

RUTH LYDIA SCHMIDT

Microbial Ecologist & Data Scientist

A dynamic and resourceful microbial ecologist with 8 years of experience in microbiome research, data analysis and science communication, with strong leadership and a broad set of technical and interpersonal skills. Passionate about finding sustainable solutions for environmental issues through the combination of research, data and policy.



EDUCATION

- 10/2017 • **Ph.D. in Microbial Ecology**
Wageningen University & Netherlands Institute of Ecology (NIOO)
Title: [Volatile communication between fungi and bacteria](#)
📍 Wageningen, The Netherlands
- 12/2012 • **M.S. in Biotechnology**
Graz University of Technology 📍 Graz, Austria
- 09/2010 • **B.Sc. in Molecular Biology**
Graz University of Technology 📍 Graz, Austria



RESEARCH EXPERIENCE

- 01/2020
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Present • **Mitacs Postdoctoral Fellow**
Institut national de la recherche scientifique (INRS) & Plotly 📍 Montréal, Canada
• Developing open-source [visualization apps for omic data in microbiome research](#) using Plotly's Dash R and Dash Bio libraries.
- 01/2020
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03/2020 • **Visiting JSPS Postdoctoral Fellow**
Kochi Core Center 📍 Kochi, Japan
• Developed PCR-based screening method for detection of terpene synthase genes (TPS) across terrestrial and aquatic environments.
• Performed amplicon sequencing of PCR products and bioinformatics data analysis.
- 07/2019-
10/2019 • **Consultant**
International Union for Conservation of Nature (IUCN) 📍 remote
• Contributed to a global report on soil biodiversity in agro-ecosystem health.
- 02/2018
|
12/2019 • **Postdoctoral Fellow**
Institut national de la recherche scientifique (INRS), Labo Yergeau 📍 Montréal, Canada
• Research on microbial solutions to drought in agriculture.
• Led lab and field studies with wheat under drought conditions.
• Conducted analysis of omic data (quantitative metagenomics, metatranscriptomics, metabolomics).
• Co-supervised 4 PhD students and 2 Master students.
• Presented findings at 6 international conferences.
• Collaborated with researchers in The Netherlands (Netherlands Institute of Ecology) & UK (Plymouth Marine Laboratory).

CONTACT INFO

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🌐 ruthlydiaschmidt.com

TECHNICAL SKILLS

💻 R, Dash & Dash Bio (Plotly),
Python, UNIX, Markdown, SQL,
CSS & HTML
📊 Multivariate statistics,
statistical models
🔬 Molecular biology techniques,
Omic technologies & data
analysis
🔧 Data cleaning, processing,
manipulation & visualization

INTERPERSONAL SKILLS

Excellent communicator
Highly creative
Problem solver
Strong team player &
collaborative
Excellent time management
Open-minded and adaptable

LANGUAGES

German (Native)
English (Fluent)
Spanish (Advanced)
French (Beginner)

- 02/2013
|
10/2018
- **PhD Candidate**
Netherlands Institute of Ecology & Wageningen University, Garbeva Group 📍 Wageningen, The Netherlands
 - Characterized molecular mechanism underlying volatile interaction in soil microbes using a combination of omic, microbiological, and analytical (GC-MS) approaches ([link to video about research](#)).
 - Analyzed omic data (proteomics, metabolomics) and developed workflow for metabolomic data analysis.
 - Mentored 4 undergraduate and 1 graduate student on molecular biology research projects.
 - Collaborated with international research institutes and universities in Germany (Max-Planck Institute for Chemical Ecology, Jena & Center for Functional Genomics of Microbes, Greifswald), US (Institute for Genome Sciences, Baltimore) & Sweden (Swedish University of Agricultural Sciences) on genomics and proteomics projects.
- 10/2010-
12/2012
- **University assistant**
Graz University of Technology 📍 Graz, Austria
 - Led and conducted field study on the effect of biocontrol agents in field in Egypt.
 - Performed analysis of 16S rRNA sequencing data, and measurement and analysis of analytical data (LC-MS).



TEACHING EXPERIENCE

- 09/2015
- **Instructor in two days hands-on course on proteomics**
Netherlands Institute of Ecology 📍 Wageningen, The Netherlands
- 10/2013
- **Teaching Assistant in Laboratory Course in Environmental Biotechnology**
Graz University of Technology 📍 Graz, Austria
- 06/2012
- **Research Assistant in Laboratory Course in Biochemistry and Molecular Biology**
Karl-Franzens University 📍 Graz, Austria



GRANTS & AWARDS

- 2019
- **Mitacs Postdoctoral Fellowship (60,000 CAD)**
Visualization of multi-omics data in microbiome research 📍 Montréal, Canada
- 2019
- **Japan Society for the Promotion of Science (JSPS) Award (8,000 CAD)**
Uncovering microbial chemical ecology in the extreme sub-seafloor environment 📍 Kochi Core Centre, Japan
- 2019
- **Coalesce BioArt residency (2,000 USD)**
[Microbial Scents and Olfactory Prosthesis for the Future](#) 📍 Coalesce: Center for Biological Art, University at Buffalo, USA
- 2018
- **Quebec Centre for Biodiversity Science (QCBS) Travel grant (1,500 CAD)**
International Phytobiome meeting 📍 Montpellier, France
- 2018
- **QCBS Seed grant (5,000 CAD)**
[Aural soilscape: creating ecological consciousness to global warming](#) 📍 Montréal, Canada
- 2018
- **QCBS Travel grant (1,500 CAD)**
ISME17 meeting 📍 Leipzig, Germany
- 2017
- **International Society of Chemical Ecology (ISCE) Travel Grant (1,000 USD)**
Annual Meeting ISCE17 📍 Kyoto, Japan
- 2017
- **Best Talk Award (150 USD)**
Annual Meeting ISCE17 📍 Kyoto, Japan
- 2017
- **Federation of European Microbiological Societies (FEMS) Research Grant (5,000 Eur)**
Research on fungal genomics at the Swedish University of Agricultural Sciences (SLU) 📍 Uppsala, Sweden
- 2016
- **International Society for Microbial Ecology (ISME) Travel Grant (800 Eur)**
ISME16 meeting 📍 Montréal, Canada
- 2015
- **FEMS Meetings Attendance Grant (300 Eur)**
Ecology of Soil Microorganisms meeting 📍 Prague, Czech Republic

2015

- **Best Poster Award (100 Eur)**
Ecology of Soil Microorganisms meeting

📍 Prague, Czech Republic



PRESENTATIONS

02/2020

- **Kochi Core Center (talk)**
Uncovering microbial terpenes in the extreme sub-seafloor environment.

📍 Kochi, Japan

06/2019

- **International Society of Chemical Ecology, ISCE 35 (talk)**
Microbial chemical ecology: past, present and future.

📍 Atlanta, USA

05/2019

- **Second International Holobiont meeting (talk)**
How microbial volatiles help plants survive in times of drought.

📍 Montréal, Canada

12/2018

- **Quebec Centre for Biodiversity Science Annual Symposium (talk)**
Microbial aromas might help plants survive drought.

📍 Montréal, Canada

12/2018

- **International Phytobiomes Conference (poster)**
Microbial terpenes in the plant holobiont as a strategy to adapt to drought.

📍 Montpellier, France

08/2018

- **International Symposium on Microbial Ecology, ISME 17 (talk)**
Do bacteria and fungi have a fragrant language all their own?

📍 Leipzig, Germany

08/2018

- **International Symposium on Microbial Ecology, ISME 17 (speaker in roundtable session)**
Microbial chemical ecology: intra- and interspecies communication.

📍 Leipzig, Germany

06/2018

- **Chamalimaud Centre for the Unknown**
Microworld - the most powerful life on earth.

📍 Lisbon, Portugal

08/2017

- **International Society of Chemical Ecology, ISCE 34 (talk)**
Terpenes as *lingua franca* between fungi and bacteria.

📍 Kyoto, Japan

08/2016

- **International Symposium on Microbial Ecology, ISME 16 (poster)**
Transcriptional responses of a beneficial soil bacterium to volatiles of a plant pathogen.

📍 Montréal, Canada

12/2015

- **Ecology of soil microorganisms, ESM (poster)**
Microbial small talk: Volatiles in fungal-bacterial interactions.

📍 Prague, Czech Republic

04/2014

- **4th International student conference on Microbial Communication, MiCom (talk)**
Chemical dialogues: The ability of bacteria to sense fungal volatiles.

📍 Jena, Germany

12/2013

- **CNRS-Jacques Monod conference: bacterial-fungal interactions: a federative field for fundamental and applied microbiology**
The role of fungal volatiles as signaling compounds in bacterial-fungal interactions.

📍 Roscoff, France

06/2013

- **Boston Bacterial Meeting, BBM (poster)**
Microbial interactions via secondary metabolites in soil.

📍 Boston, USA

02/2013

- **Netherlands Annual Ecology Meeting, NERN (poster)**
The best bacterial competitive strategies in the rhizosphere.

📍 Lunteren, The Netherlands



PUBLICATIONS

2020

- **A Gaseous Milieu: Extending the Boundaries of the Rhizosphere.**
Trends in microbiology. DOI: [10.1016/j.tim.2020.02.016](https://doi.org/10.1016/j.tim.2020.02.016)
de la Porte, A., Schmidt, R., Yergeau, É., & Constant, P.

2019

- **Microbe-driven chemical ecology: past, present and future.**
ISME J. DOI: [10.1038/s41396-019-0469-x](https://doi.org/10.1038/s41396-019-0469-x)
Schmidt, R., Ulanova, D., Wick, L. Y., Bode, H. B., & Garbeva, P.

- 2018 ● **Deciphering the genome and secondary metabolome of the plant pathogen *Fusarium culmorum*.**
FEMS Microbiol Ecol. DOI: [10.1093/femsec/fiy078](https://doi.org/10.1093/femsec/fiy078)
Schmidt, R., Durling, M. B., de Jager, V., Menezes, R. C., Nordkvist, E., Svatoš, A., Dubey, M., Lauterbach, L., Dickschat, J. S., Karlsson, M., & Garbeva, P.
- 2018 ● **Fifty Percent Human - how art brings us in touch with our microbial cohabitants.**
Microb Biotechnol. DOI: [10.1111/1751-7915.13285](https://doi.org/10.1111/1751-7915.13285)
Bäumel, S., Tytgat, H., Nemec, B., **Schmidt, R.**, Chia, L. W., & Smidt, H.
- 2018 ● **The future of ecology is collaborative, inclusive and deconstructs biases.**
Nat Ecol Evol. DOI: [10.1038/s41559-017-0445-7](https://doi.org/10.1038/s41559-017-0445-7)
Ramirez, K. S., Berhe, A. A., Burt, J., Gil-Romera, G., Johnson, R. F., Koltz, A. M., Lacher, I., McGlynn, T., Nielsen, K. J., **Schmidt, R.**, Simonis, J. L., terHorst, C. P., & Tuff, K.
- 2017 ● **Fungal volatile compounds induce production of the secondary metabolite Sodorifen in *Serratia plymuthica* PRI-2C.**
Sci Rep. DOI: [10.1038/s41598-017-00893-3](https://doi.org/10.1038/s41598-017-00893-3)
Schmidt, R., Jager, V., Zühlke, D., Wolff, C., Bernhardt, J., Cankar, K., Beekwilder, J., Ijcken, W. V., Sleutels, F., Boer, W., Riedel, K., & Garbeva, P.
- 2016 ● **Controlling the Microbiome: Microhabitat Adjustments for Successful Biocontrol Strategies in Soil and Human Gut.**
Front Microbiol. DOI: [10.3389/fmicb.2016.01079](https://doi.org/10.3389/fmicb.2016.01079)
Adam, E., Groenenboom, A. E., Kurm, V., Rajewska, M., **Schmidt, R.**, Tyc, O., Weidner, S., Berg, G., de Boer, W., & Falcão Salles, J.
- 2016 ● **Microbial Small Talk: Volatiles in Fungal-Bacterial Interactions.**
Front Microbiol. DOI: [10.3389/fmicb.2015.01495](https://doi.org/10.3389/fmicb.2015.01495)
Schmidt, R., Etalo, D. W., de Jager, V., Gerards, S., Zweers, H., de Boer, W., & Garbeva, P.
- 2016 ● **Volatile affairs in microbial interactions.**
ISME J. DOI: [10.1038/ismej.2015.42](https://doi.org/10.1038/ismej.2015.42)
Schmidt, R., Cordovez, V., de Boer, W., Raaijmakers, J., & Garbeva, P.
- 2015 ● **Exploring the genomic traits of fungus-feeding bacterial genus *Collimonas*.**
BMC Genomics. DOI: [10.1186/s12864-015-2289-3](https://doi.org/10.1186/s12864-015-2289-3)
Song, C., **Schmidt, R.**, de Jager, V., Krzyzanowska, D., Jongedijk, E., Cankar, K., Beekwilder, J., van Veen, A., de Boer, W., van Veen, J. A., & Garbeva, P.
- 2014 ● **Effects of bacterial inoculants on the indigenous microbiome and secondary metabolites of chamomile plants.**
Front Microbiol. DOI: [10.3389/fmicb.2013.00400](https://doi.org/10.3389/fmicb.2013.00400)
Schmidt, R., Köberl, M., Mostafa, A., Ramadan, E. M., Monschein, M., Jensen, K. B., Bauer, R., & Berg, G.
- 2013 ● **The microbiome of medicinal plants: diversity and importance for plant growth, quality and health.**
Front Microbiol. DOI: [10.3389/fmicb.2014.00064](https://doi.org/10.3389/fmicb.2014.00064)
Köberl, M., **Schmidt, R.**, Ramadan, E. M., Bauer, R., & Berg, G.



MANUSCRIPTS IN PREPARATION

- **Soil hydrogen enrichment increases H₂-oxidizing bacterial activity and changes microbial community structure and function (under review).**
Soil Biol. Biochem.
Wang X., **Schmidt R.**, Constant P., & Yergeau E.
- **Nitrapyrin has far reaching effects on the soil microbial community structure, composition, diversity and functions (submitted).**
Appl. Environ. Microbiol.
Schmidt R., Wang X., Garbeva, P., & Yergeau E.
- **Infochemicals in terrestrial plants and marine macroalgal holobionts under a changing climate (under review).**
New Phytologist.
Schmidt R., & Saha, M.



PRESS AND OUTREACH (EXCERPT)

- 2019 ● **Microbial aromas could save agriculture from climate change.**
The Conversation.
- 2018 ● **The Art of Microbial Communication.**
SciArt Magazine.
- 2017 ● **World's most spoken language is 'Terpene'.**
Science Daily.



REFERENCES UPON REQUEST