

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 policy/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



RESEARCH EXPERIENCE

01/2020

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

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.

CONTACT INFO

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🌐 ruthschmidt.rbind.io

in linkedin.com/ruth-schmidt/

🐙 github.com/ruthlys

TECHNICAL SKILLS

💻 Highly experienced in: R, Dash & Dash Bio (Plotly)

💻 Experience with: Python, 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

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 ([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

- 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 ● **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.



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.
- **Infochemicals in terrestrial plants and marine macroalgal holobionts under a changing climate (under review).**
New Phytologist.
Schmidt R., & Saha, M.



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.



REFERENCES UPON REQUEST