

# 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.

Currently searching for a data science position at the intersection of research and sustainability/health that allows me to build tools using visualization and statistics to help people understand and explore their data and turn them into action.



## 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



## PROFESSIONAL EXPERIENCE

- 01/2020 | 10/2020 • **Data Scientist**  
Plotly Technologies  
📍 Montréal, Canada
  - Developed open-source visualization apps for [omics data in microbiome research](#) using Plotly's Dash R and Dash Bio libraries.
  - Presented workflow and examples of Dash apps for omics data at Bioconductor 2020 ([link to slides](#))
- 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.



## ACADEMIC EXPERIENCE

- 01/2020 | 03/2020 • **Visiting 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.

## CONTACT INFO

- ✉ [schmidt.ruth@gmail.com](mailto:schmidt.ruth@gmail.com)
- 🌐 [ruthschmidt.rbind.io](http://ruthschmidt.rbind.io)
- in [linkedin.com/ruth-schmidt/](https://www.linkedin.com/ruth-schmidt/)
- 🐙 [github.com/ruthlys](https://github.com/ruthlys)

## TECHNICAL SKILLS

- 💻 Highly experienced in: R programming, Dash for R & Dash Bio
- 💻 Experience with: Python, CSS & HTML, Git, Linux/UNIX, SQL
- 📊 Multivariate statistics, statistical models & machine learning
- 🔬 Molecular biology techniques, bioinformatics/omic technologies & data analysis
- 🔧 Data cleaning, processing, manipulation & visualization (ggplot2, Plotly graphing libraries)

## INTERPERSONAL SKILLS

- Excellent communicator
- Highly creative
- Problem solver
- Strong team player & collaborative

## LANGUAGES

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

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).

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.
- 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

- 07/2020 ● **Bioconductor 2020 (talk)**  
Interactive data visualization in microbiome research with Dash R & Dash Bio ([link to slides](#)) 📍 Boston, USA (virtual)
- 06/2020 ● **INRS Seminar series (talk)**  
Nitrapyrin effects on soil microbial community structure, composition, diversity & function ([link to slides with interactive graphs](#)) 📍 Montréal, Canada
- 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 ● **Champalimaud 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 • **Field H<sub>2</sub> infusion alters bacterial and archaeal communities but not fungal communities nor nitrogen cycle gene abundance.**  
Soil Biol. Biochem. DOI: [10.1016/j.soilbio.2020.108018](https://doi.org/10.1016/j.soilbio.2020.108018)  
Wang X., **Schmidt R.**, Constant P., & Yergeau E.
- 2020 • **Infochemicals in terrestrial plants and seaweed holobionts: current and future trends.**  
New Phytologist. DOI: [10.1111/nph.16957](https://doi.org/10.1111/nph.16957)  
**Schmidt R.**, & Saha, M.
- 2020 • **Nitrapyrin has far reaching effects on the soil microbial community structure, composition, diversity and functions (submitted).**  
biorxiv. DOI: [10.1101/2020.07.21.205765](https://doi.org/10.1101/2020.07.21.205765)  
**Schmidt R.**, Wang X., Garbeva, P., & Yergeau E.
- 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.

## PRESS AND OUTREACH (EXCERPT)

- 2020 ● **How to give life to your microbiome data.**  
Towards Data Science.
- 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.

## PROFESSIONAL MEMBERSHIPS

- 2018 | 2020 ● **Quebec Centre for Biodiversity Science (QCBS)**  
Coordinated workshops and EDI training. 📍 Montréal, Canada
- 2017 | 2019 ● **500 Women Scientists**  
Coordinated partnerships with other non-profit organizations aimed at making science more inclusive and accessible. 📍 global
- 2017 | 2019 ● **International Society for Microbial Ecology (ISME)**  
Organized outreach campaigns, microbial ecology workshops and conference meetings. 📍 global



REFERENCES UPON REQUEST