

Biosketch

Univ.-Prof. Dr. Alexander Loy

Position in CoE: Key Researcher

Personal Details

Place of birth	Ceske Budejovice, Czech Republic
Nationality	German
Children	2 (2009, 2013)
Affiliation:	University of Vienna
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Profile	ResearcherID: A-8182-2008
List of publications	ORCID: 0000-0001-8923-5882
Academic age	19 years since PhD



Academic Career and Positions Held

I earned a **Master's degree** (Diploma) in **microbiology** in **1999** from the **Technical University of Munich**, Germany and received my **PhD** from the same institution in **2003**. Subsequently, I was awarded a Marie Curie postdoctoral fellowship and joined the newly founded Department of Microbial Ecology at the University of Vienna, Austria, where I established my **own research group** in **2006** based on third-party grants. I later received my **habilitation** (**2012**) and the Young Scientist Award of the City of Vienna (2012). After holding positions as Assistant Professor (2009-2013) and Associate Professor (2013-2017), I became a **Professor for Microbial Communities** (2017) at the **University of Vienna**. I currently serve as **deputy head of the Department of Microbiology and Ecosystem Science** at the Centre for Microbiology and Environmental Systems Science of the University of Vienna, **deputy operational director of the Joint Microbiome Facility** of the University of Vienna and Medical University of Vienna, and **executive committee member of AMICI - the Austrian Microbiome Initiative**. Furthermore, I am faculty member of the Austrian Polar Research Institute, member of the scientific advisory committees of the Centre for Arctic Gas Hydrate, Environment and Climate at the Arctic University of Norway, Tromsø and the microbiome company BiomeDx, Vienna, and senior editor of The ISME Journal.

Scientific Achievements and Scientific Contribution to the CoE

Scientific Achievements. Since 2002, I have published **96 peer-reviewed papers** that have been cited **>10,000 times** (WoS; Oct. 2022). I have an **h-factor of 53** (WoS). Since 2004, I obtained **13 research grants as PI** (total budget >4.3 million €) and I have been **supervisor for 13 fellowship projects** (approx. 1.2 million €). My research addresses the microbial ecology of diverse anaerobic environments such as wetlands, sediments, and the intestinal tract, with emphasis on the role of sulfur microorganisms in nutrient cycling & greenhouse gas emissions and for human health. Recent highlights of our research include the **identification and characterization of yet uncultivated bacteria that use DNA as a nutrient in marine sediments** and the **discovery of a green-diet-derived sulfosugar as selective microbial nutrient and new source of hydrogen sulfide in the human gut**.

Scientific Contribution to the CoE. I will **contribute to our cluster** with my long-standing expertise in microbial sulfur cycling, in the ecophysiology of diverse host-associated (human) and environmental microbiomes, and in developing and applying molecular and isotope-probing methods for structure-function analyses of uncultivated microorganisms. I will lead a research project on **selective sulfur nutrients and their potential for precision editing of beneficial microbiome functions** and be further involved as Co-PI or advisor in several other projects.

10 Most Important Publications (*relevant for the CoE)

1. *Gwak, J.-H.; Awala, S. I.; Nguyen, N.-L.; Yu, W.-J.; Yang, H.-Y.; von Bergen, M.; Jehmlich, N.; Kits, K. D.; **Loy, A.**; Dunfield, Peter. F.; Dahl, C.; Hyun, J.-H.; Rhee, S.-K. Sulfur and Methane Oxidation by a Single Microorganism. *Proc. Natl. Acad. Sci. U.S.A.* **2022**, *119* (32), e2114799119. <https://doi.org/10.1073/pnas.2114799119>.
2. *Wasmund, K.; Pelikan, C.; Schintlmeister, A.; Wagner, M.; Watzka, M.; Richter, A.; Bhatnagar, S.; Noel, A.; Hubert, C. R. J.; Rattei, T.; Hofmann, T.; Hausmann, B.; Herbold, C. W.; **Loy, A.** Genomic Insights into Diverse Bacterial Taxa That Degrade Extracellular DNA in Marine Sediments. *Nat Microbiol* **2021**, *6* (7), 885–898. <https://doi.org/10.1038/s41564-021-00917-9>.
3. *Hanson, B. T.; Dimitri Kits, K.; Löffler, J.; Burrichter, A. G.; Fiedler, A.; Denger, K.; Frommeyer, B.; Herbold, C. W.; Rattei, T.; Karcher, N.; Segata, N.; Schleheck, D.; **Loy, A.** Sulfoquinovose Is a Select Nutrient of Prominent Bacteria and a Source of Hydrogen Sulfide in the Human Gut. *ISME J* **2021**, *15* (9), 2779–2791. <https://doi.org/10.1038/s41396-021-00968-0>.
4. *Klufa, J.; Bauer, T.; Hanson, B.; Herbold, C.; Starkl, P.; Lichtenberger, B.; Srutkova, D.; Schulz, D.; Vujic, I.; Mohr, T.; Rappersberger, K.; Bodenmiller, B.; Kozakova, H.; Knapp, S.; **Loy, A.**; Sibilia, M. Hair Eruption Initiates and Commensal Skin Microbiota Aggravate Adverse Events of Anti-EGFR Therapy. *Sci. Transl. Med.* **2019**, *11* (522), eaax2693. <https://doi.org/10.1126/scitranslmed.aax2693>.
5. *Hausmann, B.; Pelikan, C.; Herbold, C. W.; Köstlbacher, S.; Albertsen, M.; Eichorst, S. A.; Glavina del Rio, T.; Huemer, M.; Nielsen, P. H.; Rattei, T.; Stingl, U.; Tringe, S. G.; Trojan, D.; Wentrup, C.; Wobken, D.; Pester, M.; **Loy, A.** Peatland Acidobacteria with a Dissimilatory Sulfur Metabolism. *ISME J* **2018**, *12* (7), 1729–1742. <https://doi.org/10.1038/s41396-018-0077-1>.
6. *Brugiroux, S.; Beutler, M.; Pfann, C.; Garzetti, D.; Ruscheweyh, H.-J.; Ring, D.; Diehl, M.; Herp, S.; Lötscher, Y.; Hussain, S.; Bunk, B.; Pukall, R.; Huson, D. H.; Münch, P. C.; McHardy, A. C.; McCoy, K. D.; Macpherson, A. J.; **Loy, A.**; Clavel, T.; Berry, D.; Stecher, B. Genome-Guided Design of a Defined Mouse Microbiota That Confers Colonization Resistance against Salmonella Enterica Serovar Typhimurium. *Nat Microbiol* **2017**, *2* (2), 16215. <https://doi.org/10.1038/nmicrobiol.2016.215>.
7. *Tara Oceans Coordinators; Roux, S.; (4 authors); **Loy, A.**; (18 authors). Ecogenomics and Potential Biogeochemical Impacts of Globally Abundant Ocean Viruses. *Nature* **2016**, *537* (7622), 689–693. <https://doi.org/10.1038/nature19366>.
8. Müller, A. L.; Kjeldsen, K. U.; Rattei, T.; Pester, M.; **Loy, A.** Phylogenetic and Environmental Diversity of DsrAB-Type Dissimilatory (Bi)Sulfite Reductases. *ISME J* **2015**, *9* (5), 1152–1165. <https://doi.org/10.1038/ismej.2014.208>.
9. *Berry, D.; Stecher, B.; Schintlmeister, A.; Reichert, J.; Brugiroux, S.; Wild, B.; Wanek, W.; Richter, A.; Rauch, I.; Decker, T.; **Loy, A.**; Wagner, M. Host-Compound Foraging by Intestinal Microbiota Revealed by Single-Cell Stable Isotope Probing. *Proc. Natl. Acad. Sci. U.S.A.* **2013**, *110* (12), 4720–4725. <https://doi.org/10.1073/pnas.1219247110>.
10. Hubert, C.; **Loy, A.**; Nickel, M.; Arnosti, C.; Baranyi, C.; Brüchert, V.; Ferdelman, T.; Finster, K.; Christensen, F. M.; Rosa de Rezende, J.; Vandieken, V.; Jørgensen, B. B. A Constant Flux of Diverse Thermophilic Bacteria into the Cold Arctic Seabed. *Science* **2009**, *325* (5947), 1541–1544. <https://doi.org/10.1126/science.1174012>.