

# Barbara Bayer, Ph.D.

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## Education

2019 Ph.D. in Biology, University of Vienna, Austria

2014 M.Sc. in Ecology, University of Vienna, Austria

2012 B.Sc. in Biology, University of Vienna, Austria

## Research and Professional Experience

Since 2023 **Group leader**, Centre for Microbiology and Environmental Systems Science, University of Vienna, Austria

2021 – 2023 **Senior postdoctoral researcher**, Centre for Microbiology and Environmental Systems Science, University of Vienna, Austria  
*Advisors:* Prof. Dr. Michael Wagner, Prof. Dr. Holger Daims

2019 – 2021 **Postdoctoral research fellow**, Dept. Ecology, Evolution and Marine Biology, University of California, Santa Barbara, USA  
*Advisor:* Assoc.-Prof. Dr. Alyson Santoro

5 – 7/2019 **Postdoctoral researcher**, Centre for Microbiology and Environmental Systems Science, University of Vienna, Austria  
*Advisors:* Prof. Dr. Michael Wagner, Prof. Dr. Holger Daims

5 – 6/2018 **Research stay**, Dept. Microbiology and Biogeochemistry, Royal Netherlands Institute for Sea Research (NIOZ), The Netherlands  
*Host:* Dr. Pierre Offre

2014 – 2019 **Ph.D. Student**, Dept. Limnology and Bio-Oceanography, University of Vienna, Austria  
*Advisor:* Prof. Dr. Gerhard J. Herndl

2013 – 2014 **M.Sc. student**, Dept. Limnology and Bio-Oceanography, University of Vienna, Austria  
*Advisors:* Prof. Dr. Gerhard J. Herndl, Prof. Dr. Christa Schleper

8 – 9/2013 **B.Sc. thesis** at the Center of Marine Sciences, University of Algarve, Portugal  
*Advisor:* Dr. Rodrigo Costa

## Fellowships and Awards

2023 FWF START Award

2022 Discover the Microverse Scientific Image Competition Award

2020 Rückenwind Funding Bonus, alpha+ Foundation

2020 Poster award at the ISME Virtual Microbial Ecology Summit, Unity in Diversity

2019 FWF Erwin Schrödinger Postdoctoral Fellowship

2015 Uni:docs Doctoral Fellowship for outstanding early stage researchers

2014 & 2015 Performance scholarship of the University of Vienna

## Research Funding Acquisition

- 2023 – 2028 FWF START Award – *Microbial methane cycling in aquatic ecosystems* (PI: Bayer), 1.196.271 €
- 2020 – 2023 FWF Erwin Schrödinger project J4426-B - *The influence of nitrifiers on the oceanic carbon cycle* (PI: Bayer), 171.080 €
- 2020 – 2022 JGI CSP New investigator grant 506203 - *Interactions between chemoautotrophic and heterotrophic bacteria investigated using combined transcriptomics and metabolomics* (PI: Santoro, co-PI: Bayer)
- 2015 – 2018 Uni:docs Doctoral Fellowship - *Significance of selected major microbial groups in the oxygenated deep ocean*, 102.526 €

## Publications in Peer-reviewed Journals

h-index: 11; citations (July 2023): 646

#corresponding author, &mentored student

21. Debeljak P, **Bayer B**, Sun Y, Obernosterer I, Herndl GJ. Seasonal patterns in microbial carbon and iron transporter expression in the Southern Ocean (2023). *Accepted in BMC Microbiome*
20. Tinta T, Zhao Z, **Bayer B**, Herndl GJ. Jellyfish detritus supports niche partitioning and metabolic interactions among marine bacteria (2023). *Accepted in BMC Microbiome*
19. Herndl GJ, **Bayer B**, Baltar F, Reinthaler T. Prokaryotic Life in the Deep Ocean's Water Column (2023). *Ann Rev Mar Sci* 15:461-483. doi: 10.1146/annurev-marine-032122-115655
18. **Bayer B**<sup>#</sup>, McBeain K, Carlson CA, Santoro AE. Carbon content, carbon fixation yield and dissolved organic carbon release from diverse marine nitrifiers (2023). *Limnol Oceanogr.* 68:84-96. doi: 10.1002/lno.12252
17. Zakem EJ, **Bayer B**, Qin W, Santoro AE, Zhang Y, Levine NM. Global-scale abundances, nitrification rates, and carbon fixation rates of marine nitrifying microorganisms (2022). *Biogeosciences* 19:5401-5418. doi: 10.5194/bg-19-5401-2022
16. **Bayer B**<sup>#</sup>, Kellom M, Valois F, Waterbury JB, Santoro AE<sup>#</sup>. Complete genome sequences of two phylogenetically distinct *Nitrospina* isolated from the Atlantic and Pacific Oceans (2022). *Microbiol Resour Announc* 11:e00100-22. doi: 10.1128/mra.00100-22
15. Elling F, Evans TW, Hemingway JD, Kharbush JJ, Nathan V, **Bayer B**, Spieck E, Summons RE, Pearson A. Marine and terrestrial nitrifying bacteria are sources of diverse bacteriohopanepolyols (2022). *Geobiology* 20:399-420. doi: 10.1111/gbi.12484
14. Jung M-Y, Sedlacek CJ, Kits KD, Mueller AJ, Rhee S-K, Hink L, Nicol GW, **Bayer B**, Lehtovirta-Morley L, Wright CL, de la Torre JR, Herbold CW, Pjevac P, Daims H, Wagner M. Ammonia-oxidizing archaea possess a wide range of cellular ammonia affinities (2022). *ISME J.* 16:272-283. doi: 10.1038/s41396-021-01064-z

13. Debeljak P, Blain S, Bowie A, van der Merwe P, **Bayer B**, Obernosterer I. Homeostasis drives intense microbial trace metal processing on marine particles (2021). *Limnol Oceanogr* 66:3842-3855. doi: 10.1002/lno.11923
12. **Bayer B**<sup>#</sup>, Saito MA, McIlvin M, Lüscher S, Moran DM, Lankiewicz TS, Dupont CL, Santoro AE<sup>#</sup>. Metabolic versatility of the nitrite-oxidizing bacterium *Nitrospira marina* and its proteomic response to oxygen-limited conditions (2021). *ISME J.* 15:1025-1039. doi: 10.1038/s41396-020-00828-3
11. Tinta T, Zhao Z, Escobar A, Klun K, **Bayer B**, Amano C, Bamonti L, Herndl GJ. Microbial processing of jellyfish detritus in the ocean (2020). *Front Microbiol.* 11:2638. doi: 10.3389/fmicb.2020.590995
10. Reyes C, Hodgskiss LH, Kerou M, Pribasniq T, Abby SS, **Bayer B**, Krämer SM, Schleper C. Genome wide transcriptomic analysis of the soil ammonia oxidizing archaeon *Nitrososphaera viennensis* upon exposure to copper limitation (2020). *ISME J.* 14:2659-2674. doi: 10.1038/s41396-020-0715-2
9. Mooshammer M, Alves RJE, **Bayer B**, Melcher M, Stieglmeier M, Jochum L, Watzka M, Schleper C, Herndl GJ, Wanek W. Nitrogen isotope fractionation during archaeal ammonia oxidation: Coupled estimates from measurements of residual ammonium and accumulated nitrite (2020). *Front Microbiol* 11:1710. doi: 10.3389/fmicb.2020.01710
8. Reyes C, Hodgskiss L, Baars O, Kerou M, **Bayer B**, Schleper C, Krämer S. Copper limiting threshold in the terrestrial ammonia oxidizing archaeon *Nitrososphaera viennensis* (2020). *Res Microbiol* 171:134-172. doi: 10.1026/j.resmic.2020.01.003
7. Muck S, De Corte D, Clifford E, **Bayer B**, Herndl GJ, Sintes E. Niche differentiation of aerobic and anaerobic ammonia oxidizers in a high latitude deep oxygen minimum zone (2019). *Front Microbiol* 10:2141. doi: 10.3389/fmicb.2019.02141
6. **Bayer B**<sup>#</sup>, Hansman R, Bittner MJ<sup>&</sup>, Ortega-Noriega BE, Niggemann J, Dittmar T, Herndl GJ. Ammonia-oxidizing archaea release a suite of organic compounds potentially fueling prokaryotic heterotrophy in the ocean (2019). *Environ Microbiol* 21:4062-4075. doi: 10.1111/1462-2920.14755
5. Baltar F, **Bayer B**, Bednarsek N, Deppeler S, Escibano R, Gonzalez CE, Hansman RL, Mishra RK, Moran MA, Repeta DJ, Robinson C, Sintes E, Tamburini C, Valentin LE, Herndl GJ (2019). Towards integrating evolution, metabolism and climate change studies of marine ecosystems. *Trends in Ecology & Evolution* 34:1022-1033. doi: 10.1016/j.tree.2019.07.003
4. **Bayer B**<sup>#</sup>, Pelikan C, Bittner MJ<sup>&</sup>, Reinthaler T, Könneke M, Herndl GJ, Offre P. Proteomic response of three marine ammonia-oxidizing archaea to hydrogen peroxide and their metabolic interactions with a heterotrophic alphaproteobacterium (2019). *mSystems* 4: e00181-19. doi: 10.1128/mSystems.00181-19
3. **Bayer B**<sup>#</sup>, Vojvoda J, Reinthaler T, Reyes C, Pinto M, Herndl GJ. *Nitrosopumilus adriaticus* sp. nov. and *Nitrosopumilus piranensis* sp. nov., two ammonia-oxidizing archaea from the Adriatic Sea and members of the class *Nitrososphaeria* (2019). *Int J System Evol Microbiol* 7:1892-1902. doi: 10.1099/ijsem.0.003360
2. Elling FJ, Könneke M, Nicol GW, Stieglmeier M, **Bayer B**, Spieck E, De La Torre JR, Becker KW, Prosser JI, Herndl GJ, Schleper C, Hinrichs KU (2017). Chemotaxonomic characterisation of the thaumarchaeal lipidome. *Environ Microbiol* 19:2681-2700. doi: 10.1111/1462-2920.13759

1. **Bayer B<sup>#</sup>**, Vojvoda J, Offre P, Alves RJE, Elisabeth NH, Garcia JA, Volland JM, Srivastava A, Schleper C, Herndl GJ. Physiological and genomic characterization of two novel marine thaumarchaeal strains indicates niche differentiation (2016). *ISME J* 10:1051-1063. doi: 10.1038/ismej.2015.200

## Book Chapters

Santoro AE, **Bayer B**, Elling FJ, Pearson A. Candidatus Nitrosopelagicus (2021). *Bergey's Manual of Systematics of Archaea and Bacteria*. doi: 10.1002/9781118960608.gbm01969

## Invited Talks

2022 International Symposium on Microbial Ecology (ISME18), Lausanne, Switzerland

2019 University of Oldenburg, Germany

2018 Marine Microbes Gordon Research Seminar, Lucca, Italy

## Conference Talks

2021 International Conference of Nitrification and related processes (ICON7)

2017 IMBIZO5 Workshop on Marine Biosphere Research for a sustainable Ocean, Woods Hole, USA

2017 EMBO Symposium on Aquatic Microbial Ecology (SAME), Zagreb, Croatia

2017 International Conference of Nitrification and related processes (ICON5), Vienna, Austria

2015 Aquatic Sciences Meeting (ASLO), Granada, Spain

## Student Supervision and Mentorship

Eloise Urbing (MSc Thesis, University of Vienna 2023-now)

Bence Molnár (MSc Student, University of Vienna, 2022)

Kiera Sullivan (BSc Student, University of California, Santa Barbara, 2020/21)

Meriel J. Bittner (MSc Thesis, University of Vienna, 2017-2019)

Edwin Kniha (MSc Student, University of Vienna, 2016)

Teresa Langer (BSc Student, University of Vienna, 2016)

Martina Stockinger (BSc Student, University of Vienna, 2016)

## Teaching and Outreach

Co-organizer and Lecturer, Microbial Oceanography Course (in Banyuls-sur-Mer, France), University of Vienna (2017)

Blog post “Unerforschte, spannende Tiefseebewohner” during the Mobydick research cruise in the South Indian Ocean ([Link to article](#))

Video interview with the Austrian Science Fund (FWF) for the International Day for Women and Girls in Science ([Link to Video](#))

## Field and Sea Experience

- 2023 R/V Atlantis: CliOMZ Cruise, Eastern Tropical Pacific Ocean, Golfito to San Diego (38 days)
- 2021 R/V *Roger Revelle*: Deep Sea Food Webs, Eastern North Pacific Ocean, San Diego (16 days)
- 2019 R/V *Sally Ride*: Santa Barbara Channel, San Francisco to San Diego, USA (7 days)
- 2018 R/V *Marion Dufresne*: MobyDick Cruise, South Indian Ocean, La Reunion, France (40 days)
- 2017 R/V *Nereis II*: North West Mediterranean Sea, Banyuls-sur-Mer, France (1 day)
- 2016 R/V *Sonne*: BacGeoPac Cruise, Pacific Ocean, New Zealand to Alaska, USA (34 days)
- 2015 R/V *Kilo Moana*: C-MORE Summer Course on Microbial Oceanography, North Pacific Ocean, Hawaii, USA (8 days)

## Professional Services

Early career workshop organization and session chair for poster talks “Biochemistry and Biomarkers”, International Conference of Nitrification and related processes (ICON5), Vienna, Austria

### Ad-Hoc Peer Review:

Nature Microbiology, PNAS, The ISME Journal, Communications Earth & Environment, Global Biogeochemical Cycles, Limnology and Oceanography, Environmental Microbiology, Biogeosciences, mBio, mSystems, Applied and Environmental Microbiology, Aquatic Microbial Ecology, FEMS Microbiology Letters, Frontiers in Marine Science, Frontiers in Microbiology, Marine Ecology Progress Series

(>40 verified reviews on Web of Science)