RUTH LYDIA SCHMIDT

Microbial Ecologist & Data Scientist

A dynamic and resourceful microbial ecologist with more than 7 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/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

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 Ploty'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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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 universitites 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 soilscapes: 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 meting — 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
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
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
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
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
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
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
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
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
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
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
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
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
Köberl, M., **Schmidt, R.**, Ramadan, E. M., Bauer, R., & Berg, G.

MANUSCRIPTS IN PREPARATION

Soil hydrogen enrichment increases H_2-oxiding 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