

Philipp F. Popp

PH.D. (DR. RER. NAT.) · HUMBOLDT-UNIVERSITÄT ZU BERLIN

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Personal summary

I am a molecular microbiologist with a long-standing interest in how bacteria interact with their environment, especially how they defend themselves against viruses. Over the past years, I have built a strong foundation in bacterial genetics, live-cell imaging, and tool development, contributing to the discovery and mechanistic understanding of novel immune systems in bacteria. I now aim to take this work further by monitoring these defense systems as they unfold in real time at the single-cell level, and by uncovering how different systems cooperate.

Academic Career

Humboldt-Universität zu Berlin

RESEARCH GROUP LEADER

Germany

05/2025 - present

- Host institution: Humboldt-Universität zu Berlin
- Pursuing my research on studying the interplay of bacterial anti-bacteriophage defense systems

Humboldt-Universität zu Berlin

DEPUTY PROFESSOR

Germany

05/2024 - 04/2025

- Replacement Professor for Quantitative Biology
- Establishing my own line of research on bacterial immune systems against bacteriophages

Humboldt-Universität zu Berlin

POSTDOCTORAL RESEARCHER

Germany

10/2020 - 04/2024

- Advisor: Prof. Dr. Marc Erhardt
- Establishing a microfluidics platform to investigate regulation of bacterial locomotion

Technische-Universität Dresden

POSTDOCTORAL RESEARCHER

Germany

07/2020 - 10/2020

- Advisor: Prof. Dr. Thorsten Mascher
- Finalizing running projects on the cell envelope stress response in *Bacillus subtilis*

The Ohio State University

GRADUATE RESEARCHER

USA

09/2018 - 04/2019

- Advisor: Prof. Dr. Igor Zhulin
- Establishing a bioinformatics approach to unravel the phage shock response in bacteria and archaea

Forschungszentrum Jülich

GRADUATE RESEARCHER

Germany

01/2018 - 04/2018

- Advisor: Prof. Dr. Dietrich Kohlheyer
- Developing a microfluidics setup to investigate bacterial cannibalism in *Bacillus subtilis*

Education

Technische Universität Dresden

PH.D. THESIS DEFENSE (DR.RER.NAT.)

Germany

06.07.2020

- Advisor: Prof. Dr. Thorsten Mascher
- Final grade: "summa cum laude" (excellent)

Technische Universität Dresden

DISSERTATION

Germany

10/2015 - 06/2020

- Advisor: Prof. Dr. Thorsten Mascher
- Title: Production of an antimicrobial peptide by *Bacillus subtilis* and the underlying cell envelope stress response

- Title: The *Bacillus* BioBrickBox 2.0: generation of standardized parts for the work with *Bacillus subtilis*.
- Grade: 1.3

Teaching experience

2022 -2025	Advanced Bacterial Genetics at Cold Spring Harbor Laboratory Co-instructor	Cold Spring Harbor, USA
WiSe 2024	Lecture and Seminar Quantative Molecular Biology 2 Professor [2 LVS]	HU Berlin
2023	X-Student Research Group: Virtual reality meets microbiology Instructor [2 LVS]	Berlin University Alliance, Berlin
since 2021	Annual two-week microbiology laboratory course Instructor	HU Berlin
2017 -2021	iGEM competition Instructor and Co-Instructor	TU Dresden, HU Berlin
since 2016	Predoctoral (2) Bachelor (10) and Master (6) theses Supervisor	TU Dresden, HU Berlin
2014 -2015	Two-week microbiology laboratory courses Supervisor	LMU München

Funding Grants & Awards

2025	Berlin-University-Alliance “Flex-grant” Fostering research exchange between HU Berlin and the University of Oxford, UK	4500€
since 2024	DFG research grant SPP 2330 New Concepts in Prokaryotic Virus-host Interactions	259.677€
2022 -2023	Berlin-University-Alliance “Student-project-X” Teaching grant to realize “Virtual reality meets microbiology”	3500€
2021	Berlin-University-Alliance “Workshop & travel grant” Travel between HU Berlin and the University of Oxford, UK	5000€
2014 -2015	Lehre@LMU price Recipient of three competitive grants for student-led projects	à 1000€
2014	Best wiki award iGEM competition together with the LMU iGEM team 2014	

Major Current Collaborations

Prof. Nicholas Taylor, Novo Nordisk Foundation Center for Protein Research (structural biology)
 Prof. Alexander Harms, ETH Zurich, D-HEST (phage biology)
 Prof. Marc Erhardt, Humboldt-Universität zu Berlin (microscopy and data analysis)
 Prof. Emmanuelle Charpentier, Max Planck Unit for the Science of Pathogens (anti-phage defense)
 Prof. Haike Antelmann, Freie Universität Berlin (anti-phage defense)
 Prof. Henrik Strahl, Newcastle University (tool development)
 Prof. Igor Zhulin, The Ohio State University (bioinformatics)

Attended Conferences and Invited Seminars

2025	Speaker Life Science Seminar Würzburg, Germany Host: Prof. Jörg Vogel	<i>Talk</i>
2025	MPUSP retreat Max Planck Society, Schwerin, Germany	<i>Talk</i>
2025	Speaker Georg-August Universität Göttingen, Germany Host: Prof. Jörg Stülke	<i>Talk</i>
2025	VAAM Meeting German Society of Microbiology, Bochum, Germany	<i>Talk</i>
2024	MPUSP retreat Max Planck Society, Schloss Ringberg, Germany	<i>Talk</i>
2024	Sensory Transduction in Microorganisms Gordon Research Conference, Ventura, CA, USA	<i>Poster</i>
2023	MPUSP retreat Max Planck Society, Ulrichshusen, Germany	<i>Talk</i>
2022	VAAM discussion meeting 2022 Microbial Cell Biology, Berlin, Germany	<i>Poster</i>
2022	MPUSP retreat Max Planck Society, Berlin, Germany	<i>Talk</i>
2021	BLAST online	
2021	MPUSP retreat Max Planck Society, Berlin, Germany	<i>Talk</i>
2019	BLAST New Orleans, LA, USA	
2018	DFG SPP1617 Göttingen, Germany	<i>Talk</i>
2017	19th International conference on Bacilli Berlin, Germany	<i>Talk</i>
2017	DFG SPP1617 Hohenkammern, Germany	<i>Talk</i>
2016	VAAM German Society of Microbiology, Jena, Germany	<i>Talk</i>
2015	CAS conference, Synthetic Biology II Munich, Germany	<i>Talk</i>

Professional memberships and peer review contributions

since 2015	Member of the Association for General and Applied Microbiology	
Re-viewer	Science, Current Opinion in Microbiology, Journal of Biological Chemistry, Journal of Bacteriology, Protein Science	

Publications

ORCIDID 0000-0002-7825-1550 | GOOGLE SCHOLAR H-INDEX **14** | SIGNIFICANT CONTRIBUTIONS **MARKED**

ORIGINAL RESEARCH ARTICLES

2025

21. J Winans, M Delgadillo-Guevara, **PF Popp**, M Erhardt, C Nadell. Bacterial conjugation restructures biofilms, increasing resilience while constraining dispersal. *in revision at Current Biology*
20. T Vološen, HM Deda, A Walther, **PF Popp**, T Mascher, D Wolf. A novel signal peptide toolbox for optimized heterologous expression of yeast pheromones in *Bacillus subtilis*. *Journal of Genetic Engineering and Biotechnology* [DOI] [PDF]
19. M Halte, **PF Popp**, J Severn, D Hathcock, C Goosmann, S Hüsing, A Ducret, E Charpentier, Y Tu, E Lauga, M Erhardt, and TT Renault. Optimization of bacterial flagellum growth for efficient motility and energy consumption is dictated by a critical filament length threshold. *Proceedings of the National Academy of Sciences USA* [DOI] [PDF]
18. R Ghandour, D Devlitsarov, **PF Popp**, S Melamed, M Huber, M Siemers, T Krüger, O Kniemeyer, A Klingl, A Brakhage, M Erhardt, and K Papenfort. ProQ-associated small RNAs control motility in *Vibrio cholerae*. *Nucleic Acids Research* gkae1283. [DOI] [PDF]
17. H Hu¹, **PF Popp**¹, TCD Hughes, A Roa-Eguiara, N R Rutbeek, FJO Martin, IA Hendriks, LJ Payne, Y Yan, D Humolli, V Klein de Sousa, I Songailine, Y Wang, M Lund Nielsen, RM Berry, A Harms, M Erhardt, SA Jackson and NMI Taylor. Structure and mechanism of Zorya anti- bacteriophage defense system. *Nature* [DOI] [PDF] ¹shared first

2024

16. M Delgadillo-Guevara, M Halte, M Erhardt and **PF Popp**^{*}. Fluorescent tools for the standardized work in Gram-negative bacteria. *Journal of Biological Engineering* 8;18(1):25. [DOI] [PDF] ^{*}corresponding author

2023

15. H Hu, **PF Popp**, M Santiveri, A Roa-Eguiara, Y Yan, FJO Martin, Z Liu, N Wadhwa, Y Wang, M Erhardt, and NMI Taylor. Ion selectivity and rotor coupling of the *Vibrio* flagellar sodium-driven stator unit. *Nature Communications* 14, 4411. [DOI] [PDF]
14. **PF Popp**, T Lozana- Cruz, F Dürr, A Londaitsbehere, J Hartig, F Javier de la Mata, T Mascher, and A Revilla-Guarinos. The novel synthetic antibiotic BDTL049 based on a dendritic system induces lipid domain formation while escaping the cell envelope stress resistance determinants. *Pharmaceutics* Jan 16;15(1):297. [DOI] [PDF]

2022

13. JA Buttress, M Halte, JDT Winkel, M Erhardt, **PF Popp**^{*} and H Strahl^{*}. A guide for membrane potential measurements in Gram-negative bacteria using voltage-sensitive dyes. *Microbiology* Sep;168(9). [DOI] [PDF] ^{*}shared correspondence
12. **PF Popp**, VM Gumerov, EP Andrianova, L Bewersdorf, T Mascher, IB Zhulin, and D Wolf. Phyletic distribution and diversification of the phage shock protein stress response system in bacteria and archaea. *mSystems* Jun 28;7(3). [DOI] [PDF]
11. A Revilla-Guarinos^{*}, **PF Popp**^{*}, F Dürr, T Lozano-Cruz, J Hartig, FJ de la Mata, R Gómez, and T Mascher. Synthesis and mechanism-of-action of a novel synthetic antibiotic based on a dendritic system with bow-tie topology. *Frontiers in Microbiology* Aug 26;13:912536. [DOI] [PDF] ^{*}shared first

2021

10. **PF Popp**, L Friebe, A Benjdia, A Guillot, O Berteau, and T Mascher. The epipeptide biosynthesis locus *epeXEPAB* is widely distributed in Firmicutes and triggers intrinsic cell envelope stress. **Microbial Physiology** 31(3):306-318. [DOI] [PDF]
9. YM Bredow, A Müller, **PF Popp**, D Iliasov, and C Bredow. Characterization and mode of action analysis of black soldier fly (*Hermetia illucens*) larva derived hemocytes. **Insect Science** Aug;29(4). [DOI] [PDF]

2020 _____

8. T Rodríguez-Prieto, **PF Popp**, JL Copa-Patino, FJ de la Mata, J Cano, T Mascher, and R Gómez. Silver (I) N-Heterocyclic Carbenes Carbosilane dendritic systems and their Imidazolium-Terminated analogues as antibacterial agents: Study of their mode of action. **Pharmaceutics** Oct 14 12(10):968. [DOI] [PDF]
7. N Lautenschläger, **PF Popp**, and T Mascher. Development of a novel heterologous β -lactam-specific whole-cell biosensor in *Bacillus subtilis*. **Journal of Biological Engineering** Jul 31;14:21. [DOI] [PDF]
6. A Revilla-Guarinos, F Dürr, **PF Popp**, M Döring, and T Mascher. Amphotericin B Specifically induces the two-component system LnrJK: Development of a novel whole-cell biosensor for the detection of amphotericin-like polyenes. **Frontiers in Microbiology** Aug 21;11:2022. [DOI] [PDF]
5. **PF Popp**, A Benjdia, H Strahl, O Berteau, and T Mascher. The epipeptide YydF intrinsically triggers the cell envelope stress response of *Bacillus subtilis* and causes severe membrane perturbations. **Frontiers in Microbiology** Feb 11;11:151. [DOI] [PDF]

2019 _____

4. Z Sun, **PF Popp**, C Loderer, and A Revilla-Guarinos. Genetically engineered bacterial biohybrid microswimmers for sensing applications. **Sensors** Dec 28;20(1):180. [DOI] [PDF]

2017 _____

3. **PF Popp**, M Dotzler, J Radeck, J Bartels, and T Mascher. The *Bacillus* BioBrick Box 2.0: expanding the genetic toolbox for the standardized work with *Bacillus subtilis*. **Scientific Reports** Nov 8;7(1):15058. [DOI] [PDF]
2. AW Popp, R Senn, I Curkovic, C Senn, H Buffat, **PF Popp**, and K Lippuner. Factors associated with acute-phase response of bisphosphonate-naïve or pretreated women with osteoporosis receiving an intravenous first dose of zoledronate or ibandronate. **Osteoporosis international** Jun;28(6):1995-2002. [DOI] [PDF]

2016 _____

1. C Höfler, J Heckmann, A Fritsch, **PF Popp**, S Gebhard, G Fritz, and T Mascher. Cannibalism stress response in *Bacillus subtilis*. **Microbiology** Jan;162(1):164-176. [DOI] [PDF]

PRE- AND REVIEW ARTICLES _____

- P.F. Popp**, and M. Erhardt. Supercoiled filaments propel them all. (2022) **Cell** 185 3461–3463. [DOI]
- P.F. Popp**, and M. Erhardt. With or without you: Crosstalk between cell division and flagellum assembly. (2021) **Developmental Cell** 56 573–574. [DOI]
- P.F. Popp**, and T. Mascher. Coordinated cell death in isogenic bacterial populations: Sacrificing some for the benefit of many? (2019) **Journal of Molecular Biology** Nov 22;431(23):4656-4669. [DOI]
- D. Wolf, **P.F. Popp**, and T. Mascher. Kannibalismus und Brudermord: Warum Bakterien Artgenossen töten. (2017) **Biospektrum** 23, 260–263. [DOI]