

## Biosketch

### Univ.-Prof. Martin Polz, PhD

Position in CoE: Key Researcher

#### Personal Details

<b>Place of birth</b>	Linz, Austria
<b>Nationality</b>	Austrian
<b>Children</b>	2 (2012, 2014)
<b>Affiliation:</b>	University of Vienna
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<b>Profile</b>	ResearcherID: ABE-7199-2020
<b>List of publications</b>	ORCID: 0000-0002-4975-2946
<b>Academic age</b>	25 years since PhD



#### Academic Career and Positions Held

My academic career started with a **Master's degree** from the **University of Vienna** in **Zoology** during which I carried out laboratory work at **UCSD Scripps Institution of Oceanography**, San Diego. After returning briefly to Vienna, I received a fellowship from **Harvard University** for a **PhD** in Organismic and Evolutionary Biology. After **graduating** in **1997**, I joined the faculty at **MIT** in **1998** as an assistant professor, where I received **tenure** in **2004** and was promoted to **full professor** in **2009**. At MIT, I was engaged in several leadership activities, including directorships of the Joint Program in Biological Oceanography between MIT and the Woods Hole Oceanographic Institution, and the MIT Microbiology Graduate Program, which is an interdisciplinary program comprising 10 departments. I also **chaired several institute-wide committees**. As service to the community, I organized several conferences, served as editor for leading microbiology journals, and participated in workshops on topics of scientific and societal relevance organized by different academies in the US. I received **several prizes** and distinctions, including membership in the American Academy for Microbiology and the Eli Lilly and Company Research Award, the oldest and most prestigious award from the American Society for Microbiology. In **2020**, I accepted a **professorship** at the **University of Vienna**.

#### Scientific Achievements and Scientific Contribution to the CoE

**Scientific achievements.** I have published 134 peer reviewed papers, including 10 in Science, Nature and Cell, as well as 21 in tier 2 journals such as PNAS, Nature Microbiol., Nature Ecol. Evol., Nature Comm. and Cell Syst. My research asks fundamental questions on **ecology and evolution of microbes** in nature, including how **horizontal gene transfer** structures populations, how viruses interact with their hosts, and how populations and communities change over time. We use a diversity of tools, ranging from culturing, genomics, and modeling to genetics. Our work has been supported by the US NSF, NIH, DOE as well as the Moore and Simons foundations with more than 10 million US\$. I have given ~100 invited talks, have convened 9 symposia at international conferences, and am the founding member of a new conference series on Microbiome at Cold Spring Harbor Laboratories. I have also recently edited a book on Microbial Population Genomics.

**Scientific contributions to the CoE.** I will contribute my expertise on **genomics, single cell growth, virus-host interactions and computational abilities**. My labs (at Vienna and MIT) consist of 5 PostDocs and 3 PhD students who are engaged in population genomic analysis, establishment of a novel technique for single cell mass and mass increase measurements, and analysis of eco-evolutionary dynamics of virus-host interactions, including host defense and viral counter-defense.

## 10 Most Important Publications (\*relevant for the CoE)

# Denotes equal contribution

1. \*Hussain, F. A.<sup>#</sup>; Dubert, J.<sup>#</sup>; Elsherbini, J.; Murphy, M.; VanInsberghe, D.; Arevalo, P.; Kauffman, K.; Rodino-Janeiro, B. K.; Gavin, H.; Gomez, A.; Lopatina, A.; Le Roux, F.; **Polz, M. F.** Rapid Evolutionary Turnover of Mobile Genetic Elements Drives Bacterial Resistance to Phages. *Science* **2021**, *374* (6566), 488–492. <https://doi.org/10.1126/science.abb1083>.
2. \*Arevalo, P.; VanInsberghe, D.; Elsherbini, J.; Gore, J.; **Polz, M. F.** A Reverse Ecology Approach Based on a Biological Definition of Microbial Populations. *Cell* **2019**, *178* (4), 820–834.e14. <https://doi.org/10.1016/j.cell.2019.06.033>.
3. \*Kauffman, K. M.; Hussain, F. A.; Yang, J.; Arevalo, P.; Brown, J. M.; Chang, W. K.; VanInsberghe, D.; Elsherbini, J.; Sharma, R. S.; Cutler, M. B.; Kelly, L.; **Polz, M. F.** A Major Lineage of Non-Tailed DsDNA Viruses as Unrecognized Killers of Marine Bacteria. *Nature* **2018**, *554* (7690), 118–122. <https://doi.org/10.1038/nature25474>.
4. \*Martin-Platero, A. M.; Cleary, B.; Kauffman, K.; Preheim, S. P.; McGillicuddy, D. J.; Alm, E. J.; **Polz, M. F.** High Resolution Time Series Reveals Cohesive but Short-Lived Communities in Coastal Plankton. *Nat Commun* **2018**, *9* (1), 266. <https://doi.org/10.1038/s41467-017-02571-4>.
5. \*Cermak, N.; Becker, J. W.; Knudsen, S. M.; Chisholm, S. W.; Manalis, S. R.; **Polz, M. F.** Direct Single-Cell Biomass Estimates for Marine Bacteria via Archimedes' Principle. *ISME J* **2017**, *11* (3), 825–828. <https://doi.org/10.1038/ismej.2016.161>.
6. \*Hehemann, J.-H.; Arevalo, P.; Datta, M. S.; Yu, X.; Corzett, C. H.; Henschel, A.; Preheim, S. P.; Timberlake, S.; Alm, E. J.; **Polz, M. F.** Adaptive Radiation by Waves of Gene Transfer Leads to Fine-Scale Resource Partitioning in Marine Microbes. *Nat Commun* **2016**, *7* (1), 12860. <https://doi.org/10.1038/ncomms12860>.
7. \*Cordero, O. X.; Wildschutte, H.; Kirkup, B.; Proehl, S.; Ngo, L.; Hussain, F.; Le Roux, F.; Mincer, T.; **Polz, M. F.** Ecological Populations of Bacteria Act as Socially Cohesive Units of Antibiotic Production and Resistance. *Science* **2012**, *337* (6099), 1228–1231. <https://doi.org/10.1126/science.1219385>.
8. \*Cordero, O. X.; Ventouras, L.-A.; DeLong, E. F.; **Polz, M. F.** Public Good Dynamics Drive Evolution of Iron Acquisition Strategies in Natural Bacterioplankton Populations. *Proc. Natl. Acad. Sci. U.S.A.* **2012**, *109* (49), 20059–20064. <https://doi.org/10.1073/pnas.1213344109>.
9. \*Shapiro, B. J.; Friedman, J.; Cordero, O. X.; Preheim, S. P.; Timberlake, S. C.; Szabó, G.; **Polz, M. F.**; Alm, E. J. Population Genomics of Early Events in the Ecological Differentiation of Bacteria. *Science* **2012**, *336* (6077), 48–51. <https://doi.org/10.1126/science.1218198>.
10. \*Hunt, D. E.; David, L. A.; Gevers, D.; Preheim, S. P.; Alm, E. J.; **Polz, M. F.** Resource Partitioning and Sympatric Differentiation Among Closely Related Bacterioplankton. *Science* **2008**, *320* (5879), 1081–1085. <https://doi.org/10.1126/science.1157890>.