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Orcid ID: [0000-0002-9017-7461](https://orcid.org/0000-0002-9017-7461); Researcher ID: [A-1079-2017](https://orcid.org/A-1079-2017); ScopusID: [6504023000](https://orcid.org/6504023000)

Main research interest

One gram of soil contains over a million microorganisms, yet much of their function remains unknown. This has fascinated me since my PhD education. I have been investigating soil microorganisms (i.e. *Acidobacteriota*) via cultivation, ‘-omics’ methods and metabolic process measurements. I am currently exploring mechanisms that allow for survival and success of soil microorganisms in their challenging soil environment, more specifically atmospheric gas oxidation for the generation of maintenance energy and the use of diverse terminal oxidases to permit flexibility in respiration.

My research interests and associated achievements are listed below:

- *Physiology of soil microorganisms* - Using genome-resolved analysis, revealed physiological capabilities of *Acidobacteriota*, explaining their ubiquity, prevalence and success in soils. Namely their capacity to survive via H₂ oxidation, plant polymeric and readily oxidizable C degradation and the use low-affinity terminal oxidases to respire nanomolar O₂ concentrations, which were further explored using growth-based experimentations. My further expertise is with cellulose degrading microorganisms – one of the first researchers to successfully identify novel participants using DNA-stable isotope probing.
- *Survival mechanisms and dormancy in terrestrial systems* - Identified dormancy mechanisms in temperate soil bacteria, particularly the mechanisms for energy generation such as atmospheric H₂ oxidation.
- *Cultivating the uncultivables* – Developed novel methods to isolate, detect and subsequently culture elusive soil microorganisms. I am considered an expert in cultivating one of the most abundant soil phyla, members of the *Acidobacteriota*.
- *Single-cell method development for exploring the activity of soil microorganisms* – Made significant advancements in the application of NanoSIMS and Raman microspectroscopy to investigate the activity of microbial cells in soils.

Education

2007	PhD , Microbiology and Molecular Genetics, College of Natural Science, Michigan State University, East Lansing, MI, USA. Graduated with Cum Laude (GPA 3.6/4.0).
2000	Bachelor of Science , Benedictine University, Lisle, IL USA. Graduated Magna Cum Laude (GPA 3.9/4.0).

Scientific experience

Since 2017	Senior Scientist (permanent position) , Department of Microbiology and Ecosystem Science, University of Vienna, Austria.
2018	Maternity leave (April – October).

- 2012-2017 **Scientist**, Department of Microbiology and Ecosystem Science, University of Vienna, Vienna, Austria.
- 2011 **Guest Scientist**, Joint BioEnergy Institute, Emeryville, CA USA. PI: Steven W. Singer.
- 2007-2010 **Postdoctoral fellow** at Los Alamos National Laboratory, Bioscience Division, Los Alamos, NM USA. PI: Cheryl R. Kuske.
- 2007-2008 **Course coordinator** for the Microbial Diversity Course, Woods Hole, Massachusetts, USA. Course Directors: Prof. Thomas M. Schmidt & Prof. William Metcalf.
- 2007 **Postdoctoral researcher** at Michigan State University, East Lansing, MI USA. PI: Prof. Thomas M. Schmidt.
- 2001-2007 **PhD Student**: Microbiology and Molecular Genetics, College of Natural Science, Michigan State University, East Lansing, MI, USA. Advisors: Prof. Thomas M. Schmidt and Prof. John A. Breznak.
- 1996-2000 **Bachelor of Science**, Benedictine University, Lisle, IL USA.
- 1998-2000 **Undergraduate researcher** at Benedictine University, Lisle, IL USA.
- 1996-2000 **Undergraduate lab student technician**, Biology department, Benedictine University, Lisle, IL USA.

Teaching Experience

- Starting 2025 University of Vienna, UE Practical Skills for Microbiome Science. (UE 301503)
- 2013-current University of Vienna, UE Practical Course in Molecular Microbiology, Microbial Ecology and Immunobiology. *Diversity and Function of Uncultured Microbes in Medical and Environmental Samples*. (UE 300484)
- 2017-2023 University of Vienna, Proseminar Microbial Ecology (UE 301487).
- 2007-2008 Course coordinator/teaching assistant in the Microbial Diversity Course at the Marine Biological Laboratory, Woods Hole, MA, USA. Directors: Thomas M. Schmidt, William Metcalf
- 2007 Certificate in Teaching of College Science & Mathematics, Michigan State University, East Lansing, MI, USA College of Natural Science.
- 2006 Michigan State University, BS159H – Honors Cell and Molecular Biology Laboratory. Professor: John W. Urbance, PhD, Spring Semester 2006.
- 2005 Michigan State University, BS111L – Cells and Molecules Laboratory, Supervisor: Sonya Lawrence, Fall Semester 2005.
- 2001 Michigan State University, MMG 408 – Advanced Microbiology Lab, Professor: Larry R. Snyder, PhD, Fall Semester 2001.

Supervision of Researchers in Early Career Phases. Stephanie has supervised 11 Master & Bachelor Theses, along with co-supervising 3 PhD students at the University of Vienna. She is activity supervising 1 PhD student and 2 research technicians.

Academic publications

Until now I have published 34 papers in peer-reviewed journals and 2 book chapters, which were cited >4300 times (Google scholar). I have manuscripts in **Nature Microbiology**, **Nucleic Acid Research paper** and **Nature Communications**. A complete list of my publications can be found <https://orcid.org/0000-0002-9017-7461>

Samrat R, Salas E, Fuchslueger L, Schmidt H, Gorfer M, Schagerl M, **Eichorst SA**, Wanek W. 2025. High-resolution lipidomics for decoding the soil biome: Improved lipid annotation, quantitation, and response to climate stress. *Soil Biol. Biochem.* 209:109892. doi: 10.1016/j.soilbio.2025.109892.

Trojan D, García-Robledo E, Hausmann B, Revsbech NP, Woebken D, **Eichorst SA***. 2024. A respiro-fermentative strategy to survive nanoxia in *Acidobacterium capsulatum*. *FEMS Microbiol Ecol.* 100(12): doi: 10.1093/femsec/fiae152. *denotes corresponding author.

Dietrich M, Panhölzl C, Angel R, Giguere AT, Randi D, Hausmann B, Herbold CW, Pötsch EM, Schaumberger A, **Eichorst SA**, Woebken D. 2024. Plant roots affect free-living diazotroph communities in temperate grassland soils despite decades of fertilization. *Commun Biol.* 7(1):846. doi: 10.1038/s42003-024-06522-w.

Imminger S, Meier DV, Schintlmeister A, Legin A, Schnecker J, Richter A, Gillor O, **Eichorst SA**, Woebken D. 2024. Survival and rapid resuscitation permit limited productivity in desert microbial communities. *Nat Commun.* 15, 3056. doi.org/10.1038/s41467-024-46920-6.

Salas E, Gorfer M, Bandian D, **Eichorst SA**, Schmidt H, Horak J, Rittmann SKR, Schleper C, Reischl B, Pribasniq T, Jansa J, Kaiser C, Wanek W. 2024. Reevaluation and novel insights into amino sugar and neutral sugar necromass biomarkers in archaea, bacteria, fungi, and plants. *Sci Total Environ.* 906:167463. doi: 10.1016/j.scitotenv.2023.167463.

Huber KJ, Pester M, **Eichorst SA**, Navarrete AA, Foesel BU. 2022. Editorial: *Acidobacteria* - Towards Unraveling the Secrets of a Widespread, Though Enigmatic, Phylum. *Front Microbiol.* 13:960602. doi: 10.3389/fmicb.2022.960602.

Falkenberg R, Fochler M, Sigl L, Bürstmayr H, **Eichorst S**, Michel S, Oburger E, Staudinger C, Steiner B, Woebken D. 2022. The breakthrough paradox: How focusing on one form of innovation jeopardizes the advancement of science: How focusing on one form of innovation jeopardizes the advancement of science. *EMBO Rep.* 23(7):e54772. doi: 10.15252/embr.202254772.

Trojan D, Garcia-Robledo E, Meier DV, Hausmann B, Revsbech NP, **Eichorst SA***, Woebken D. 2021. Microaerobic lifestyles at nanomolar O₂ concentrations mediated by low-affinity terminal oxidases in abundant soil bacteria. *mSystems.* 6(4): e0025021. doi: 10.1128/mSystems.00250-21. *denotes corresponding author.

Giguere AT*, **Eichorst SA***, Meier DV, Herbold CW, Richter A, Greening C, Woebken D. 2021. Acidobacteria are active and abundant members of diverse atmospheric H₂-oxidizing communities detected in temperate soils. *ISME J.* 15(2): 363-376. doi: 10.1038/s41396-020-00750-8. *denotes co-first authors.

Alteio LV, Schulz F, Seshadri R, Varghese N, Rodriguez-Reillo W, Ryan E, Goudeau D, **Eichorst SA**, Malmstrom RR, Katz LA, Blanchard JL, Woyke T. 2020. Complementary metagenomic approaches improve reconstruction of microbial diversity in a forest soil. *mSystems.* 5:e00768-19. doi:10.1128/mSystems.00768-19.

Eichorst SA, Trojan D, Huntemann M, Clum A, Pillay M, Palaniappan K, Varghese N, Mikhailova N, Stamatis D, Reddy TBK, Daum C, Goodwin LA, Shapiro N, Ivanova N, Kyrpides N, Woyke T, Woebken D. 2020. One complete and seven draft genome sequences of subdivision 1 and 3 *Acidobacteria* isolated from soil. *Microbiol Resour Announc.* 9(5):e01087-19. doi: 10.1128/MRA.01087-19.

- Zheng Q, Hu Y, Zhang S, Noll L, Böckle T, Dietrich M, Herbold CW, **Eichorst SA**, Woebken D, Richter A, Wanek W. 2019. Soil multifunctionality is affected by the soil environment and by microbial community composition and diversity. *Soil Biol Biochem.* 136:107521. doi: 10.1016/j.soilbio.2019.107521.
- Gorka S, Dietrich M, Mayerhofer W, Gabriel R, Wiesenbauer J, Martin V, Zheng Q, Imai B, Prommer J, Weidinger M, Schweiger P, **Eichorst SA**, Wagner M, Richter A, Schintlmeister A, Woebken D, Kaiser C. 2019. Rapid transfer of plant photosynthates to soil bacteria via ectomycorrhizal hyphae and its interaction with nitrogen availability. *Front Microbiol.* 10:168. doi: 10.3389/fmicb.2019.00168.
- Angel R, Nepel M, Panhölzl C, Schmidt H, Herbold CW, **Eichorst SA**, Woebken D. Evaluation of primers targeting the diazotroph functional gene and development of NifMAP - a bioinformatics pipeline for analyzing *nifH* amplicon data. *Front Microbiol.* 9:703. doi: 10.3389/fmicb.2018.00703.
- Hausmann B, Pelikan C, Herbold CW, Köstlbacher S, Albertsen M, **Eichorst SA**, Glavina Del Rio T, Huemer M, Nielsen PH, Rattei T, Stingl U, Tringe SG, Trojan D, Wentrup C, Woebken D, Pester M, Loy A. 2018. Peatland Acidobacteria with a dissimilatory sulfur metabolism. *ISME J.* 12(7):1729-1742. doi: 10.1038/s41396-018-0077-1.
- Eichorst SA**, Trojan D, Roux S, Herbold C, Rattei T, Woebken D. 2018. Genomic insights into the Acidobacteria reveal strategies for their success in terrestrial environments. *Environ Microbiol.* 20:1041-1063. doi:10.1111/1462-2920.14043.
- Kolinko S, Wu YW, Tachae F, Denzel E, Hiras J, Gabriel R, Bäcker N, Chan LJG, **Eichorst SA**, Frey D, Chen Q, Azadi P, Adams PD, Pray TR, Tanjore D, Petzold CJ, Gladden JM, Simmons BA, Singer SW. 2018. A bacterial pioneer produces cellulase complexes that persist through community succession. *Nature Microbiol.* 3(1): 99-104. doi: 10.1038/s41564-017-0052-z.
- Angel R, Panhölzl C, Gabriel R, Herbold C, Wanek W, Richter A, **Eichorst SA**, Woebken D. 2018. Application of stable-isotope labelling techniques for the detection of active diazotrophs. *Environ Microbiol.* (1):44-61. doi: 10.1111/1462-2920.13954. Erratum in: *Environ Microbiol.* 2022 (10):4962-4963. doi: 10.1111/1462-2920.16213.
- Hiras J, Wu YW, **Eichorst SA**, Simmons BA, Singer SW. 2016. Refining the phylum Chlorobi by resolving the phylogeny and metabolic potential of the representative of a deeply branching, uncultivated lineage. *ISME J.* 10(4):833-45. doi: 10.1038/ismej.2015.158.
- Spohn M, Pötsch EM, **Eichorst SA**, Woebken D, Wanek W, Richter A. 2016. Soil microbial carbon use efficiency and biomass turnover in a long-term fertilization experiment in a temperate grassland. *Soil Biol Biochem.* 97: 168-175. doi.org/10.1016/j.soilbio.2016.03.008.
- Eichorst SA**, Strasser F, Woyke T, Schintlmeister A, Wagner M, Woebken D. 2015. Advancements in the application of NanoSIMS and Raman microspectroscopy to investigate the activity of microbial cells in soils. *FEMS Microbiol Ecol.* 91(10); pii: fiv106. doi: 10.1093/femsec/fiv106.
- Eichorst SA**, Joshua C, Sathitsuksanoh N, Singh S, Simmons BA, Singer SW. 2014. Substrate-specific development of thermophilic bacterial consortia by using chemically pretreated switchgrass. *Appl Environ Microbiol.* 80(23):7423-32. doi: 10.1128/AEM.02795-14.
- Wu YW, Joshua C, **Eichorst SA**, Gladden JM, Simmon BA, Singer SW. 2015. Genomic analysis of xylose metabolism in members of the *Deinococcus-Thermus* phylum from thermophilic biomass-deconstructing bacterial consortia. *Bioenerg. Res.* 8, 1031–1038. doi.org/10.1007/s12155-015-9600-7
- Berthrong ST, Yeager CM, Gallegos-Graves L, Steven B, **Eichorst SA**, Jackson RB, Kuske CR. 2014. Nitrogen fertilization has a stronger effect on soil nitrogen-fixing bacterial communities than elevated atmospheric CO₂. *Appl Environ Microbiol.* 80(10):3103-12. doi: 10.1128/AEM.04034-13.

Eichorst SA, Varanasi P, Stavila V, Zemla M, Auer M, Singh S, Simmons BA, Singer SW. 2013. Community dynamics of cellulose-adapted thermophilic bacterial consortia. *Environ Microbiol.* 15:2573-87. doi: 10.1111/1462-2920.12159.

Gans JD, Dunbar J, **Eichorst SA**, Gallegos-Graves LV, Wolinsky M, Kuske CR. 2012. A robust PCR primer design platform applied to the detection of Acidobacteria Group 1 in soil. *Nucleic Acids Res.* 40(12):e96. doi: 10.1093/nar/gks238.

Eichorst SA, Kuske CR. 2012. Identification of cellulose-responsive bacterial and fungal communities in geographically and edaphically different soils by using stable isotope probing. *Appl Environ Microbiol.* 78(7):2316-27. doi:10.1128/AEM.07313-11.

Dunbar J, **Eichorst SA**, Gallegos-Graves LV, Silva S, Xie G, Hengartner NW, Evans RD, Hungate BA, Jackson RB, Megonigal JP, Schadt CW, Vilgalys R, Zak DR, Kuske CR. 2012. Common bacterial responses in six ecosystems exposed to 10 years of elevated atmospheric carbon dioxide. *Environ Microbiol.* 14(5):1145-58. doi: 10.1111/j.1462-2920.2011.02695.x.

Liu KL, Porras-Alfaro A, Kuske CR, **Eichorst SA**, Xie G. 2012. Accurate, rapid taxonomic classification of fungal large-subunit rRNA genes. *Appl Environ Microbiol.* 78(5):1523-33. doi: 10.1128/AEM.06826-11.

Gladden JM, **Eichorst SA**, Hazen TC, Simmons BA, Singer SW. Substrate perturbation alters the glycoside hydrolase activities and community composition of switchgrass-adapted bacterial consortia. *Biotechnol Bioeng.* 2012 May;109(5):1140-5. doi: 10.1002/bit.24388.

Challacombe JF, **Eichorst SA**, Hauser L, Land M, Xie G, Kuske CR. 2011. Biological consequences of ancient gene acquisition and duplication in the large genome of Candidatus Solibacter usitatus Ellin6076. *PLoS One.* 6(9):e24882. doi: 10.1371/journal.pone.0024882.

Eichorst SA, Kuske CR, Schmidt TM. 2011. Influence of plant polymers on the distribution and cultivation of bacteria in the phylum *Acidobacteria*. *Appl Environ Microbiol.* 77:586-596. doi: 10.1128/AEM.01080-10.

Eichorst SA, Breznak JA, Schmidt TM. 2007. Isolation and characterization of bacteria from soil that define *Terriglobus* gen. nov., in the phylum *Acidobacteria*. *Appl Environ Microbiol.* 73:2708-2717. doi: 10.1128/AEM.02140-06.

Stevenson BS, **Eichorst SA**, Wertz JT, Schmidt TM, Breznak JA. 2004. New strategies for cultivation and detection of previously uncultured microbes. *Appl Environ Microbiol.* 70(8):4748-55. doi: 10.1128/AEM.70.8.4748-4755.2004.

Book Chapters

Eichorst SA, Trojan D, Woebken D. 2017. Genus *Terriglobus*. In *Bergey's Manual of Systematics of Archaea and Bacteria*.

Eichorst S.A. and D. Woebken. 2014. Investigation of microorganisms at the single-cell level using Raman Microspectroscopy and Nanometer-scale Secondary Ion Mass Spectrometry. In *Molecular Methods and Applications in Microbiology*, in press. (Skovhus, T.L., Caffrey, S., and Hubert, C.R.J., ed.). Caister Academic Press, Norfolk, UK.

Additional research achievements

2024-2028 FWF Stand-Alone Project: *Beyond O₂ – factors influencing microbial terminal oxidases*. Funded by the “FWF – Der Wissenschaftsfonds” (Austrian Science Fund), Stephanie A. Eichorst (PI) Grant-DOI 10.55776/PAT8860623 (511,314 Euros).

- 2014-2017 FWF Stand-Alone Project: *Investigating the function of the ubiquitous Acidobacteria in terrestrial environments*. Funded by the “FWF – Der Wissenschaftsfonds” (Austrian Science Fund), Dagmar Wuebken (PI) and Stephanie A. Eichorst (co-PI). P 26392-B20 (435,698 Euros).
- 2013-2016 FWF Stand-Alone Project: *A functional approach to understand active non-symbiotic diazotrophs in soil*. Funded by the “FWF – Der Wissenschaftsfonds” Dagmar Wuebken (PI) and Stephanie A. Eichorst (co-PI). P 25700-B20 (448,751 Euros).
- 2012-2014 Project grant: *NanoSIMS enabled approach to understand bacterial and fungal cellulose degraders in soils*. Marie Curie International Incoming Fellowship (IIF), fellow Dr. Stephanie A. Eichorst. Funded by Marie Curie FP7 (EU), Host: Dr. Michael Wagner, Department of Microbiology and Ecosystem Science, University of Vienna. No. 300807 (180,191 Euro).
- 2010 Joint Genome Institute, Community Sequencing Proposal. *Populating the branches of the Phylum Acidobacteria with relevant soil strains*.
- 2007 Michigan State University, Rudolph Hugh Scholarship for academic achievement (\$2000)
- 2003 Kellogg Biological Station’s Long-Term Ecological Research Grant (\$1200).
- 1998-1999 Howard Hughes Medical Institute (HHMI) Undergraduate Summer Research Award, Benedictine University, Lisle, Illinois.