

➤ CURRICULUM VITAE

Personal information

Name: Silvia Bulgheresi
Date of birth: February, 7, 1973
Place of birth: La Spezia (IT)
Place of residence: Vienna (AT)
Nationality: Italian
Languages: Italian (mother tongue), fluent in English, German, and French
Children: Lil Bianca Bulgheresi born July, 29, 2005
Frances Athol Bulgheresi born February, 5, 2007
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Degrees

23/07/1996 Graduated *cum laude* in **Biological Sciences (Molecular Biology & Biochemistry)** at the Faculty of Mathematics, Physics and Natural Sciences, Biological Sciences, University of Pisa. **Thesis title:** *Role of the XLFB3 gene in the early development of the frog X. laevis.* **Subject:** Developmental Biology; Supervisor: G. Barsacchi, Department of Physiology and Biochemistry, University of Pisa, IT.

15/12/2000 PhD in **Genetics and Molecular Cell Biology** at the Faculty of Life Sciences, University of Vienna. **Thesis title:** *Mechanisms of asymmetric cell division in D. melanogaster neuroblasts: the two-hybrid screen approach.* **Subject:** Developmental Cell Biology; Supervisor: J.A. Knoblich, Research Institute of Molecular Pathology (I.M.P.), Vienna, AT.

16/12/2014 Venia Docendi ("Lehrbefugnis") in the fields of **Molecular & Cellular Biology** at the Faculty of Life Sciences, University of Vienna, AT. **Thesis title:** *Faithful, ingenious and most useful: marine nematode and flatworm symbioses.*

Professional experience

2002 – 2004 Austrian Science Fund (FWF) postdoctoral fellow at the Department of Marine Biology, University of Vienna. Project title: *Molecular mechanisms of partner recognition and association maintenance in marine ectosymbioses*

January – March 2003 Research stay at the laboratory of Prof. Richard M. Maizels, Institute of Immunology and Infection Research, University of Edinburgh (UK).

May – December 2005 Eight months' maternity leave.

2005 – 2008 FWF postdoctoral fellow at the Department of Marine Biology, University of Vienna. Project title: *A stilbonematid EST project*

December 2006 – March 2007 Four months' maternity leave.

November 2005 & July 2006 Two research stays at the laboratory of Prof. R. M. Maizels, Institute of Immunology and Infection Research, University of Edinburgh (UK).

2008 – 2010 Austrian Research Promotion Agency (FFG) postdoctoral fellow at the Department of Marine Biology, University of Vienna. Project title: *Immunomodulatory action of a marine lectin*

January – March 2010 Research stay at the laboratory of Prof. S. Patricia Stock, Department of Entomology, University of Arizona, Tucson (US).

2010 – 2011 Independent PI at the Department of Ecogenomics & Systems Biology (former Department of Genetics in Ecology), University of Vienna. Project title: *Ectosymbioses of marine nematodes*.

2011 – 2013 Independent PI at the Laboratories of Genome Dynamics, Medical University of Vienna. Project title: *Ectosymbioses of marine nematodes*.

2013 – 2019 University Assistant and independent PI at the Department of Ecogenomics & Systems Biology, University of Vienna.

2015 – 2019 Habilitated University Assistant and Independent PI at the Department of Ecogenomics & Systems Biology, University of Vienna, in the frame of two FWF Stand Alone projects (*Growth and septation of animal-attached bacteria* and *Animal host control of beneficial bacteria*), and in the frame of the FWF DK+ Program Graduate School on *Microbial N cycling*.

2018 – 2020 Assistant Professor “Tenure - Track Environmental cell Biology” at the Department of Ecogenomics & Systems Biology, University of Vienna.

Since 2020 Associate Professor in Environmental Cell Biology at the Department of Functional and Evolutionary Ecology, University of Vienna.

Awards

2006 – 2007 Discovery Grant Antiviral activity of His-Mermaid, PIs J. Ott & S. Bulgheresi (University of Vienna, 100 kEUR)

2014 Emerging Field *Cell biology of microorganisms in their natural environment* (University of Vienna, 15 kEUR)

Esteem factors

Co-organizer of the European Nematode Society (ESN) meeting 2010

Editor for: ASM Spectrum, Frontiers in Microbiology

Reviewer activity for the following scientific journals: The Biological Bulletin, Current Biology, Ecology Letters, Environmental Microbiology, Environmental Microbiology Reports, mBio, mSystems, PLoS One, Proceedings of the National Academy of Sciences (PNAS), The ISME Journal

Reviewer activity for the following research funding agencies: Agence Nationale de la Recherche (ANS, France), National Science Foundation (NSF, US), National Foundation for Science Higher Education and Technological Development of the Republic of Croatia (NZZ, HR), Czech Republic Funding agency (GAČR, CZ)

Served as PhD defence opponent member for

T. Ayers, D. Domman, I. Ergal, P. Herrera, T. Hinzke R. Kaur, L. Mauerhofer L. Paz, C. Pelikan J. Polzin, D. Schneider, F. Schulz, A. Söllinger, I. Zink, J. Orleans

Served as habilitation committee member for G. Genikhovich, D. Berry, V. Ibl

Served as Professorship committee member for C. Griffin, M. Pavlicev, M. Zimmer

Past and current cooperation partners (in chronological order)

Richard M. Maizels (University of Edinburgh, UK)
Mark Blaxter (University of Edinburgh, UK)
Johnatan Ewbank (Centre d' Immunologie de Marseille-Luminy, FR)
Tie Chen (Hubei University of Science and Technology, CN)
Nemani V. Prasadarao (Los Angeles Children's Hospital, US)
Teunis Geijtenbeek (University of Amsterdam, NL)
Tanneke den Blaauwen (University of Amsterdam, NL)
Paul Sternberg (Caltech, US)
S. Patricia Stock (University of Arizona, US)
Lawrence Rothfield (University of Connecticut Health Center, US)
Piet de Boer (Case Western Reserve University, US)
Yves Brun (University of Montreal, CA)
Cees Dekker (TU Delft, NL)
Felipe Cava (Umea University, SE)
Simonetta Gribaldo (Institut Pasteur, FR)
Stephanie Markert (University of Greifswald, DE)
Raymond Lee (Washington State University, US)
Michael Wagner (University of Vienna, AT)
Thomas Pradeu (CNRS & University of Bordeaux, FR)
Damien Devos (University of Sevilla, ES)
Michael Wagner (University of Vienna, AT)
David Berry (University of Vienna, AT)
Frederic Veyrier (INRSA Laval, Québec, CA)

➤ **FULL LIST OF PUBLICATIONS**

Peer reviewed publications 1,587 total citations, 18 h-index (Google Scholar);

* indicates equally contributing authors; the five most significant original articles (IF>9) are highlighted

1. **Bulgheresi S.**, Kleiner E., Knoblich J.A. Inscuteable dependent apical localization of the microtubule-binding protein Cornetto suggests a role in asymmetric cell division. 2001. **Journal of Cell Science**. 114:3655-62.

2. Ott J.A., Bright M., **Bulgheresi, S.** Marine Microbial Thiotrophic Ectosymbioses. 2004. **Oceanography & Marine Biology, an Annual Review** 42:95-118.

3. Ott J.A., Bright M., **Bulgheresi S.** Symbioses between marine nematodes and sulfur-oxidizing chemoautotrophic bacteria. 2004. **Symbiosis** 36:103-126.
4. **Bulgheresi S.**, Schabussova I., Chen T., Mullin N. P., Maizels R. M., Ott J.A. A new C-type lectin similar to the human immunoreceptor DC-SIGN mediates symbiont acquisition by a marine nematode. 2006. **Applied and Environmental Microbiology**. 72:2950-2956.
 - First report of the functional role of a conserved, key innate immune effector in microbial symbiosis maintenance
5. Zhang P., Snyder S., Feng P., Azadi P., Zhang S., **Bulgheresi S.**, Sanderson K., He J.J., Klena J.D., Chen T. Role of N-Acetylglucosamine within Core Lipopolysaccharide of Several Species of Gram-negative Bacteria in Targeting the DC-SIGN (CD209). 2006. **Journal of Immunology**. 177(6):4002-4011.
6. Zhang P., Skurnik M., Zhang S., Schwartz O., Kalyanasundaram R., **Bulgheresi S.**, He J.J., Klena J.D., B. Hinnebusch J., Chen T. Human DC-SIGN (CD209) is a receptor for *Yersinia pestis* that promotes phagocytosis by dendritic cells. 2008. **Infection and Immunity**. 76(5):2070-9.
7. Nabatov A.A., de Jong M.A.W.P., de Witte L., **Bulgheresi S.***, Geijtenbeek T.H.B.* C-type lectin Mermaid inhibits dendritic cell mediated HIV-1 transmission to CD4+ T cell. 2008. **Virology**. 378(2):323-8.
8. Bayer C., Heindl R.N., Rinke C., Luecker S., Ott, J.A., **Bulgheresi S.** Molecular characterization of the symbionts associated with marine nematodes of the genus *Robbea*. 2009. **Environmental Microbiology Rep.** 1(2):136-144.
9. Mittal R., **Bulgheresi S.**, Emami C., Prasadarao N.V. *Enterobacter sakazakii* targets DC-SIGN to induce immunosuppressive responses in dendritic cells by modulating MAP kinases. 2009. **Journal of Immunology**. 183(10):6588-99.
10. Bright M., **Bulgheresi S.** Microbial symbiont transmission. 2010. **Nature Reviews Microbiology**. 8(3):218-30.
 - Overview of the molecular mechanisms that mediate symbiont attraction and accumulation, inter-partner recognition and selection, as well as symbiont confrontation with the host immune system
11. **Bulgheresi S.**, Gruber-Vodicka H.R., Heindl N.R., Dirks U., Kostadinova M., Breiteneder H., Ott J.A. Sequence variability of the pattern recognition receptor Mermaid mediates specificity of marine nematode symbioses. 2011. **The ISME Journal**. 5(6):986-98.
12. Heindl N.R., Gruber-Vodicka H.R., Bayer C., Luecker S., Ott J.A., **Bulgheresi S.** First detection of thiotrophic symbiont phylotypes in the pelagic environment. 2011. **FEMS Microbiology Ecology**. 77(1):223-7.
13. Gruber-Vodicka H., Dirks U., Leisch N., Baranyi C., Stoecker K., **Bulgheresi S.**, Niels R. Heindl, Horn M., Lott C., Loy A., Wagner M., Ott J.A. *Paracatenula*: an ancient symbiosis between Thiotrophic *Alphaproteobacteria* and catenulid flatworms. 2011. **Proceedings of the National Academy of Sciences US**. 108(29):12078-83.
14. **Bulgheresi S.** Calling the roll on *Laxus oneistus* immune defense molecules. 2011. **Symbiosis** 55:127-135.
15. Dirks U., Gruber-Vodicka H.R., Leisch N., **Bulgheresi S.**, Egger B., Ladurner P., Ott J.A. Bacterial Symbiosis Maintenance in the Asexually Reproducing and Regenerating Flatworm *Paracatenula galateia*. 2012. **PLoS ONE** 7(4): e34709.

16. Murfin K.E., Dillman A.R., Foster J.M., **Bulgheresi S.**, Slatko B.E., Sternberg P.W., Goodrich-Blair H. Nematode-Bacterium Symbioses - Cooperation and Conflict Revealed in the 'Omics' Age. 2012. **The Biological Bulletin** 223(1):85-102.

17. Leisch N., Verheul J., Heindl N.R., Gruber-Vodicka H.R., Pende N., den Blaauwen T., **Bulgheresi S.** Growth in width and FtsZ ring longitudinal positioning in a gammaproteobacterial symbiont. 2012. **Current Biology**. 22(19):831-32.

- First report of FtsZ-based longitudinal binary fission in a rod-shaped bacterium
[http://www.cell.com/current-biology/pdf/S0960-9822\(12\)00998-0.pdf](http://www.cell.com/current-biology/pdf/S0960-9822(12)00998-0.pdf)

18. Pende N., Leisch N., Gruber-Vodicka H.R., Heindl N.R., Ott, A.J., den Blaauwen, T., **Bulgheresi S.** Size-independent division in extraordinary long polyploid cells. 2014. **Nature Communications**. 5:4803.

- In a gammaproteobacterial symbiont symmetric binary fission occurs in 120 µl-long cells and in a second one fission occurs at virtually every size between 4 and 45 µm
<https://www.nature.com/articles/ncomms5803.pdf>

19. Yang K., Gyu Park C., Cheong C., **Bulgheresi S. et al.** Host Langerin (CD207) is a receptor for *Yersinia pestis* phagocytosis and promotes dissemination. 2015. **Immunology & Cell Biology**. 93(9):815-24.

20. **Bulgheresi S.** All the microbiology nematodes can teach us. 2016. **FEMS Microbiology Ecology**. 94(1): fix170.

21. **Bulgheresi S.** Bacterial cell biology outside the streetlight. 2016. **Environmental Microbiology**. 18(8):2305-18.

22. Leisch N., Pende N., Weber M.P., Gruber-Vodicka R.H., Verheul J., Vischer N.O.E., Abby S., den Blaauwen T., **Bulgheresi S.** Asynchronous division by non-ring FtsZ in the gammaproteobacterial symbiont of *Robbea hypermnestra*. 2016. **Nature Microbiology**. 2:16182.

- The FtsZ ring is dispensable in the first bacterium reported to divide by asynchronous longitudinal fission
<https://www.nature.com/articles/nmicrobiol2016182.pdf>

23. Petersen J.M., Kemper A., Gruber-Vodicka R.H., Cardini U., van der Geest M., **Bulgheresi S.**, Mußmann M., Seah K.B.B., Chakkiath P.A., Herbold C., Belitz A., Miriam W. Chemosynthetic sulphur-oxidizing symbionts of marine invertebrate animals are capable of nitrogen fixation. 2016. **Nature Microbiology**. 2:16195.

24. Pende N., Wang J., Weber P.M., Verheul J., Kuru E., Rittmann S.K.-M.R., Leisch N., Michael S. VanNieuwenhze M., Brun Y.V., den Blaauwen T., **Bulgheresi S.** Host-polarized cell growth in animal symbionts. 2018. **Current Biology**. 28:1-13.

- The actin homolog MreB is required for both septal growth and longitudinal fission in two gammaproteobacterial symbionts.

25. Yang K., He Y., Park C.G., Zhang P., Han Y., Cui Y., **Bulgheresi S. et al.** *Yersinia pestis* interacts With SIGNR1 (CD209b) for promoting host dissemination and infection. 2019. **Front Immunol**. 10: 96.

26. Weber P.M., Moessel F., Paredes G.F., Viehboeck T., Vischer N.O.E., **Bulgheresi S.** A bidimensional segregation mode maintains symbiont chromosome orientation toward its host. 2019. **Current Biology**. 29:1-11. **IF=9.2**

- First study of DNA segregation in an animal symbiont reveals ParB-mediated transgenerational maintenance of chromosome configuration.
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27. Wang J., Alvarez L., **Bulgheresi S.**, Cava F., den Blaauwen T. PBP4 is likely involved in cell division of the longitudinally dividing bacterium *Candidatus Thiosymbion oneisti*. 2021. **Antibiotics**. 10(3): 274.
28. Paredes G.F., Viehboeck T., Raymond L., Palatinszky M., Mausz M., Reipert S., Schintlmeister A., Volland J.M., Hirschfeld C., Wagner M., Berry D., Markert S., **Bulgheresi S.**, König L. Anaerobic sulfur oxidation underlies adaptation of a chemosynthetic symbiont to oxic-anoxic interfaces. 2021. **mSystems**. 6(3): e01186-20.
29. Weber P.M., Paredes G.F., Viehböck T., Pende N., Volland J.M., J.A. Ott, Gros O., **Bulgheresi S.** 2021. FtsZ localizes at the septum of naturally occurring cuboid bacteria. 2021. **iScience**, under review.

Book Chapters

Bulgheresi S. Microbial symbiont transmission: basic principles and dark sides. 2011. In *Beneficial Microorganisms in Multicellular Life Forms*, E. Rosenberg/U. Gophna (eds), Springer-Verlag, p.299-311.

Ott J.A., **Bulgheresi S.** *et al.* Chemosynthetic symbioses in meiofauna (in preparation) In *Meiofauna as a link between the micro- and macroworld*, O. Giere/J.A. Ott (eds), Springer-Verlag (in preparation).

Scientific book review

Bulgheresi S. I, microbe. 2016. **Nature Microbiology**. 1(8):16117.

➤ LIST OF SELECTED SCIENTIFIC TALKS (the five most significant are highlighted)

- 2010** 6th International Symbiosis Society (ISS) meeting, Madison (US)
- 2010** 1st Meeting of the NemaSym Research Coordination Network, Madison (US)
- 2010** Bat-Sheva de Rothschild Seminar on *Role of microorganisms in the adaptation and evolution of animals and plants*, Ein Gedi (IL)
- 2011** 3rd Meeting of the NemaSym Research Coordination Network, Corvallis (US) (keynote speaker)
- 2012** 7th International Symbiosis Society (ISS) meeting, Krakow (PL).
- 2012** **Gordon Research Conference (GRC) on Bacterial Cell Surfaces**, Mount Snow Resort, West Dover (US)
- 2014** The Royal Netherlands Academy of Arts and Sciences Colloquium: *50 years Fts: the A-Z of bacterial cell division*, Amsterdam (NL)
- 2015** **GRC on Animal-Microbe Symbiosis**, Waterville Valley Resort (US)
- 2015** 8th International Symbiosis Society (ISS) meeting, Lisbon (Portugal)
- 2016** **American Society of Microbiology (ASM) General Meeting**, Boston (US)(plenary)

- speaker)
- 2016** **GRC on *Plant & Microbial Cytoskeleton***, Andover (US)
 - 2017** **ASM General Meeting, Symposium on Diversity in Cell Division Mechanisms**, New Orleans (US)
 - 2018** DFG Seminar on *Spatiotemporal dynamics of bacterial cells*, Marburg (DE)
 - 2018** **GRC on *Microbial Stress Response***, South Hadley (US)
 - 2018** Symposium on *Microbial Interactions in Marine Systems*, Greifswald (DE)
 - 2019** DFG-funded conference on *Prokaryotic cell biology*, Banz Abbey (DE)
 - 2019** EMBO Workshop on *Bacterial cell division*, Lund (SE)
 - 2019** International Society for the History Philosophy and Social Studies of Biology biennial meeting, Oslo (NO)
 - 2019** Great Wall Symposium 2019, Paris (FR) (keynote speaker)
 - 2021** 7th International Congress of Nematology, Antibes (FR) (postponed to 2022)
 - 2021** **GRC on *Bacterial Cell Biology and Development***, New London (US) (postponed to 2022)
 - 2021** Virtual joint **ASM Microbe 2021 and FEMS 202**, *Not just your garden variety: microbial physiology beyond classical model organisms*, cross-track symposium
 - 2021** Microbiology 2021, Cagliari (IT) (plenary speaker) (postponed to 2023)

➤ **THIRD PARTY FUNDING** (the five most significant are highlighted)

2001 – 2004 **FWF Stand-alone Project** *Molecular mechanisms of partner recognition*, PI J. Ott; co-PI: S. Bulgheresi, 177 kEUR

2005 – 2008 **FWF Stand-alone Project** *A stilbonematid EST database*, PI J. Ott; co-PI: S. Bulgheresi, 167 kEUR

2008 – 2010 **The Austrian Research Promotion Agency (FFG)** Project *Immunomodulatory action of a marine lectin*, PI E. Prieschl-Grassauer, co-PI: S. Bulgheresi, 140 kEUR

January – March 2010 **National Science Foundation (NSF) exchange visit** grant to perform collaborative research at the University of Arizona (S.P. Stock's Lab), Tucson (US), PI S. Bulgheresi, 5 kUSD.

2010 – 2013 **Mobility grant** from the Ministry of Economy and Finance (BMWF) for scientific-technical cooperation with the Institute of Marine Biology, Kotor (ME) PI S. Bulgheresi, 5.2 kEUR.

2010 – 2013 **FWF Stand-alone Project** *Marine nematode ectosymbioses*, PI S. Bulgheresi, 395 kEUR

2015 – 2018 **FWF Stand-alone Project** *Growth and septation of animal-attached bacteria*, PI S. Bulgheresi, 319 kEUR

2016 – 2019 **FWF Stand-alone Project** *Animal host control of symbiotic bacteria*, PI S. Bulgheresi, 293 kEUR

2016 – 2019 **FWF DK+ Doctoral School** *Microbial N cycling*. Speaker C. Schleper, 2.5 Mio; PI S. Bulgheresi

2019 – 2023 FWF doc.funds MAINTAIN *Microbial symbioses in dynamic environments: Metabolic interplay and novel interactions.* PI S. Bulgheresi. Speaker M. Horn 1.9 Mio; PI S. Bulgheresi

Patents

Universität Wien: **Bulgheresi S.**, Ott J. Pharmaceutical preparation for the prevention of infections. WO2007109821 (2007) 34 pages

➤ **ACADEMIC TEACHING AND SUPERVISION**

Teaching activity at the University of Vienna

For Bachelor students

Practical course: *Extremophilic and Thiotrophic Microorganisms from Volcanic Environments*

Lecture series: *Microbial genome plasticity*

For Master and PhD students

Practical courses:

Molecular Microbiology, Microbial Ecology and Immunobiology

Marine Microbial Symbioses (2016-2017)

Seminars:

Symbiosis - Concepts and Model Systems

Advanced topics in Molecular Biology and Physiology of Bacteria and Archaea

Literature seminars on Biodiversity and Ecosystems

Lectures:

Molecular mechanisms of Symbiosis

Symbiosis - Concepts and Model Systems I

Symbiosis - Concepts and Model Systems II

Biology and Evolution of Archaea

Environmental Cell Biology

Teaching activity outside the University of Vienna

Ad hoc invited lecturer for the **ERC Training Network BluePharmTrain** Workshop, Tallinn (EE), October 2015, 8 hr total. Host: D. Sipkema, Wageningen University, NL

Ad hoc Invited lecturer at **Immunoconcept - immunology from concept and experiments to translation**, University of Bordeaux (FR), March 2017. Host: T. Pradeu, University of Bordeaux (FR)

Supervised students (in chronological order, *=current students)

Bachelor students: Isabelle Hinger, Isabella Kreijci, Melanie Lorenz, Lukas Malfertheiner; **Master students:** Christoph Bayer, Niels R. Heindl, Lisa Bauer, Nika Pende, Amir Schmidt, Philipp Weber, Tobias Viehböck, Friedrich Mössel, Belma Beijtovic, Nicole Krause*; **PhD students:** Nikolaus Leisch, Nika Pende, Gabriela Paredes*, Philipp Weber*, Tobias Viehböck*

PhD students' scientific output

Name of the student	Sex m/f	Research topic	Title of the thesis	Number of publications
Nikolaus Leisch	m	Symbiont morphology and reproduction	Marine nematode-bacterium symbioses - new species and unexpected bacterial reproductive strategies	6 papers
Nika Pende	f	Symbiont morphology and reproduction	Reproduction Mechanisms of Host-Attached Bacteria	3 papers + 1 under review
Philipp Weber*	m	Symbiont morphology and reproduction	Molecular mechanisms of septation and DNA segregation in bacterial nematode symbionts	3 papers + 1 under review +2 in preparation
Gabriela Paredes*	f	Symbiont physiology	S, C, and N metabolism in chemosynthetic nematode symbioses	2 papers + 1 under review + 1 in preparation
Tobias Viehböck*	m	Symbiont genomics and epigenomics	Compaction and organization of animal symbiont chromosomes	2 papers + 1 under review + 2 in preparation