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## Main Research Interest

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- Microbial mediated cellulose degradation
- Ecophysiology of acidobacteria
- Single-cell method development for work in complex systems, such as soils

## Scientific experience

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2017 – present **Senior Scientist**, Division of Microbial Ecology, University of Vienna, Vienna, Austria.

2012-2016 **Scientist**, Division of Microbial Ecology, University of Vienna, Vienna, Austria.

2011 **Guest Scientist**, Joint BioEnergy Institute, Emeryville, CA USA. PI: Steven W. Singer PhD.

2007-2010 **Postdoctoral fellow**, Los Alamos National Laboratory, Bioscience Division, Los Alamos, NM USA. PI: Cheryl R. Kuske PhD.

2007-2008 **Course coordinator**, Microbial Diversity Course, Woods Hole, Massachusetts, USA. Course Directors: Prof. Thomas M. Schmidt & Prof. William Metcalf.

2007 **Postdoctoral fellow**, Michigan State University. 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.

## Degrees

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2007 **PhD**: Microbiology and Molecular Genetics, College of Natural Science, Michigan State University, East Lansing, MI, USA. Dissertations "Isolation and characterization of members of the phylum *Acidobacteria* from soils" Advisors: Prof. Thomas M. Schmidt and Prof. John A. Breznak. 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).

## Peer-reviewed third-party funding

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- **Project grant**: *Investigating the function of the ubiquitous Acidobacteria in terrestrial environments*. Funded by the "FWF – Der Wissenschaftsfonds" (Austrian Science Fund), project No. P 26392-B20 (435,698 €) (Co-PI with Dr. Dagmar Wobken), 2014-2017

- **Project grant:** *A functional approach to understand active non-symbiotic diazotrophs in soil*. Funded by the “FWF – Der Wissenschaftsfonds” (Austrian Science Fund), project No. P 25700- B20 (448,751 €) (Co-PI with Dr. Dagmar Woebken), 2013-2016
- **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), project No. 300807 (180,191 €) (Host: Prof. Michael Wagner), 2012-2014
- **Community Sequencing Proposal**, Joint Genome Institute. *Populating the branches of the Phylum Acidobacteria with relevant soil strains*, 2010.
- **Kellogg Biologica Station Long Term Ecological Research Grant**. (\$1,200), 2003.
- **Howard Hughes Medical Institute (HHMI) Undergraduate Summer Research Award**, Benedictine University, Lisle, IL, 1998-1999.

## Other scientific activities

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- Ad-hoc reviewer:** Applied and Environmental Microbiology, FEMS Microbiology Ecology, Canadian Journal of Microbiology, Microbial Ecology, Environmental Microbiology, International Journal of Systematic and Evolutionary Microbiology, Frontiers in Terrestrial Microbiology
- Review Editor:** Frontiers in Terrestrial Microbiology

## Academic prizes and awards

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- 2012 Marie Curie FP7 (EU), *NanoSIMS enabled approach to understand bacterial and fungal cellulose degraders in soils*. Marie Curie International Incoming Fellowship (IIF) (180,191 €)
- 2007 Michigan State University, Rudolph Hugh Scholarship for academic achievement (\$2000)

## Invited presentations

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- 2011 Department of Energy, Joint BioEnergy Institute, Emeryville, CA, USA
- 2010 Los Alamos National Laboratory, Bioscience Division, Los Alamos, NM, USA
- 2009 Argonne National Laboratory First Annual Soil Metagenomics Workshop, Argonne, IL USA
- 2007 Los Alamos National Laboratory, Bioscience Division, Los Alamos, NM, USA
- 2007, 2008 Microbial Diversity Course, Marine Biological Laboratory, Woods Hole, MA, USA

## Publications

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Until now I have published 22 papers in peer-reviewed journals, which were cited >1000 times. Current “h-index” of 14 (ResearcherID, January 2020) or 18 (Google scholar, January 2020).

### 2020

**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. *Microbiology Resource Announcement*, accepted.

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. Complementary metagenomic approaches improve reconstruction of microbial diversity in a forest soil. *mSystems*. In revision.

## 2019

Zheng Q, Hu Y, Zhang S, Noll L, Böckle T, Dietrich M, Herbold CW, **Eichorst SA**, Wuebken D, Richter A, Wanek W. 2019. Soil multifunctionality is affected by the soil environment and by microbial community composition and diversity. *Soil Biology and Biochemistry*. 136:107521.

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, Wuebken D, Kaiser C. 2019. Rapid transfer of plant photosynthates to soil bacteria via ectomycorrhizal hyphae and its interaction with nitrogen availability. *Frontiers in Microbiology*. In press (DOI: 10.3389/fmicb.2019.00168).

## 2018

Angel R, Nepel M, Panhölzl C, Schmidt H, Herbold CW, **Eichorst SA**, Wuebken D. 2018. Evaluation of primers targeting the diazotroph functional gene and development of NifMAP – a bioinformatics pipeline for analyzing *nifH* amplicon data. *Frontiers in Microbiology* 9:1-15.

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, Wuebken D, Pester M, Loy A. 2018. Peatland *Acidobacteria* with a dissimilatory sulfur metabolism. *The ISME Journal* 12:1729-1742.

**Eichorst SA**, Trojan D, Roux S, Herbold C, Rattei T, Wuebken D. 2018. Genomic insights into the *Acidobacteria* reveal strategies for their success in terrestrial environments. *Environmental Microbiology* 20:1041-1063.

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 Microbiology* 3(1): 99-104.

Angel R, Panhölzl C, Gabriel R, Herbold C, Wanek W, Richter A, **Eichorst SA**, Wuebken D. 2018. Application of stable-isotope labeling techniques for the detection of active diazotrophs. *Environmental Microbiology* 20:44-61.

## 2017

**Eichorst SA**, Trojan D, and Wuebken D. 2017. *Terriglobus*. In *Bergey's Manual of Systematics of Archaea and Bacteria*. (eds W.B. Whitman, F. Rainey, P. Kämpfer, M. Trujillo, J. Chun, P. DeVos, B. Hedlund and S. Dedysh). doi:[10.1002/9781118960608.gbm00003.pub2](https://doi.org/10.1002/9781118960608.gbm00003.pub2)

## 2016

Spohn M, Pötsch EM, **Eichorst SA**, Wuebken 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 Biology and Biochemistry*. 97: 168-175.

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. *The ISME Journal* 10(4): 833-845.

## 2015

**Eichorst SA**, Strasser F, Woyke T, Schintlmeister A, Wagner M, Wuebken D. 2015. Advancements in the application of NanoSIMS and Raman microspectroscopy to investigate the activity of microbial cells in soils. *FEMS Microbiology Ecology*: 91(10); pii: fiv106.

Hiras J\*, Wu YW\*, **Eichorst SA**, Simmons BA, Singer SW. 2015. Refining the phylum *Chlorobi* by resolving the phylogeny and metabolic potential of the representative of a deeply branching, uncultivated lineage. *The ISME Journal*, 10(4): 833-845. \*denotes co-first authorship

Wu Y, Joshua C, **Eichorst SA**, Gladden JM, Simmons BA, Singer SW. 2015. Genomic analysis of xylose metabolism in members of the Deinococcus-Thermus phylum from thermophilic biomass-deconstructing bacterial consortia. *Bioenergy Research*. 8(3): 1031-1038.

#### **Before 2014**

**Eichorst SA**, Joshua C, Sathitsuksanoh N, Singh S, Simmons BA, Singer SW. 2014. Substrate-specific development of thermophilic bacteria consortia using chemically pretreated switchgrass. *Applied and Environmental Microbiology*. 80(23): 7423-7432.

Berthrong S, Yeager CM, Gallegos-Graves L, Steven B, **Eichorst SA**, Jackson RB and Kuske CR. 2014. Nitrogen fertilization has a stronger effect on soil N-fixing bacterial communities than elevated atmosphere CO<sub>2</sub>. *Applied and Environmental Microbiology*. 80(10): 3103-3112.

**Eichorst SA**, Varanasi P, Stalvia V, Zemla M, Auer M, Singh S, Simmons BA, Singer SW. 2013. Community dynamics of cellulose-adapted thermophilic bacterial consortia. *Environmental Microbiology*. 15(9): 2573-2587.

**Eichorst SA** and Kuske CR. 2012. Identification of cellulose-responsive bacterial and fungal communities in geographically and edaphically different soils by using stable isotope probing. *Applied and Environmental Microbiology* 78:2316-2327.

Gladden JM, **Eichorst SA**, Hazen TC, Simmons BA, Singer SW. 2012. Substrate perturbation alters the glycoside hydrolase activities and community composition of switchgrass-adapted bacterial consortia. *Biotechnology and Bioengineering*. 109(5): 1140-1145.

Dunbar JM, **Eichorst SA**, Gallegos-Graves L, 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 ten years of elevated atmospheric carbon dioxide. *Environmental Microbiology*. 14:1145-1158.

Gans JD, Dunbar J, **Eichorst SA**, Gallegos-Graves L, Wolinsky M, Kuske CR. 2012. A robust platform for design of PCR-based nucleic acid assays applied to the construction of *Acidobacteria* group 1-specific assays. *Nucleic Acids Research* 40(12), e96.

Liu KL, Porras-Alfaro A, Kuske CR, **Eichorst SA**, Xie G. 2012. Accurate, rapid taxonomic classification of fungal large-subunit rRNA genes. *Applied and Environmental Microbiology* 78:1523-1533.

**Eichorst SA**, Kuske CR, Schmidt TM. 2011. Influence of plant polymers on the distribution and cultivation of bacteria in the phylum *Acidobacteria*. *Applied and Environmental Microbiology* 77:586-596.

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.

**Eichorst SA**, Breznak JA, Schmidt TM. 2007. Isolation and characterization of bacteria from soil that define *Terriglobus* gen. nov., in the phylum *Acidobacteria*. *Applied and Environmental Microbiology* 73:2708-2717.

Stevenson BS, **Eichorst SA**, Schmidt TM, Breznak JA. 2004. New strategies for cultivation and detection of previously uncultured microbes. *Applied and Environmental Microbiology*. 70(8): 4748-4755.

#### **Book chapters and other publications**

**Eichorst SA**, Trojan D, and Woebken D. 2017. *Terriglobus*. In *Bergey's Manual of Systematics of Archaea and Bacteria*. (eds W.B. Whitman, F. Rainey, P. Kämpfer, M. Trujillo, J. Chun, P. DeVos, B. Hedlund and S. Dedys). doi:[10.1002/9781118960608.gbm00003.pub2](https://doi.org/10.1002/9781118960608.gbm00003.pub2)

**Eichorst S.A.** and D. Wuebken. 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.

### **Contributions to international conferences**

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**Eichorst, S.A.**, D. Trojan, A. Giguere, E.G. Robledo, S. Roux, C. Herbold, A. Richter, N.P. Revsbech, T. Rattei, D. Wuebken. 2019. Scavenging atmospheric gases for energy and the ecological implications in soil acidobacteria. Annual Conference 2019 of the Association for General and Applied Microbiology. Contributed Oral Presentation.

Wuebken D and **S.A. Eichorst**. 2019. *Exploring the potential and ecological implications of atmospheric gas scavenging in soil acidobacteria*. Bacterial Genetics and Ecology (BAGECO 15), Lisbon, Portugal, oral presentation.

**Eichorst, S.A.**, D. Trojan, A. Giguere, S. Roux, C. Herbold, T. Rattei, D. Wuebken. 2018. Exploring the ecophysiology of acidobacteria and identifying the potential strategies for their success in soil. ASM 2018, Atlanta, Georgia, USA. Poster presentation.

**Eichorst, S.A.**, 2016. Exploring the niches of cellulose degradation in a forested soil – from process to the single-cell scale. ISME 16, Montreal, Canada. Contributed Oral Presentation.

Strasser, F., **S.A. Eichorst**, L. Fuchslueger, J. Schnecker, M. Watzka, A. Richter, D. Wuebken 2015. Influences of carbon substrates and nitrogen availability on microbial-mediated cellulose degradation in an Austrian beech forest soil. Ecology of Soil Microorganisms. Poster presentation.

Trojan, D., **S.A. Eichorst**, C. Herbold, T. Rattei, D. Wuebken 2015. Investigating the ecophysiology of the ubiquitous Acidobacteria in the dynamic soil environment. Ecology of Soil Microorganisms. Poster presentation.

Angel, R., R. Gabriel, **S.A. Eichorst**, C. Herbold, T. Rattei, D. Wuebken 2015. Optimizing the toolbox to investigate free-living diazotrophs in soil – from bulk measurements to single-cell analysis. Ecology of Soil Microorganisms. Poster presentation.

**Eichorst, S.A.**, F. Strasser, L. Fuchslueger, J. Schnecker, M. Watzka, A. Richter, D. Wuebken 2014. Temporal patterns and edaphic drivers in microbial cellulose degradation in an Austrian beech forest soil. ISME 15, Seoul, South Korea. Poster presentation.

**Eichorst, S.A.**, F. Strasser, T. Woyke, A. Schintlmeister, M. Wagner, D. Wuebken. 2014. One Cell at a Time: Advancements on the application of single-cell methods, NanoSIMS and Raman microspectroscopy, in terrestrial environments. ISME 15, Seoul, South Korea. Poster presentation.

**Eichorst, S.A.** 2014. Investigating microbial cellulose degradation in an Austrian beech forest soil – from the process to the single-cell level. DGB Workshop – Soil Processes – is the whole system regulated at ‘hot spots’? From micro-scales to the pedon.” Freising, Germany. Oral Presentation.

**Eichorst, S.A.**, F. Strasser, T. Woyke, A. Schintlmeister, M. Wagner, D. Wuebken. 2013. Understanding the Edaphic Drivers of Cellulose-Degrading Guilds in an Austrian Beech Forest Soil. 2<sup>nd</sup> Thünen Symposium on Soil Metagenomics. Thünen, Germany. Poster presentation.

**Eichorst, S.A.**, J.M. Gladden, M. Allgaier, P. D’haeseleer, T.C. Hazen, J.S. VanderGheynst, P. Hugenholtz, B.A. Simmons, S.W. Singer. 2011. Glycoside Hydrolase Activities and Community Composition of Feedstock-Adapted Thermophilic Bacterial Consortia. Gordon Research Conference, Applied and Environmental Microbiology. Poster presentation.

**Eichorst, S.A.** 2010. Identification of active bacterial and fungal cellulolytic communities in soils. Joint BioEnergy Institute, Deconstruction/Microbial Communities Division. Invited Seminar.

**Eichorst, S.A.**, C.R. Kuske. 2010. Identification of active bacterial and fungal cellulolytic communities using stable isotope probing and in-depth rDNA sequencing across pine forest soils. ISME 13, Seattle, Washington USA. Poster presentation.

Kuske, C.R., J. Dunbar, G. Xie, L. Ticknor, **S.A. Eichorst**, L. Gallegos-Graves, S. Silva, C. Weber, D. Zak, R. Vilgalys, C. Schadt, D. Evans, P. Megonigal, B. Hungate, R. Jackson, A. Porras-Alfaro, S. Tringe. 2010. Responses of soil bacterial and fungal communities to long term elevated carbon dioxide and other environmental factors in six terrestrial ecosystems. ISME 13, Seattle, Washington USA. Poster presentation.

Lui, K.L., G. Xie, A. Porras-Alfaro, **S.A. Eichorst**, N. Hengartner, C.R. Kuske. 2010. Curated LSU rRNA and ITS database and a fungal classifier for short read sequences. ISME 13, Seattle, Washington USA. Poster presentation.

Kuske, C.R., J. Dunbar, L. Ticknor, **S.A. Eichorst**, D. Zak, R. Vilgalys, C. Schadt, D. Evans, P. Megonigal, B. Hungate, R. Jackson. 2010. Spatial variability and influence of edaphic factors on biogeographic patterns in soil communities within and across six terrestrial biomes. ISME 13, Seattle, Washington USA. Poster presentation.

**Eichorst, S.A.**, J.F. Challacombe, N. Ward, T.M. Schmidt, C.R. Kuske. 2008. Genomic and physiological description of subdivision 1 and 3 in the phylum *Acidobacteria*. ASM 108<sup>th</sup> General Meeting, Boston, Massachusetts, USA. Poster presentation.

J.F. Challacombe, G. Xie, **S.A. Eichorst**, T.S. Brettin, C.R. Kuske. 2008. Factors contributing to the large genome of the soil bacterium *Solibacter usitatus*. ASM 108<sup>th</sup> General Meeting, Boston, Massachusetts, USA. Poster presentation.

**Eichorst, S.A.**, J.F. Challacombe, N. Ward, T.M. Schmidt, C.R. Kuske. 2008. Genomic and physiological description of subdivision 1 and 3 in the phylum *Acidobacteria*. Department of Energy, Los Alamos National Laboratory, Bioscience, Biosecurity, and Cognitive Science Capability Review, Los Alamos, USA. Poster presentation, award winner.

Z.M.P. Lee, **S.A. Eichorst**, T.M. Schmidt. 2007. Exploring the Effect of Variation in Translational Machinery on Bacterial Growth Efficiency. ASM 107<sup>th</sup> General Meeting, Toronto, Canada. Poster presentation.

**Eichorst, S.A.**, J.A. Breznak, T.M. Schmidt. 2005. Isolation and Characterization of Carotenoid Containing Strains of the Phylum *Acidobacteria* from Soil. ASM 105<sup>th</sup> General Meeting, Atlanta, Georgia, USA. Poster presentation.

**Eichorst, S.A.**, B. Stevenson, D. Engles, T.M. Schmidt, J.A. Breznak. 2003. Methanol-Induced Shifts in Acidobacterium Diversity and Isolation of a Novel Acidobacterium from Soil. LTER All-Investigator Meeting, East Lansing, USA. Poster presentation.

**Eichorst, S.A.**, B. Stevenson, D. Engles, T.M. Schmidt, J.A. Breznak. 2003. Methanol-Induced Shifts in Acidobacterium Diversity and Isolation of a Novel Acidobacterium from Soil. ASM 103<sup>rd</sup> General Meeting Washington, DC, USA. Poster presentation.

B. Stevenson, **S.A. Eichorst**, J. Wertz, T.M. Schmidt, J.A. Breznak. 2003. Plate Wash PCR: A method to streamline the isolation of novel organisms. ASM 103<sup>rd</sup> General Meeting Washington, DC, USA. Poster presentation.

## **Public Outreach**

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**University of Vienna, KinderUni.** 2014-current. Summer Workshop entitled “What would the world look like without microbes? Adventures into the microbial world”. (<https://www.kinderuni.at/kinderuniwien/>)

**American International School** – 3-day workshop for school children entitled “An Underground Adventure. Dirt – The Scoop on Soil”. (<http://www.ais.at/>)

## Collaboration partners

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Dr. Dagmar Wuebken	Division of Microbial Ecology, Department of Microbiology and Ecosystem Science, University of Vienna, Vienna, Austria
Prof. Dr. Alexander Loy	Division of Microbial Ecology, Department of Microbiology and Ecosystem Science, University of Vienna, Vienna, Austria
Associate Prof. Chris Greening	Monash University School of Biological Sciences, Victoria, Australia
Univ.-Prof. Dr. Sergey Zotchev	University of Vienna, Department of Pharmacognosy, Vienna, Austria.
Simon Roux, PhD	Department of Energy, Joint Genome Institute, Walnut Creek, California, USA
Tanja Woyke, PhD	Microbial Genomics Program Lead, DOE Joint Genome Institute, Walnut Creek, USA
Arpita Bose, PhD	Washington University, St. Louis, Missouri, USA
Jeffrey Blanchard, PhD	University of Massachusetts, Biology Department, Amherst, Massachusetts, USA
Prof. Dr. Niels Peter Revsbech	Department of Bioscience – Microbiology, Aarhus University, Denmark
Dr. Emilio Garcia-Robledo	Universidad de Cadiz, Cadiz, Spain

*Updated January 2020*