

Christopher J. Sedlacek, PhD

Personal Information

Nationalities Canada and Ireland
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Current institution University of Vienna, Centre for Microbiology and Environmental Systems Science, Division of Microbial Ecology, Vienna, Austria
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Education and Employment History

2020-Present **Independent postdoctoral researcher, University of Vienna, Austria**
Interplay between biological nitrification inhibitors, nitrogen cycling, and agronomic nitrogen use efficiency

2015-2020 **Postdoctoral researcher, University of Vienna, Austria**
Mentors: Dr. Michael Wagner and Dr. Holger Daims
The genomic and ecophysiological characterization of diverse nitrifying microorganisms

PhD **PhD in Microbiology**, August 2015
2009-2015 Department of Microbiology, Miami University, Oxford, OH, USA
Mentor: Dr. Annette Bollmann
The ecophysiology of the ammonia-oxidizing bacterium Nitrosomonas sp. Is79

BSc **BSc in Biology (cum laude)**, May 2009
2005-2009 Department of Biology, Fairmont State University, Fairmont, WV, USA
Mentor: Dr. Albert Magro
The effect of pharmacologically induced apoptosis on glioblastoma tumor cell migration

Funded Grants

2020	Young Investigator Researcher Group Project (Austrian Science Fund) <i>PlayNICE - Interplay between biological nitrification inhibitors, nitrogen cycling, and agronomic nitrogen use efficiency</i> (PI)	€2.5m
2017	Research network chemistry meets microbiology joint interdisciplinary research (University of Vienna) <i>Investigating interactions of ammonia-oxidizing archaea and co-enriched heterotrophic bacteria by stable isotope labeling and metabolomics</i> (Co-PI)	€7,000
2016	Career relocation grant (Austrian Research Promotion Agency, FFG)	€2,000
2014	Doctoral undergrad opportunities for scholarship, Miami University, USA <i>Physiological comparison of nitrite-oxidizing bacteria</i> (PI)	\$1,000
2013	Doctoral undergrad opportunities for scholarship, Miami University, USA <i>The role of divergent amoC genes in Nitrosomonas sp. Is79</i> (PI)	\$1,000

Publications (*shared first author, #corresponding author, &permanent BioRxiv article)

2024 *Metagenome-assembled genomes of two nitrifying microorganisms from the freshwater archaeal ammonia-oxidizing enrichment culture BO1*
Annette Bollmann, **Sedlacek CJ**, Sayavedra-Soto L, Norton JM. Microbiology Resource Announcements, in press.

- 2024 *Biofilm colonization and succession in a full-scale partial nitrification-anammox moving bed biofilm reactor*
Suarez C, Rosenqvist T, Dimitrova I, **Sedlacek CJ**, Modin O, Paul CJ, Hermansson M, Persson F. Microbiome, in press
- 2024 *Visualizing small-scale subsurface NH₃ and pH dynamics surrounding nitrogen fertilizer granules and impacts on nitrification activity*
Merl T, **Sedlacek CJ**, Pjevac P, Fuchslueger L, Sandén T, Spiegel H, Koren K, Giguere AT. Soil Biology and Biochemistry 189.
- 2022 *Disturbance-based management of ecosystem services and disservices in partial nitrification-anammox biofilms*
Suarez C, **Sedlacek CJ**, Gustavsson D, Eiler A, Modin O, Hermansson M, Persson F. NPJ Biofilms and Microbiomes 8 (1), 1-9.
- 2022*# *Ammonia-oxidizing archaea possess a wide range of cellular ammonia affinities*
Jung MY, **Sedlacek CJ**, Kits KD, Mueller AJ, Rhee SK, Hink L, Nicol GW, Bayer B, Lehtovirta-Morley L, Wright CL, de la Torre JR, Herbold CW, Pjevac P, Daims H, Wagner M. ISME J 16(1):272-283.
- 2021 *Sustained nitrogen loss in a symbiotic association of Comammox Nitrospira and Anammox bacteria*
Gottshall EY, Bryson SJ, Cogert KI, Landreau M, **Sedlacek CJ**, Stahl DA, Daims H, Winkler M. Water Research 202, 117426.
- 2020# *It Takes a Village: Discovering and Isolating the Nitrifiers*
Sedlacek CJ. Frontiers in Microbiology 11, 1900.
- 2020 *Transcriptomic response of a continuous Nitrosomonas europaea culture to reduced oxygen availability*
Sedlacek CJ, Giguere AT, Dobie MD, Mellbye BL, Sayavedra-Soto LA, Bottomley PJ, Daims H, Wagner M, Pjevac P. Msystems 5(1).
- 2020# *Is too much fertilizer a problem?*
Sedlacek CJ, Giguere AT, Pjevac P. Frontiers for Young Minds.
- 2019 *A physiological and genomic comparison of Nitrosomonas cluster 6a and 7 ammonia-oxidizing bacteria*
Sedlacek CJ, McGowan B, Norton J, Laanbroek HJ, Suwa Y, Stein LY, Klotz MG, Arp D, Sayavedra-Soto L, A Bollmann. Microbial ecology 78(4), 985-994.
- 2019 *Low yield and abiotic origin of N₂O formed by the complete nitrifier Nitrospira inopinata*
Kits KD, Jung MY, **Sedlacek CJ**, Vierheilig J, Pjevac P, Herbold C, Stein LY, Richter A, Wissel H, Brüggemann N, Wagner M, Daims H. Nature communications 10(1), 1-12.
- 2019& *A new method for rapid genome classification, clustering, visualization, and novel taxa discovery from metagenome*
Wang Z, Ho H, Egan R, Yao S, Kang D, Froula J, Sevim V, Schulz F, Shay JE, Macklin D, McCue K, Orsini R, Barich DJ, **Sedlacek CJ**, Li W, Morgan-Kiss RM, Woyke T, Slonczewski JL.
- 2018 *Characterization of the first Nitrotoga isolate reveals metabolic versatility and separate evolution of widespread nitrite-oxidizing bacteria*
Kitzinger K, Koch H, Lückner S, **Sedlacek CJ**, Herbold C, Schwarz J, Daebeler A, Mueller A, Lukumbuzya M, Romano S, Leisch N, Karst SM, Kirkegaard R, Albertsen M, Nielsen PH, Wagner M, Daims H. mBio 9(4).

- 2018 *Cultivation and Genomic Analysis of “Candidatus Nitrosocaldus islandicus,” an Obligately Thermophilic, Ammonia-Oxidizing Thaumarchaeon from a Hot Spring Biofilm in Graendalur Valley, Iceland*
Daebeler A, Herbold C, Vierheilig J, **Sedlacek CJ**, Pjevac P, Albertsen M, Kirkegaard RH, Daims H, Wagner M. *Frontiers in Microbiology* 9, 193.
- 2017 *Kinetic analysis of a complete nitrifier reveals an oligotrophic lifestyle*
Kits KD, **Sedlacek CJ**, Lebedeva EV, Han P, Bulaev A, Pjevac P, Daebeler A, Romano S, Albertsen M, Stein LY, Daims H, Wagner M. *Nature* 549(7671), 269-272.
- 2016 *The effect of bacterial community members on the proteome of the ammonia-oxidizing bacterium Nitrosomonas sp. Is79.*
Sedlacek CJ, Gries K, Nielsen S, Revsbeck NP, Laanbroek HJ, Bollmann A. *Applied and Environmental Microbiology* 82(15), 4776-88.
- 2013 *Complete genome sequence of Nitrosomonas sp. Is79, an ammonia-oxidizing bacterium adapted to low ammonium concentrations*
Bollmann A, **Sedlacek CJ**, Norton J, *et al.*. *Standards in Genomic Sciences* 7(3), 469-82.

Teaching Experience (*Denotes graduate level or graduate cross-listed classes)

- 2022/2023* Current topics in molecular microbial ecology and evolution
- 2017/2018* Diversity and function of uncultured microbes in medical and environmental samples
- 2013 Introduction to microbiology and human disease
- 2010-2014* Medical bacteriology and bacterial pathogenesis
- 2010-2011* Immunology principles and practices
- 2009 Biological concepts: ecology, evolution, genetics, and diversity

Professional Development: Workshops Attended

- 2023 **Combining face-to-face and online teaching: Introduction to blended learning**
Centre for teacher education, University of Vienna
- 2023 **Actively engage students in your course: Methods for student activation**
Centre for teacher education, University of Vienna
- 2016 **Principles and applications of microsensors**
Unisense microsensor workshop, Aarhus, Denmark
- 2014 **American Society for Microbiology: Undergraduate teaching workshop**
M(icro)OOCs Webinar Series: Documenting your Perspective on Teaching

Scientific Service

- 2020-current Review editor for *Frontiers in Microbiology- Microbial Physiology and Metabolism*
- 2017-current Ad-hoc reviewer for:
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| <i>International Society for Microbial Ecology (ISME)</i> | <i>Nature Communications</i> |
| <i>Applied Microbiology and Biotechnology</i> | <i>Frontiers in Microbiology</i> |
| <i>Environmental microbiology</i> | <i>Annals of Microbiology</i> |
| <i>Applied Science</i> | <i>Water research</i> |
| <i>FEMS Microbiology</i> | <i>Applied Soil Ecology</i> |

Scientific and Public Outreach

- 2023 **Application note for Unisense**
Understanding the denitrification dynamics of nitrifying microorganisms
- 2021 **Article for Nature Microbiology community**
Behind the paper: Cellular kinetics of ammonia-oxidizing microorganisms
- 2017 **Co-Chair: Cultivation in the age of culture independent studies**
The 11th Innovative Techniques in Microbial Ecology Meeting (Aalborg, Denmark)
- 2017 **Co-Organizer: Early career and graduate student workshop**
The 5th International Conference on Nitrification (University of Vienna)
- 2015 **Co-Chair: N-cycle ecology, ecogenomics, and niche differentiation session**
The 4th International Conference on Nitrification (University of Alberta, Canada)

Select Scholarships, Fellowships, and Awards

- 2014-2015 Dissertation research fellow, Miami University, USA
- 2013-2014 American Society for Microbiology science teaching fellow
- 2012-2015 Excellence in graduate studies award, Miami University, USA
- 2012 Orton K Stark graduate award in research and teaching, Miami University, USA
- 2009 Outstanding senior biology student award, Fairmont State University, USA
- 2005-2009 Athletic swimming scholarship, Fairmont State University, USA

Five Most Recent Oral Presentations (#Invited)

- 2023[#] Nitrification regulation: efficiency through ecophysiology
Dalhousie University (Truro, Canada; virtual)
- 2023[#] Nitrification regulation: efficiency through ecophysiology
Department of Plant and Soil Sciences, University of Kentucky (KY, USA)
- 2023[#] The ecophysiology of nitrifying microorganisms: genomes to enzyme kinetics
Department of Microbiology, University of Manitoba (Winnipeg, Canada)
- 2022 *Cellular physiology and kinetics govern the substrate competitiveness of ammonia oxidizers*
25th European Nitrogen Cycling meeting (Rome, Italy)
- 2022[#] *Cellular physiology and kinetics govern the substrate competitiveness of ammonia oxidizers*
Annual Meeting of the Korean Society of Environmental Biology (Republic of Korea; virtual)

Five Most Recent Poster Presentations

- 2023 *The role, or lack thereof, of sNOR during denitrification by ammonia-oxidizing bacteria*
7th International Conference on Nitrification (ICON 7) (Princeton, USA)
- 2019 *Ammonia-oxidizing archaea possess a wide range of substrate affinities*
Archaea: Ecology, Metabolism and Molecular biology GRC and GRS (Les Diablerets, Switzerland)
- 2018 *A catalase-positive bacterium protects an ammonia-oxidizing archaeon from white light inhibition*
17th International Symposium on Microbial Ecology (ISME) (Leipzig, Germany)
- 2017 *Nitrososphaera gargensis: combating oxidative stress*
5th International Conference on Nitrification (ICON 5) (Vienna, Austria)
- 2016 *Oxidative stress in ammonia-oxidizing archaea: Implications for cultivation and ecology*
16th International Symposium on Microbial Ecology (ISME) (Montreal, Canada)