

# Christopher J. Sedlacek, PhD

## Personal Information

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Nationalities Canada and Ireland  
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Current institution University of Vienna, Centre for Microbiology and Environmental Systems Sciences,  
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Google Scholar <https://scholar.google.com/citations?user=AkPhwnsAAAAJ>

## Education

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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*  
Diploma **High School Diploma**, June 2005  
2001-2005 St. Thomas of Villanova Secondary School, LaSalle, ON, Canada

## Scientific Employment History

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2020-Present Independent postdoctoral researcher  
*Interplay between biological nitrification inhibitors, nitrogen cycling, and agronomic nitrogen use efficiency*  
2015-2020 Postdoctoral researcher, University of Vienna, Austria  
Group Leaders: Dr. Michael Wagner and Dr. Holger Daims  
*The genomic and ecophysiological characterization of diverse nitrifiers*  
2009-2015 Graduate research and teaching assistant, Miami University, USA  
2006-2008 Undergraduate research assistant, Fairmont State University, USA

## Teaching Experience (\*Denotes graduate student classes)

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2022/2023 Current Topics in Molecular Microbial Ecology and Evolution\*  
Lecture course, 10 students, University of Vienna  
2017/2018 Diversity and function of uncultured microbes in medical and environmental samples\*  
Lecture and laboratory course, 15 students, University of Vienna  
2013 Introduction to microbiology and human disease (MBI 111)  
Lecture course, 80 students, Miami University  
2010-2014 Medical bacteriology and Bacterial pathogenesis (MBI 405/505\*)  
Laboratory course, 20 students, multiple sessions, Miami University  
2010-2011 Immunology principles and practices (MBI 415/515\*)  
Laboratory course, 20 students, multiple sessions, Miami University

2009 Biological concepts: ecology, evolution, genetics, and diversity (BMZ 115)  
Laboratory course, 20 students, multiple sessions, Miami University

## Mentoring Experience

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### PhD students (University of Vienna)

2021-Present Paula Rojas  
*The identification and characterization of novel biological nitrification inhibitors*  
Christina Maisl  
*Metabolome based discovery of plant derived nitrification inhibitors*

### Master's students (University of Vienna)

2021-Present Katharina Klawatsch  
*Characterization of synthetic nitrification inhibitors*  
Daniel Loy  
*The role of multiple nitric oxide reductases in Nitrosomonas europaea*

### Undergraduate students

2018-Present University of Vienna  
6 students in the Microbial ecology or Molecular Biology program  
2010-2015 Miami University  
4 students in the Microbiology or Bioengineering program

## Funded Grants

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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

## Select Scientific Service

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

## Select Scientific and Public Outreach

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- 2021 Behind the paper: Cellular kinetics of ammonia-oxidizing microorganisms
- 2017-2021 Scientist for the “Skype A Scientist” program  
Skype seminars with classrooms across 5 countries (>20 sessions)
- 2018 Co-Organizer: Microbial KinderUni workshop (University of Vienna)
- 2017 Co-Chair: Cultivation in the age of culture independent studies  
The 11<sup>th</sup> Innovative Techniques In Microbial Ecology Meeting (Aalborg, Denmark)
- 2017 Co-Organizer: Early career and graduate student workshop  
The 5<sup>th</sup> International Conference on Nitrification (University of Vienna, Austria)
- 2015 Co-Chair: N-cycle ecology, ecogenomics, and niche differentiation session  
Young Investigators Workshop, The 4<sup>th</sup> International Conference on Nitrification  
(University of Alberta, Canada)

## Select Scholarships, Fellowships, and Awards

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- 2014-2015 Dissertation research fellow, Miami University, USA
- 2013-2014 American Society for Microbiology science teaching fellow
- 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

## Field Experience

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- 2020 Miljacka Caves, Puljane Croatia  
*Detection and enrichment of metal-oxidizing microorganisms*
- 2014 McMurdo Dry Valleys, Antarctica  
*Protist diversity and function in the McMurdo Dry Valley lakes*
- 2012-2014 Acton Lake, OH, USA  
*In situ growth comparisons of ammonia-oxidizing microorganisms*

## Professional Development: Workshops Attended

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- 2016 Unisense microsensor workshop, Aarhus, Denmark  
*Principles and applications of microsensors*
- 2014 American Society for Microbiology: Undergraduate teaching workshop  
*M(icro)OOCs Webinar Series: Documenting your Perspective on Teaching*

## Publications (\*shared first author, #corresponding author)

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- 2021 *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.
- 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.
- 2021 *Ammonia-oxidizing archaea possess a wide range of cellular ammonia affinities*

Jung MY, **Sedlacek CJ**<sup>#</sup>, 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.

- 2020 *It Takes a Village: Discovering and Isolating the Nitrifiers*  
**Sedlacek CJ**<sup>#</sup>. 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**<sup>#</sup>, 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 N<sub>2</sub>O 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.
- 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.

## Manuscripts in Review

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- 2022 *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

## Oral Presentations (\*keynote, #Invited)

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- 2022 *Substrate competition among ammonia oxidizers, a cellular kinetic story*  
Annual Meeting of the Korean Society of Environmental Biology (Republic of Korea)
- 2022 *Cellular physiology and kinetics govern the substrate competitiveness of ammonia oxidizers*  
25<sup>th</sup> European Nitrogen Cycling meeting (Rome, Italy)
- 2019\* *Nitrification 2.0: Where do we go from here*  
6<sup>th</sup> International Conference on Nitrification (Xiamen University, China)
- 2019 *Ammonia-oxidizing archaea possess a wide range of substrate affinities*  
Archaea: Ecology, metabolism and molecular biology GRS (Les Diablerets, Switzerland)
- 2015 *The proteomic response of the ammonia-oxidizing bacterium Nitrosomonas sp. Is79 in co-culture with bacterial community members*  
Ohio branch of the ASM (Lorain County Community College, OH, USA)
- 2013 *Physiologic and genomic characterization of ammonia-oxidizing bacteria adapted to low ammonium environments*  
3<sup>rd</sup> International Conference on Nitrification (Chuo University. Tokyo, Japan)
- 2013 *Cultivating oligotrophic ammonia-oxidizing bacteria*  
Young researcher workshop, 3<sup>rd</sup> International Conference on Nitrification (Tokyo, Japan)
- 2012 *Ammonia-oxidizing bacteria adapted to low ammonium environments*  
#Department of Biology, Fairmont State University, WV, USA

## Poster Presentations

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- 2019 *Ammonia-oxidizing archaea possess a wide range of substrate affinities*  
Archaea: Ecology, Metabolism and Molecular biology GRC and GRS (Les Diablerets, Switzerland)
- 2018 *With a little help from my friend: A catalase-positive bacterium protects an ammonia-oxidizing archaeon from white light inhibition*  
17<sup>th</sup> International Symposium on Microbial Ecology (ISME) (Leipzig, Germany)
- 2017 *Nitrososphaera gargensis: combating oxidative stress*  
5<sup>th</sup> International Conference on Nitrification (ICON 5) and the Early Career Workshop (Vienna, Austria)
- 2016 *Oxidative stress in ammonia-oxidizing archaea: Implications for cultivation and ecology*  
16<sup>th</sup> International Symposium on Microbial Ecology (ISME) (Montreal, Canada)
- 2015 *The proteomic response of the ammonia-oxidizing bacterium Nitrosomonas sp. Is79 to co-culture with bacterial community members*  
4<sup>th</sup> International Conference on Nitrification (ICON 4) (University of Alberta, Canada)
- 2014 *Characterization and comparison of ammonia-oxidizing Bacteria adapted to different substrate concentrations.*  
114<sup>th</sup> General Meeting of the American Society for Microbiology (ASM) (Boston, MA, USA)
- 2013 *Genomic characterization of ammonia-oxidizing bacteria adapted to low ammonium environments*  
Graduate Research Forum (Miami University, OH, USA)
- 2013 *Physiologic and genomic characterization of ammonia-oxidizing bacteria adapted to low ammonium environments.*

3<sup>rd</sup> International Conference on Nitrification (ICON 3) and the Young Researcher Workshop (Chuo University, Tokyo, Japan)

- 2013 Physiologic and genomic characterization of ammonia-oxidizing bacteria  
Ohio Branch of the American Society for Microbiology (Ashland University, OH, USA)
- 2012 *Physiologic and genomic characterization of ammonia-oxidizing bacteria*  
Molecular Basis of one carbon metabolism GRC and GRS (Bates College, USA)
- 2012 *Physiologic and genomic characterization of ammonia-oxidizing bacteria*  
Graduate Research Forum (Miami University, OH, USA)
- 2012 *Physiological characterization of ammonia-oxidizing bacteria adapted to low substrate availability*  
Ohio Branch of the American Society of Microbiology (Mason, OH, USA)
- 2011 *Physiological characterization of ammonia-oxidizing bacteria adapted to low substrate availability*  
Graduate Research Forum (Miami University, OH, USA)
- 2010 *Medium composition affects uranium detection and microbial growth*  
Graduate Research Forum (Miami University, OH, USA)
- 2010 *Bacteria in consortia*  
Ohio Branch of the American Society for Microbiology (Mason, OH, USA)
- 2008 *The effects of foliar nutrient spray on photosynthesis and overall growth in crop plants*  
83<sup>rd</sup> Meeting of the West Virginia Academy of Science (Fairmont State University, WV, USA)
- 2007 *Pharmacologically induced apoptosis reduces cell surface determinants*  
82<sup>nd</sup> Meeting of the West Virginia Academy of Science (Marshall University, WV, USA)
- 2007 *The effect of chemotherapeutic cell death on cell surface proteins*  
Undergraduate Research Day at the Capitol (Charlestown, WV, USA)
- 2006 *Changes in cell surface proteins following the induction of apoptosis*  
5<sup>th</sup> Annual WV-INBRE Summer Research Symposium (West Virginia University, WV, USA)