)

### Professional experience

2024/09/01 - 2026/08/31 **Marie Skłodowska-Curie Actions Postdoctoral Fellow**, Institute of Evolutionary Biology, CSIC - UPF, Spain  
*Hosts:* [Daniel J. Richter](#) and [Ramon Massana](#)  
*Project:* The hidden majority: high-resolution imaging and genomics of the most ecologically important microbial eukaryotes in the ocean

2023/03/01 - 2024/08/31 **Beatriu de Pinós Postdoctoral Fellow**, Institute of Evolutionary Biology, CSIC - UPF, Spain  
*Hosts:* [Daniel J. Richter](#) and [Ramon Massana](#)  
*Project:* The hidden majority: high-resolution imaging of the most ecologically important microbial eukaryotes in the ocean

2022/09/08 - 2023/02/28 **Parental leave**

2020/09/15 - 2022/09/07 **Postdoctoral researcher**, Dept. of Organismal Biology, Uppsala University, Sweden  
*Advisor:* [Fabien Burki](#)  
*Project:* Eco-evolution of microbial eukaryotes, insights from metabarcoding surveys  
*Experience:* Diversification analysis, networks analysis, large data mining, lecturer, workshop organisation, fluorescence in situ hybridization

2016/10/01 - 2019/11/30 **Ph.D. Student**, Biological Station of Roscoff, CNRS - Sorbonne University, France  
*Supervisor:* [Fabrice Not](#)  
*Project:* Diversity and Evolution of Nassellaria and Spumellaria (Radiolaria)  
*Experience:* Single-cell molecular approaches, phylogenetics, molecular clock, metabarcoding and next generation sequencing analysis, scanning electron and confocal microscopy, student supervision

2016/03/01 - 05/31 **Research assistant**, Biological Station of Roscoff - Sorbonne University, France  
*Supervisor:* [Sophie Martin](#)  
*Project:* Impact of global and local changes in Maerl, red algae  
*Experience:* Experimental development

2015/10/05 - 2016/01/29 **Research assistant**, Oviedo University, Spain  
*Supervisor:* [Eva Garcia-Vazquez](#)  
*Project:* Top-down regulation in freshwater communities suggested from environmental DNA. A case study in mountain stream communities  
*Experience:* Field work, environmental DNA sampling and analysis

2015/01/12 - 06/30 **Master thesis**, Oviedo University, Spain  
*Supervisor:* [Consolación Fernández](#)  
*Project:* Long-term changes in low intertidal rocky shore assemblages in the coast of Cape Peñas (North of Spain).  
*Experience:* Multivariate analysis

## Education

2016/10/01 - 2019/11/31	<b>Ph.D. in molecular diversity and evolution</b> , Biological Station of Roscoff - Sorbonne University, France. <i>Supervisor: Fabrice Not.</i> Awarded on <b>November 22, 2019</b>
- 2019/01/28 - 02/09	Visiting scientist: Institute of Marine Science, CSIC, Barcelona (Spain)
- 2018/10/15 - 12/07	Visiting scientist: National Institute of Water and Atmospheric Research, Wellington (New Zealand)
- 2017/10/30 - 11/03	Visiting scientist: Tropical Biosphere Research Center, Okinawa (Japan)
- 2016/10/05 - 10/28	Visiting scientist: Oceanographic Observatory of Villefranche sur Mer, CNRS (France)
2013/09/02 - 2015/06/30	<b>International MSc in Marine Biodiversity and Conservation</b> (EMBC+)
- 2015/01/12 - 06/30	Oviedo University, Spain. Master Thesis. <i>Supervisor: Consolación Fernández</i>
- 2014/09/01 - 12/19	Sorbonne University, France
- 2014/04/07 - 04/18	Göteborg University, Sweden. Spring School. <i>Supervisor: Rick Officer</i>
- 2013/09/02 - 2014/06/27	Algarve University, Portugal
2008/09/29 - 2013/06/04	<b>BSc in Biology</b> , Ecology speciality. 311 ECTS. Oviedo University, Spain
- 2013/01/14 - 07/31	Student intern: Ecology department. <i>Supervisor: Jose Luis Acuña</i>
- 2012/09/03 - 12/21	ERASMUS: Klaipeda University, Lithuania
2006/09/04 - 2008/06/31	<b>International Baccalaureate</b> , IES Real Instituto de Jovellanos, Gijón, Spain

## Fellowships and grants

2023	<b>Marie Skłodowska-Curie Actions - Postdoctoral Fellowship</b> (MSCA-2022-PF 101103530): 181 152.96 € (2 years); score: 98.6%
2022	<b>Postdoctoral fellowship Beatriz de Pinós</b> (2021 BP 00068): 144 300 € (3 years); score: 87.3%
2024/10	CGUE 2024 conference, <b>child support award</b> : 605€
2022/05/10	International Society Of Protistologists (ISOP) <b>grant</b> to attend Protistology Nordics
2017/05/15	Young Research Association (AJC, Biological Station of Roscoff) <b>grant</b> to attend InterRad XV, France
2016 - 2019	<i>Agence Nationale de la Recherche</i> (ANR) and the Brittany Region Grants, France, to carry out doctoral studies (PhD)
2008 - 2013	Scholarship to study BSc from the National Ministry of Education, Spain

## Awards and honors

2024	<i>Qualification - Section 67 (Biologie des populations et écologie)</i> : Qualified to become a university teacher by the Minister of Higher Education and Science, France
2020/01/22	<b>Best oral presentation award</b> in Young Researchers Day (JJC) Biological Station of Roscoff, France
2019	The Micropalaeontological Society: Microfossil Image Competition & Calendar 2019
2018/12/07	<b>3<sup>rd</sup> best oral presentation award</b> in Young Researchers Day (JJC) Biological Station of Roscoff, France
2017/10/24	<b>Best oral presentation for Young Scientists</b> in InterRad XV, Japan

## Skills and qualifications

<b>Languages</b>	Spanish: Native English: Working knowledge French: Conversational Portuguese: Basics	<b>Softwares</b>	LibreOffice: Extensive experience Inkscape: Advanced Fiji and GIMP: User-level
<b>Programming</b>	R and python: Advanced Bash, UNIX/LINUX: Intermediate HTML & CSS: Basics	<b>Driving licence</b>	B
		<b>Diving</b>	GUE fundamentals (Nitrox 32) SSI advanced and scientific

## Expeditions & Fieldworks

2018/10/21 - 11/21	<b>TAN1810</b> expedition, 5 weeks, <i>Tangaroa</i> Ocean Research Vessel, New Zealand
2017/09/11 - 09/24	<b>Bio-MOOSE</b> expedition, 2 weeks, <i>L'atalante</i> Ocean Research Vessel, France
2013/04/28 - 05/04	<b>BioCant 3</b> expedition, 1 week, <i>Sarmiento de Gamboa</i> Ocean Research Vessel, Spain

## Professional training

2019/06/24 - 06/28	Evolutionary Networks, AIRE Team, Sorbonne University
2018/05/14 - 05/18	Metabarcoding Analysis, IFREMER
2018/18/01 - 19/01	Data Management With Python, ABiMS, Biological Station of Roscoff
2017/05/16 - 05/17	Advanced Linux, ABiMS, Biological Station of Roscoff
2017/03/02	Advanced R Language, ABiMS, Biological Station of Roscoff
2017/03/06 - 03/10	Phylogenetic Analysis Using R, Barcelona
2015/11/27 - 12/06	International Summer School: New challenges for research in biodiversity and ecology of micro- and macro-algae. ECIM, Las Cruces, Chile
2015/01/19 - 03/14	Statistical Online Course: Statistical Learning. Stanford University
2013/10/02 - 2014/04/14	Diving: GUE Fundamentals (Nitrox 32), Advanced & scientific diver 1 (SSI)

## Teaching

2024/12/12	<b>Invited speaker:</b> 1.5 hours: Phylogenetic analyses and tree thinking, Biological Station of Roscoff, France. "Data analysis meetings"
2022/04/06	<b>Lecturer:</b> 2.5 hours: Diversity of single-celled marine eukaryotes, Uppsala University, Sweden. Bachelor students year 1
2021/11/29 - 12/03	<b>Invited teacher assistant:</b> 30 hours. Novel methods for exploring molecular microbial diversity: long-read sequencing. Masters " <i>Océanographie et Environnements Marins</i> " (OEM), Biological Station of Roscoff, France
2021/04/15	<b>Lecturer:</b> 1.5 hours: Diversity of single-celled marine eukaryotes, Uppsala University, Sweden. Bachelor students year 1
2021/01/19	<b>Organiser and lecturer:</b> 8 hours: An introduction to Sequence Similarity Networks, Uppsala University, Sweden. Systematic Biology
2018/04/12 - 04/13	<b>Teacher assistant:</b> 12 hours. Single-cell molecular approaches for studying mixotrophs, Biological Station of Roscoff, France. MixITiN MSCA-ITN
2017/11/20 - 11/24	<b>Teacher assistant:</b> 30 hours. Marine MICROorganisms: MOLEcular approaches to their taxonomic and functional diversity (MICROMOL). Masters " <i>Océanographie et Environnements Marins</i> " (OEM) and "Marine Biodiversity and Conservation" (EMBC), Biological Station of Roscoff, France

## Supervision

2024/04 - 2024/09	<u>Natalia Morales</u> , Master thesis: Integrating DNA sequencing and oceanographic simulations to trace the origins of planktonic communities in the Caribbean Sea. Master: " <i>Oceanografía y Gestión del Medio Marino</i> ", Barcelona University, Spain PDF accessible via digital.CSIC: <a href="http://hdl.handle.net/10261/394488">http://hdl.handle.net/10261/394488</a>
2022/03/31	<u>Thomas M. Huber</u> , Master thesis: Little big data - extending plastid genome databases using marine planktonic metagenomes. Master: Erasmus Mundus Master Programme in Evolutionary Biology, Uppsala University, Sweden. <b>Opponent</b>
2018/01/08 - 06/18	<u>Elsa Gadoin</u> , Master thesis: Molecular diversity of microalgae in symbiosis with Nassellaria and Spumellaria (Radiolaria). Master: " <i>Océanographie et Environnements Marins</i> ", Sorbonne University, France

## Outreach

2025/05/22	<i>Entrevista con un biólogo</i> : 6-8 years old students, CRA Les Mariñes, Asturias, Spain
2021/10/01 - 10/11	<i>Fête de la Science</i> : interactive poster: Rhizaria (Ocean Touch), Brest, France
2020/02/13	Introducing biodiversity and DNA to high-school students, Morlaix, France
2019/10/06	<i>Fête de la Science</i> : Introducing plankton to the public, Morlaix, France
2017/10/15	<i>Fête de la Science</i> : Introducing plankton to the public, Roscoff, France

## Scientific services

Reviewer of [Deep-Sea Research](#), [Journal of Plankton Research](#), [ISME](#), [Molecular Ecology Resources](#), [PNAS](#) and [Protist](#) since 2020, and *recommender* in [PCI microbiol.](#)

Expert curator of PR2, Radiolaria: [pr2-database.org/team/](http://pr2-database.org/team/)

**Lead organiser of The Life of Retaria Seminar Series:** [thelifeofretaria.github.io/](http://thelifeofretaria.github.io/)

Software contributor in GitHub: [github.com/MiguelMSandin](https://github.com/MiguelMSandin)

## Online scientific output

A total of 16 Silhouettes of Radiolaria available to the public domain for further presentations, manuscripts and outreach purposes: available at [phylopic.org/](http://phylopic.org/)

A tool for the high throughput design of specific oligonucleotides: [github.com/MiguelMSandin/oligoN-design](https://github.com/MiguelMSandin/oligoN-design)

An introduction to Sequence Similarity Networks: [github.com/MiguelMSandin/SSNetworks](https://github.com/MiguelMSandin/SSNetworks)

A practical guide to phylogenetic analyses: [miguelmsandin.github.io/phylogeniesQuickStart](https://miguelmsandin.github.io/phylogeniesQuickStart)

A set of scripts and functions to deal with common DNA fasta files and phylogenetic trees through the command line: [github.com/MiguelMSandin/random](https://github.com/MiguelMSandin/random)

A tool to estimate the entropy of a multiple sequence alignment (published in Sandin et al., 2021)  
[github.com/MiguelMSandin/DNA-alignment-entropy](https://github.com/MiguelMSandin/DNA-alignment-entropy)

A wet-laboratory protocol for single-cell rDNA amplification of Nassellaria (doi: [10.17504/protocols.io.t5req56](https://doi.org/10.17504/protocols.io.t5req56)) and Spumellaria (doi: [10.17504/protocols.io.xwvfpe6](https://doi.org/10.17504/protocols.io.xwvfpe6))

A protocol for cleaning and staining of radiolaria skeletons to be imaged in a confocal microscope (doi: [10.17504/protocols.io.t5qeq5w](https://doi.org/10.17504/protocols.io.t5qeq5w))

A protocol for scanning electron microscopy imaging of opaline silica single-cell skeletons (Polycystine Radiolaria: doi: [10.17504/protocols.io.ug9etz6](https://doi.org/10.17504/protocols.io.ug9etz6))

## Conferences

- |            |   |
|------------|---|
| 2025/09/29 | Symposium on Aquatic Microbial Ecology (SAME18), Barcelona, Spain<br><b>Poster:</b> <i>"OligoN-design: A simple and versatile tool to design specific probes and primers from large heterogeneous datasets"</i>   |
| 2025/09/24 | 17 <sup>th</sup> InterRad congress, Florence, Italy<br><b>Round table chair:</b> <i>"Molecular biology for studying diversity, ecology and evolution"</i><br><b>Talk:</b> <i>"Is the gelatinous matrix of Nassellaria a strategy for coping with oligotrophy?"</i>                                  |
| 2025/06/23 | 16 <sup>th</sup> International Congress of Protistology, ICOP-ISOP joint meeting, Seoul, South Korea<br><b>Invited talk:</b> <i>"Revealing the diversity and evolution of Radiolaria beyond the stars of the ocean"</i>   |
| 2024/10/02 | Comparative genomics of unicellular eukaryotes (CGUE): Interactions and symbioses, Sant Feliu de Guixols, Spain<br><b>Talk:</b> <i>"Environmental phylogenetics reveals early diversification of crown eukaryotes in the Mesoproterozoic"</i>   |
| 2023/07/11 | IX European Congress of Protistology, ECOP-ISOP joint meeting, Vienna, Austria<br><b>Talk:</b> <i>"The early evolutionary history of microbial eukaryotes and the unknown diversity"</i>  |
| 2023/07/05 | Jornada de Biología Evolutiva, Barcelona, Spain<br><b>Talk:</b> <i>"The early evolutionary history of microbial eukaryotes and the unknown diversity"</i>   |
| 2023/01/20 | International Society for Evolutionary Protistology, Virtual Meeting<br><b>Talk:</b> <i>"The eco-evolution of microbial eukaryotes: insights from molecular environmental surveys"</i>  |
| 2022/09/13 | 16 <sup>th</sup> InterRad congress, Ljubljana, Slovenia<br><b>Talk:</b> <i>"Radiolaria diversity, ecology and evolution: an integrative approach"</i> (Presented by Fabrice Not)  |
| 2022/05/10 | Protistology Nordics, Natural History Museum of Oslo, Norway<br><b>Talk:</b> <i>"Biotic interactions driving early eukaryotic evolution"</i>  |
| 2020/01/22 | Young Researchers Day, Biological Station of Roscoff, France<br><b>Talk:</b> <i>"Diversity and evolution of Radiolaria"</i><br><b>Poster:</b> <i>"Intra-genomic rDNA gene variability of Nassellaria and Spumellaria (Rhizaria, Radiolaria) assessed by Sanger, MinION and Illumina sequencing"</i> |

- 2019/07/30 VIII European Congress of Protistology, ECOP-ISOP Joint meeting, Rome, Italy  
**Talk:** “Diversity and evolution of Radiolaria”
- 2018/12/07 Young Researchers Day, Biological Station of Roscoff, France  
**Talk & Poster:** “Time Calibrated Morpho-molecular Classification of Nassellaria (Radiolaria)”
- 2017/10/24 15<sup>th</sup> InterRad congress, Niigata, Japan  
**Talk:** “Time Calibrated Morpho-molecular Classification of Nassellaria (Radiolaria)”
- 2016/12/08 Young Researchers Day, Biological Station of Roscoff, France  
**Flash-Talk:** “Diversity and Evolution of Nassellaria and Spumellaria (Radiolaria)”

### Seminars

- 2025/07/16 The Life of Retaria Seminar Series, Online Meeting  
**Talk:** “Calibrating the Retaria molecular clock”
- 2025/01/14 MicrobeHub Seminar, Institute of Evolutionary Biology, Barcelona, Spain  
**Talk:** “Revealing the diversity and evolution of Radiolaria beyond the stars of the ocean”
- 2024/05/10 The Life of Retaria Seminar Series, Online Meeting  
**Kick-off presentation**, on behalf of the organising committee
- 2024/02/22 Ongoing and future research, Institute of Evolutionary Biology, Barcelona, Spain  
**Flash-talk:** “The hidden majority: Exploring environmental DNA to better understand eukaryotic diversity and evolution”
- 2023/09/04 MicrobeHub Seminar, Institute of Evolutionary Biology, Barcelona, Spain  
**Talk:** “Gelatinous matrix, an original strategy to cope oligotrophy in Nassellaria (Radiolaria)”
- 2023/06/19 MicrobeHub Seminar, Institute of Evolutionary Biology, Barcelona, Spain  
**Talk:** “The hidden majority: Exploring environmental DNA to better understand eukaryotic diversity and evolution”
- 2022/06/22 Systematic Biology Seminar Series, Uppsala University, Sweden  
**Talk:** “Biotic interactions driving early eukaryotic evolution”
- 2021/10/21 Systematic Biology Seminar Series, Uppsala University, Sweden  
**Talk:** “Eukaryotic environmental molecular diversity and its eco-evolutionary history”

### Publications

Total citations: 485

H-index: 12

### Pre-prints and other publications

**Sandin MM**, Walde M, Henry N, Forn I, Simon N, Berney C, Massana R, Richter DJ (2025) OligoN-design: A simple and versatile tool to design specific probes and primers from large heterogeneous datasets. bioRxiv 2025.11.04.685038 doi: [10.1101/2025.11.04.685038](https://doi.org/10.1101/2025.11.04.685038)

### PhD thesis

**Sandin MM**. Diversity and Evolution of Nassellaria and Spumellaria (Radiolaria). Protistology. Sorbonne Université, 2019. **PhD Thesis**. HAL Id: [tel-03137926](https://tel.archives-ouvertes.fr/tel-03137926)

### Peer reviewed publications

- Trubovitz S, **Sandin MM**, Caron DA (2025) Genetic variability in microbial eukaryotes reframes marine biodiversity assessment in the age of amplicon sequencing. *PLoS One*. 20(6): e032605. doi: [10.1371/journal.pone.0326053](https://doi.org/10.1371/journal.pone.0326053)
- Sandin MM**, Renaudie J, Suzuki N, Not F (2025) Diversity and evolution of Radiolaria: Beyond the stars of the ocean. *Current Biology*. 35, 2524–2538. doi: [10.1016/j.cub.2025.04.032](https://doi.org/10.1016/j.cub.2025.04.032)
- Llopis-Monferrer N, Romac S, Laget M, Nakamura Y, Biard T, **Sandin MM** (2025) Gelatinous matrix, an original strategy to cope with oligotrophy in Nassellaria (Radiolaria). *Environ. Microbiol.* 27 (5), e70098. doi: [10.1111/1462-2920.70098](https://doi.org/10.1111/1462-2920.70098)
- Llopis-Monferrer N, Biard T, **Sandin MM**, Lombard F, Picheral M, Elineau A, Guidi L, Leynaert A, Tréguer PJ, Not F (2022) Siliceous Rhizaria abundances and diversity in the Mediterranean Sea assessed by combined imaging and metabarcoding approaches. *Front. Mar. Sci.* 9:895995. doi: [10.3389/fmars.2022.895995](https://doi.org/10.3389/fmars.2022.895995)

- Sandin MM**, Romac S, Not F (2022) Intra-genomic rDNA gene variability of Nassellaria and Spumellaria (Rhizaria, Radiolaria) assessed by Sanger, MinION and Illumina sequencing. *Environ Microbiol.* 24(7):2979-2993. doi: [10.1111/1462-2920.16081](https://doi.org/10.1111/1462-2920.16081)
- Xiao L, Johansson S, Rughöft S, Burki F, **Sandin MM**, Tenje M, Behrendt L (2022) Photophysiological response of Symbiodiniaceae single cells to temperature stress. *ISME J* doi: [10.1038/s41396-022-01243-6](https://doi.org/10.1038/s41396-022-01243-6)
- Burki F, **Sandin MM**, Mahwash J (2021) Diversity and ecology of protists revealed by metabarcoding. *Curr. Biol.* 31-19: R1267-R1280. doi: [10.1016/j.cub.2021.07.066](https://doi.org/10.1016/j.cub.2021.07.066)
- Sandin MM**, Biard T, Romac S, O'Dogherty L, Suzuki N, Not F (2021) A Morpho-molecular Perspective on the Diversity and Evolution of Spumellaria (Radiolaria). *Protist.* 172, 125806. doi: [10.1016/j.protis.2021.125806](https://doi.org/10.1016/j.protis.2021.125806)
- Llopis-Monferrer N, Boltovskoy D, Tréguer P, **Sandin MM**, Not F, Leynaert A (2020) Estimating biogenic silica production of Rhizaria in the global ocean. *Global Biogeochemical Cycles*, 34, e2019GB006286. doi: [org/10.1029/2019GB006286](https://doi.org/10.1029/2019GB006286)
- Nakamura Y, **Sandin MM**, Suzuki N, Somiya R, Tuji A, Not F (2020) Phylogenetic revision of the order Entactinaria—Paleozoic relict Radiolaria (Rhizaria, SAR). *Protist* 171. Doi: [10.1016/j.protis.2019.125712](https://doi.org/10.1016/j.protis.2019.125712)
- Qui-minet ZN, Coudret J, Davoult D, Grall J, Cariou T, **Sandin MM**, Martin S (2019) Combined effects of global climate change and nutrient enrichment on the physiology of three temperate maerl species. *Ecol.* 00, 1–21. doi: [10.1002/ece3.5802](https://doi.org/10.1002/ece3.5802)
- Sandin MM**, Pillet L, Biard T, Poirier C, Bigeard E, Romac S, Suzuki N, Not F (2019) Time Calibrated Morpho-molecular Classification of Nassellaria (Radiolaria). *Protist* 170, 187–208. doi: [10.1016/j.protis.2019.02.002](https://doi.org/10.1016/j.protis.2019.02.002) (Journal cover)
- Villar E, Dani V, Bigeard E, Linhart T, **Sandin MM**, Bachy C, Six C, Lombard F, Sabourault C, Not F (2018) Symbiont Chloroplasts Remain Active During Bleaching-Like Response Induced by Thermal Stress in *Collozoum pelagicum* (Collodaria, Retaria). *Front. Mar. Sci.* 5, 1–11. doi: [10.3389/fmars.2018.00387](https://doi.org/10.3389/fmars.2018.00387)
- Fernandez S, **Sandin MM**, Beaulieu PG, Clusa L, Martinez JL, Ardura A, García-Vázquez E (2018) Environmental DNA for freshwater fish monitoring: insights for conservation within a protected area. *PeerJ* 6 e4486. doi: [10.7717/peerj.4486](https://doi.org/10.7717/peerj.4486)
- Sandin MM**, Fernández C (2016) Changes in the structure and dynamics of marine assemblages dominated by *Bifurcaria bifurcata* and *Cystoseira* species over three decades (1977-2007). *Estuar. Coast. Shelf Sci.* 175, 46–56. doi: [org/10.1016/j.ecss.2016.03.015](https://doi.org/10.1016/j.ecss.2016.03.015)