

PEDRO R FRADE

Curriculum Vitae



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ACADEMIC QUALIFICATIONS

- Jun 09 - PhD in coral biology and microbial ecology, with thesis entitled "Corals through the light - Phylogenetics, functional diversity and adaptive strategies of coral-symbiont associations over a large depth range".
University of Amsterdam, The Netherlands (25.06.2009)
- Oct 02 - Licentiate Degree (MSc-equivalent) in Marine Animal Biology at the Faculty of Sciences, University of Lisbon (FCUL), Portugal

PROFESSIONAL ACTIVITIES

- Feb 16 - present - Postdoctoral researcher at the Center of Marine Sciences (CCMAR) at the University of Algarve, within the group of Prof. dr. Ester Serrão (Marine Ecology and Evolution)
- Jun 11 - Dec 15 - Postdoctoral researcher within the group of Prof. dr. Gerhard J Herndl (Microbial Oceanography) at the Department of Limnology and Bio-Oceanography (former Marine Biology) in the University of Vienna, Austria, and PI in the project COSMIC - "Coral Surface Microlayer: production and dynamics of mucus-associated microbial communities".
- Jun 10 - Nov 10 - Postdoctoral researcher at the Universidad Nacional Autonoma de Mexico (UNAM, Mexico) in the EU Project FORCE (Future of Reefs in a Changing Environment: an ecosystem approach to managing Caribbean coral reefs in the face of climate change), working on coral calcification in mesocosms simulating future ocean acidification scenarios. This position was supervised by Prof. dr. Roberto Iglesias-Prieto.
- May 04 - Jun 09 - PhD research supervised by Prof. dr. Rolf PM Bak at NIOZ Royal Netherlands Institute for Sea Research and the University of Amsterdam (UvA), The Netherlands, with co-promoter Prof. dr. Jef Huisman.
- Sep 08 - Dec 08 - Guest Researcher within the group of Dr. Jaap Kaandorp, in the Section Computational Science at the University of Amsterdam, the Netherlands.
- Aug 03 - Mar 04 - MPA Researcher at the Department of Oceanography and Fisheries of the University of the Azores, Portugal, with a junior research grant attributed by IMAR (Institute of the Sea), under the EU-funded project INTERREG IIIb/OGAMP, Ordering and Management of Marine Protected Areas, supervised by Prof. dr. Ricardo Serrão Santos (<http://www.horta.uac.pt/projectos/macmar/ogamp/ogamp.html>).
- Oct 01 - Oct 02 - Research project to conclude the (MSc-equivalent) graduation in Marine Animal Biology, entitled "Coral population structures in marginal environments: the inland bays of Curaçao, Netherlands Antilles", supervised by Prof. dr. Rolf PM Bak (UvA), Dr. Adolph O Debrot (CARMABI) and Prof. dr. Jose Guerreiro (FCUL).

SCIENTIFIC PUBLICATIONS**Peer-review articles**

16. Glasl B, Bongaerts P, Elisabeth NH, Hoegh-Guldberg O, Herndl GJ and **Frade PR** (*in press in Coral Reefs*) Microbiome variation in corals with distinct depth distribution ranges across a shallow-mesophotic gradient (15-85 m)
15. Goldammer H, Hollergschwandtner E, Elisabeth NH, **Frade PR**, and Reipert S (2016) Automated freeze substitution of algae accelerated by a novel agitation module. *Protist* 167: 369-376. doi: 10.1016/j.protis.2016.06.002
14. Glasl B, Herndl GJ and **Frade PR** (2016) The microbiome of coral surface mucus has a key role in mediating holobiont health and survival upon disturbance. *The ISME Journal advance online publication*, 8 March 2016. doi: 10.1038/ismej.20169
13. **Frade PR**, Roll K, Bergauer K and Herndl GJ (2016) Archaeal and Bacterial communities associated with the surface mucus of Caribbean corals differ in their degree of host specificity and community turnover over reefs. *PLoS ONE* 01/2016, 11(1): e0144702. doi: 10.1371/journal.pone.0144702
12. **Frade PR**, Schwaninger V, Glasl B, Sintes E, Hill RW, Simó R and Herndl GJ (2015) Dimethylsulfoniopropionate in corals and its interrelations with bacterial assemblages in coral surface mucus. *Environmental Chemistry* 13(2) 252-265. doi: 10.1071/EN15023
11. Bongaerts P, Carmichael M, Hay KB, Tonk L, **Frade PR** and Hoegh-Guldberg O (2015) Prevalent endosymbiont zonation shapes the depth distributions of scleractinian coral species. *Royal Society Open Science* 2: 140297. doi: 10.1098/rsos.140297
10. Bongaerts P, **Frade PR**, Hay KB, Englebert N, Latijnhouwers K, Bak RPM, Vermeij MJA and Hoegh-Guldberg O (2015) Deep down on a Caribbean reef: lower mesophotic depths harbor a specialized coral-endosymbiont community. *Scientific Reports* 5: 7652. doi: 10.1038/srep07652
9. Bongaerts P, **Frade PR**, Ogier JJ, Hay KB, van Bleiswijk J, Englebert N, Vermeij MJA, Bak RPM, Visser PM and Hoegh-Guldberg O (2013) Sharing the slope: depth partitioning of Agariciid corals and their associated *Symbiodinium* across shallow and mesophotic habitats (0-60 m) on a Caribbean reef. *BMC Evolutionary Biology* 13: 205. doi: 10.1186/1471-2148-13-205
8. Filatov MV, **Frade PR**, Bak RPM, Vermeij MJA and Kaandorp JA (2013) Comparison between colony morphology and molecular phylogeny in the Caribbean scleractinian coral genus *Madracis*. *PLoS ONE* 8 (8): e71287. doi: 10.1371/journal.pone.0071287
7. Vermeij MJA, **Frade PR** and Bak RPM (2013) Zooxanthellae presence acts as a settlement cue for aposymbiotic planulae of the Caribbean coral *Montrastraea faveolata*. *Caribbean Journal of Science* 47: 31-36
6. **Frade PR**, Reyes-Nivia MC, Faria J, Kaandorp JA, Luttikhuisen PC and Bak RPM (2010) Semi-permeable species boundaries in the coral genus *Madracis*: The role of introgression in a brooding coral system. *Molecular Phylogenetics and Evolution* 57: 1072-1090
5. Hill RW, Li C, Jones AD, Gunn JP and **Frade PR** (2010) Abundant betaines in reef-building corals and ecological indicators of a photoprotective role. *Coral Reefs* 29: 869-880
4. **Frade PR**, de Jongh F, Vermeulen F, van Bleijswijk J and Bak RPM (2008) Variation in symbiont distribution between closely related coral species over large depth ranges. *Molecular Ecology* 17: 691-703
3. **Frade PR**, Bongaerts P, Winkelhagen AJS, Tonk L and Bak RPM (2008) In situ photobiology of corals over large depth ranges: a multivariate analysis on the roles of environment, host, and algal symbiont. *Limnology and Oceanography* 53: 2711-2723
2. **Frade PR**, Englebert N, Faria J, Visser PM and Bak RPM (2008) Distribution and photobiology of *Symbiodinium* types in different light environments for three colour morphs of the coral *Madracis pharensis*: is there more to it than total irradiance? *Coral Reefs* 27: 913-925
1. Vermeij MJA, **Frade PR**, Jacinto RIR, Debrot AO and Bak RPM (2007) Habitat-related differences in population structure are associated with coral reproductive mode: a comparison between fringing reef and inland bay coral communities. *Marine Ecology Progress Series* 351: 91-102

Selected conference contributions in the last 5 years

10. Organizer of the *AutReef2015*, a workshop on reef research made in Austria, Natural History Museum (NHM), in Vienna, 28 Oct 2015 (www.autreef.com)
9. Host of the session “Microbial lifestyles and microbe-driven processes in Caribbean coral reefs” at the *37th Scientific Meeting of the Association of Marine Laboratories of the Caribbean (AMLC)*, Curaçao, 18-22 May 2015
8. **Frade PR**, Schwaninger V, Glasl B, Sintes E, Hill RW, Simó R and Herndl GJ (2015) Coral dimethylsulfoniopropionate: responses to light and stress, and interrelations with bacterial assemblages in surface mucus (oral presentation). *37th Scientific Meeting of the Association of Marine Laboratories of the Caribbean (AMLC)*, Curaçao, 18-22 May
7. **Frade PR**, Elisabeth NH, Hay KB, Englebert N, Latijnhouwers KRW, Bak RPM, Vermeij MJA, Herndl GJ, Hoegh-Guldberg O and Bongaerts P (2015) A specialized coral-*Symbiodinium*-Bacteria community deep down on a Caribbean reef (poster presentation). *37th Scientific Meeting of the Association of Marine Laboratories of the Caribbean (AMLC)*, Curaçao, 18-22 May
6. Glasl B, Herndl GJ and **Frade PR** (2015) Corals use mucus to garden their microbiome and stay healthy (poster presentation). *37th Scientific Meeting of the Association of Marine Laboratories of the Caribbean (AMLC)*, Curaçao, 18-22 May
5. **Frade PR** and Herndl GJ (2014) Linking the composition of coral surface mucus to the structure and function of its associated microbial biofilm community (oral presentation). *Biofilms 6*, Vienna, Austria, 13 May
4. **Frade PR**, Roll K, Garcia J, Birgel D and Herndl GJ (2013) A multidisciplinary approach to study coral surface mucus as a microbial niche (oral presentation). *SAME conference on Aquatic Microbial Ecology*, Stresa, Italy, 8-13 September
3. **Frade PR** (2012) Coral surface microlayer: the unexplored microhabitat linking zooxanthellae activity to the structure and dynamics of mucus-associated prokaryotic communities (oral presentation). *Symposium “Let’s talk about symbiosis”*, University of Vienna, Austria, 10 October
2. **Frade PR**, Bergauer K and Herndl GJ (2012) Diversity and community structure of coral-associated Bacteria: interspecific, vertical and spatial variation (poster presentation). *Ocean Sciences Meeting*, Salt Lake City, Utah, USA, 20-24 February
1. **Frade PR** (2011) The *Madracis* monsters: an evolutionary perspective on coral-symbiont associations (oral presentation). *Symposium “Branching Out In Coral Reef Ecology” in honour of the retirement of Prof. dr. Rolf PM Bak*, University of Amsterdam, Amsterdam, The Netherlands, 7 December

Thesis / Books

1. **Frade PR** (2009) Corals through the light - Phylogenetics, functional diversity and adaptive strategies of coral-symbiont associations over a large depth range. *PhD Thesis*, University of Amsterdam, 176 pp. (ISBN: 978-90-9024362-7) (<http://dare.uva.nl/record/305853>)

SCHOLARSHIPS & AWARDS

- Jan 16 - present - Postdoctoral Fellowship by FCT, the Portuguese Science Foundation, to work on the project “Coral’s Gastric Cavity: a bioreactor for microbe-driven metabolic pathways” (reference nr SFRH/BPD/110285/2015; funding of Euro 18.690,00 per year, for a total of 6 years).
- Oct 15 - Hans and Lotte Hass Marine Conservation Prize (“Hans und Lotte Hass Meeresschutzpreis”), awarded by the “Haus des Meeres - Aqua Terra Zoo”, in Vienna, Austria.
- Aug 15 - University of Queensland Travel Award for International Collaborative Research, to work with Prof. dr. Ove Hoegh-Guldberg at the Global Change Institute in Brisbane, Australia.
- Aug 13 - July 15 - EU Marie Curie IntraEuropean Fellowship (nr 299320, under call identifier FP7-PEOPLE-2011-IEF; total funding of Euro 180.191,40) to work on the project “COSMIC - Coral Surface Microlayer: production and dynamics of mucus-associated microbial communities”.
- May 13 - ASSEMBLE (Association of European Marine Biological Laboratories) Infrastructure Access

- Fellowship with the project MUMISOLCOR, "Mucus Microbiome of Solitary Scleractinian Corals".
- Jan 12 - Jul 13 - Lise-Meitner Postdoctoral Fellowship attributed by the Austrian Science Fund (FWF, nr M1363-B20; total of Euro 149.340,00).
- Jun 10 - Nov 10 - Postdoctoral fellowship within the EU-funded FORCE project (Future of Reefs in a Changing Environment: an ecosystem approach to managing Caribbean coral reefs in the face of climate change).
- Jun 04 - Jun 08 - PhD Fellowship by the Portuguese Science Foundation (FCT, reference nr SFRH/BD/13382/2003; total funding of Euro 133.520,00).
- Aug 03 - Mar 04 - Junior Scientific Research grant attributed by IMAR (Institute of the Sea, Portugal), under the EU-funded project INTERREG IIIb/OGAMP, Ordering and Management of Marine Protected Areas.
- Sep 00 - Feb 01 - EU PRODEP grant to cover studies (ERASMUS) in the Netherlands.

SYNERGISTIC ACTIVITIES

- 2015 - Scientific Manager in the project "*Scopulum Anima - Reef Soul*" (directed by digital artist Roman Hansi), a full-dome underwater documentary including real footage and digital animation, to be released in 2017.
- 2014 - Course on "Stable isotopes: analysis and application in foodweb ecology" at the Ghent University (Belgium), part of the Doctoral Programme on Marine Ecosystem Health and Conservation (MARES).
- 2011 - 2012 - Invited speaker at the Coral Reef Ecosystems Course lectured at the Institute for Biodiversity and Ecosystem Dynamics as part of the MSc in Biological Science at the University of Amsterdam (The Netherlands).
- 2004 - present - Supervisor of 15 MSc students, both in the lab and in the field, including thesis guidance and final grading (University of Amsterdam, University of Lisboa, University of Vienna, University of Innsbruck, University of South Denmark, University of Algarve).
- 2004 - present - PADI Divemaster (nr. 965070), Enriched Air NITROX Diver (nr. 0501099785), First Aid and Oxygen Provider courses (DAN Europe)
- 2001 - present - Extensive fieldwork experience with over 1000 research dives.

REVIEWER DUTIES

Over 30 revisions for scientific journals such as Molecular Ecology, Marine Ecology Progress Series, Marine Biology, Biogeosciences, Coral Reefs, Journal of Evolutionary Biology, JEMBE, Limnology and Oceanography, Aquatic Microbial Ecology, Environmental Chemistry, Environmental Microbiology, Scientific Reports and Frontiers in Microbiology, as well as for funding institutions such as the National Science Foundation (USA).

LANGUAGES

Portuguese: native; English: fluent; Spanish: fluent; French: medium; German: medium; Dutch: basic