Detailed programme

Microbiomes in soil, plant, animal and human health.

One Health Summer School

11.–16. August 2019, University of Bern

Keynotes and workshops for PhDs and Postdocs researching soil, plant and gut microbiomes and their links to host and environmental health. **Speakers:** Thomas Clavel (DE), Viviane Cordovez (NL), Noah Fierer (US), Gilbert Greub (CH), Corné Pieterse (NL), Paul Schulze-Lefert (DE), Emma Wetter Slack (CH), Shinichi Sunagawa (CH), Jean-Claude Walser (CH)

www.onehealth.unibe.ch/summerschool

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WELCOME !

The Interfaculty Research Cooperation «One Health: Cascading and Microbiome-Dependent Effects on Multitrophic Health» unifies nine research groups from the Faculties of Natural Sciences, Medicine and VetSuisse of the University of Bern. Together we investigate how environmental chemicals and microbiomes impact the health of soils, plants, animals and humans (see www.onehealth.unibe.ch).

On the topic of Microbiomes and One Health, we organize an International Summer School, which will take place from the 11. – 16. August 2019 in Bern. This event is designed for PhD and postdoctoral researchers from the fields of biology, environmental sciences, medicine, chemistry and bioinformatics.

The program of the first two days consists of conceptual keynote lectures (about soil, plant and gut microbiomes and their links to environmental health) and a poster session where participants present and discuss their own research with the attendees. The other three days offer hands-on activities on the following topics: microbiota analysis (amplicon data), microbiome analysis (shotgun metagenomic data), scientific visualization and advanced graphics, ordination and network analysis. Two workshops are related to graphics and data analysis in R and the two other workshops cover command line based microbiota and microbiome analyses. It is important that participants are comfortable with some form of coding language. You do not have to be fluent in R but you need to be able to understand basic R code. The program is rounded with social events on the topics of 'Women in Science' (Sunday) and 'Microbes and Games' (Wednesday).

Klaus Schlaeppi, Alban Ramette, Siegfried Hapfelmeier, Adrien Mestrot, Matthias Erb

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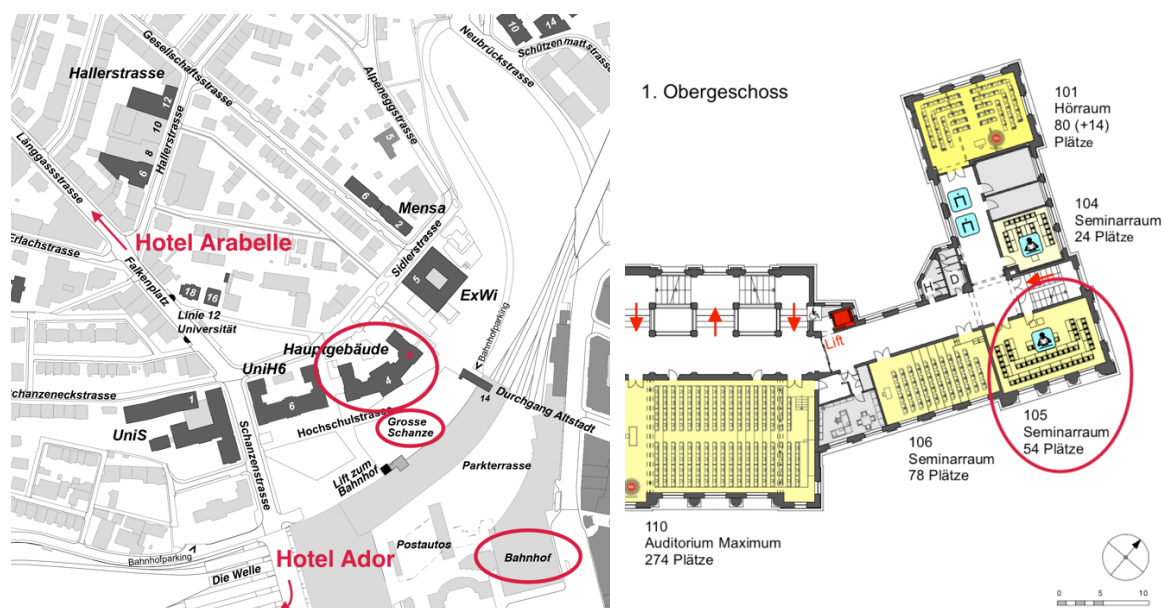
Venue

The summer school takes place in and around the main building of the University of Bern (=Hauptgebäude; indicated on the map below). The address of the main building is Hochschulstrasse 4 in 3012 Bern. It can be reached in a 5 min walk from the train station (=Bahnhof).

The scientific program including lectures, discussions, poster sessions and workshops will take place in the main building in the seminar rooms 104, 105 and 106 (**first floor**, East wing *).

Our social dinner events on Sunday and Wednesday evenings will take place at the restaurant Grosse Schanze (indicated on the map below; www.grosseschanze.ch).

Coarse directions to the speaker and student hotels Ador (Laupenstrasse 15) and Arabelle (Mittelstrasse 6) are also indicated on the map below.

Program

Overview

	11.08.19	12.08.19	13.08.19	14.08.19		15.08.19		16.08.19
	SUN	MO	TUE	WED		THU		FR
Locations:	Grosse Schanze	Hauptgebäude, 105	Hauptgebäude, 105	104	105	104	105	104 and 105
Chairs	Klaus/Adrien	Klaus	Klaus	Adrien	Klaus	Alban	Klaus	Klaus
09:00		Noah Fierer	Emma Slack	Scientific visualization, Mirjam Quick	Microbiota analysis using QIIME2	Ordination & network analysis, Jean-Claude Walser	Microbiome analysis, Shinichi Sunagawa	Exerscience! Practical application with template data, Jean-Claude Walser
09:30								
10:00		Coffee	Coffee					
10:30		Viviane Cordovez	Thomas Clavel					
11:00								
11:30		participant talks	participant talks					
12:00								
12:30		LUNCH	LUNCH	LUNCH		LUNCH		LUNCH
14:00		Paul Schulze-Lefert	discussion groups 105, 104, 106	Scientific visualization, Mirjam Quick	Microbiota analysis using QIIME2	Ordination & network analysis, Jean-Claude Walser	Microbiome analysis, Shinichi Sunagawa	Exerscience! ...
14:30								
15:00		Corné Pieterse	synthesis					
15:30			Poster odd					**Synthesis**
16:00	registration and	Coffee						Closure with Apéro
16:30	welcome drink	participant talks	Coffee					
17:00	welcome note		Poster even					
17:30	**Women in Science**							
18:00	presentations			Grosse Schanze				
18:30		**Sessions:**						
19:00	DINNER	The soil microbiome and links to One Health		DINNER (Zoe)				
19:30		The plant microbiome and links to One Health						
20:00	**Women in Science**	The gut microbiome and links to One Health		Gilbert Greub				
20:30	podium discussion	Microbiomes and their links to One Health		**Playing microbe games**				
21:00	Bar							

Sunday 11.8.2019

@Grosse Schanze

17:00   Registration and welcome drink (Zoe Bont, One Health UniBE)

17:30   Welcome note – **Prof. Matthias Erb** (One Health UniBE)

Women in Science

17:45   **Prof. Britta Engelhardt** – Clinical Neuroscience, University of Bern and representing the equal opportunity commission
www.neuroscience.unibe.ch/about_us/personen/prof_dr_engelhardt_britta

Women in Science: Passion wins over prejudice

Prof. Susanne Reffert – Theoretical Physics, University of Bern
www.reffert.itp.unibe.ch

Women in theoretical physics – My experience

18:30   Dinner

Chairs: Dr. Francesca Ronchi and Prof. Adrien Mestrot (One Health UniBE)

20:00   **Panel discussion** with **Profs. Britta Engelhardt, Susanne Reffert** and…

Prof. Heike Meyer – Economic Geography, University of Bern
www.geography.unibe.ch/about_us/staff/prof_dr_mayer_heike

Dr. Christelle Robert – Chemical Ecology, University of Bern
www.ips.unibe.ch/research/plantphys/chemecol

21:00   Bar

Monday 12.8.2019

@Main building, seminar room 105

Chair: Dr. Alban Ramette (One Health UniBE)

The soil microbiome and its links to One Health

9:00 Keynote lecture

Prof. Noah Fierer – University of Colorado, US
www.fiererlab.org

Searching for simplicity amidst the complexity of the soil microbiome

10:00 Coffee break

10:30 Keynote lecture

Dr. Viviane Cordovez – Netherlands Institute of Ecology, NL
www.nioo.knaw.nl/nl/employees/viviane-cordovez-da-cunha

Microbiome of disease suppressive soils: microbiology and chemistry at the plant-soil interface

11:30 Participant talks introducing their science and advertising their poster (presented on TUE afternoon) in 3'-speed talks:
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12:30 Lunch break **@ Mensa, Gesellschaftsstrasse 2**

@Main building, seminar room 105

Chair: Dr. Klaus Schlaeppi (One Health UniBE)

The plant microbiome and its links to One Health

14:00   Keynote lecture

Prof. Corné Pieterse – Utrecht University, NL
www.uu.nl/en/research/plant-microbe-interactions/corne-pieterse

The root microbiome and plant immunity

15:00   Keynote lecture

Prof. Paul Schulze-Lefert – Max Planck Institute for Plant Breeding Research, D
www.mpipz.mpg.de/schulze-lefert

Reductionist approaches to explore plant microbiota establishment and functions

16:00   Coffee break

16:30   Participant talks introducing their science and advertising their poster (presented on TUE afternoon) in 3'-speed talks:
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until ca. 17:30

Tuesday 13.8.2019

@Main building, seminar room 105

Chair: Prof. Siegfried Hapfelmeier (One Health UniBE)

The gut microbiome and its links to One Health

9:00   Keynote lecture

Prof. Emma Wetter Slack – ETH Zurich, CH
foodimmunology.ethz.ch

Immunity and the gut ecosystem

10:00   Coffee break

10:30   Keynote lecture

Prof. Thomas Clavel – University Hospital Aachen/TU Munich, DE
www.ukaachen.de/kliniken-institute/institut-fuer-medizinische-mikrobiologie/forschung/ag-clavel

Host specificity of gut microbiomes

11:30   Participant talks introducing their science and advertising their poster (presented on TUE afternoon) in 3'-speed talks:
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12:30   Lunch break   **@ Mensa, Gesellschaftsstrasse 2**

@Main building, seminar rooms 104, 105 and 106

Chair: Dr. Klaus Schlaeppi (One Health UniBE)

Microbiomes and their links to One Health

14:00   Discussion groups:

- What are the emergent questions in your research field?
- What did you learn from the other fields?
- Links of 'your' microbiome to One Health?
- Areas of collaboration?

@104: Soil group and keynote speakers with Dr. Alban Ramette
@105: Plant group and keynote speakers with Dr. Klaus Schlaeppi.
@106: Gut group and keynote speakers with Prof. Siegfried Hapfelmeier

15:00   @105: Synthesis
Discussion groups bring their key points into the plenary discussion

15:30   Poster session – odd numbers

PhDs and Postdocs introduce their research to the keynote speakers and the other participants. The session is split in two (even and odd numbers) so that participants have time to present their work and to discuss the work of others.

Coffee will be served around 4 pm.

16:30   Poster session – even numbers

17:30   Closing of the day

Wednesday 14.8.2019

NOTE: In parallel we host the public International One Health Symposium. It is not possible to attend both the Summer School and the Symposium ;-(

	seminar room 104	**@Main building** **seminar room 105**
	Chair: Adrien Mestrot	Chair: Klaus Schlaeppi
9:30 *	Workshop 1 - **Scientific visualization** **Dr. Miriam Quick** miriamquick.com In this workshop you will learn the basic principles of scientific data visualization using the R package ggplot2. It will cover topics such as visual variables, design thinking, choosing the right chart, tidy data principles and how to make readable charts. This workshop is advanced graphics using R.	Workshop 2 – **Microbiota analysis using QIIME2** **Drs. Aeriel Belk and Claire Duvallet** qiime2.org QIIME2 is a software environment that covers all analysis steps from raw DNA sequence to data analysis including visualization and statistical testing. In this workshop you will learn how to process amplicon sequence data (e.g. 16S rRNA gene fragments) to OTU tables and first analyses.
12:30	Lunch break	**@ Mensa, Gesellschaftsstrasse 2**
14:00 *	Workshop 1 - **Scientific visualization**	Workshop 2 – **Microbiota analysis using QIIME2**

until ca. 18:00
* Coffee will be served for individual breaks

		@Grosse Schanze
18:30	Dinner (Zoe Bont, One Health UniBE)	
		Chair: Dr. Klaus Schlaeppi (One Health UniBE)
	Microbes and games	
20:00	Keynote lecture **Prof. Gilbert Greub** - University of Lausanne, CH www.chuv.ch/en/microbiologie/imu-home/research/research-groups/gilbert-greub *Playing with microbes : science education and outreach*	
20:30	**Playing microbe games**	

Thursday 15.8.2019

	seminar room 104	@Main building seminar room 105

	Chair: Alban Ramette	Chair: Klaus Schlaeppi
9:00 *	Workshop 3 – **Microbiota analysis in R** **Dr. Jean-Claude Walser** (ETH, CH) www.gdc.ethz.ch/the-gdc This workshop combines theoretical aspects with practical exercises to better understand your microbial data. You learn the basics in microbial ecology and you will be able to explore and analyse microbiota datasets in R in a reproducible manner. Besides the basics we will have a closer look at cluster analysis and we will touch network analysis	Workshop 4 – **Microbiome analysis using mOTUs** **Prof. Shinichi Sunagawa** (ETH, CH) www.micro.biol.ethz.ch/research/sunagawa The mOTU-tool (motu-tool.org) processes shotgun sequencing data and enables to define the taxonomic profile of metagenomes, to quantify metabolically active members in metatranscriptomes and to quantify differences between strain populations using single nucleotide variation profiles.
12:30	Lunch break	**@ Mensa, Gesellschaftsstrasse 2**
14:00 *	Workshop 3 – **Microbiota analysis in R**	Workshop 4 – **Microbiome analysis using mOTUs** mOTUs functions with a database of mOTUs presenting operational taxonomic units that are based on 10 single copy protein- coding phylogenetic marker genes that delineate prokaryotes reliably at the species level. In this workshop, you will learn how to use the different functionalities of the tool.

until ca. 17:30
* Coffee will be served for individual breaks

Friday 16.8.2019

@Main building, seminar room 104 and 105

Chair: Dr. Klaus Schlaeppi (One Health UniBE)

9:00   Workshop 5 – **Exerscience!**

Dr. Jean-Claude Walser (ETH, CH)
www.gdc.ethz.ch/the-gdc

It is time to apply the learned skills from the separate workshops. In groups of two – mixing attendees of different workshops – you will process a microbiota/microbiome data set from count tables to the graphic visualization. Each group produces an exemplified template code for one type of analysis (e.g., taxonomy profile, diversity analysis, co-occurrence patterns...) with the goal to make these code chunks as markdown files available for all course attendees. You will leave the course with code examples that are ready to be applied to your data.

Coffee will be served for individual breaks

12:30   Lunch break   **@ Mensa, Gesellschaftsstrasse 2**

14:00   Workshop 5 – **Exerscience!**

15:30   Workshop synthesis

16:00   Summer school closure with Apéro

Practical Information

Participants
PhD students and postdoctoral scientists with a background in biology, environmental sciences, medicine, chemistry and bioinformatics

Registration
Registration functions through the online registration form and closes by May 17th, 2019. The number of participants is limited to 40. We will review the applications to build a diverse and motivated group of attendees that is balanced with regard to gender, career stage and research topics. Accepted participants are notified by end of May and thereby they receive the payment instructions. With payment until the deadline June 15th (tbc) the participants confirm their attendance. Unconfirmed participation offers are handed to people of the waiting list. After receiving the payment we will communicate the detailed information and instructions for the summer schools (bring you own laptop, preparatory work with a poster and 3' speed talk to introduce the poster).

Workshops
Workshop participation will be assigned to balance the attendees according to the specified priorities. You need your own laptop to participate in the workshops. Make sure you have R eventually as 'R studio' installed. Further software requirements for the workshops will be communicated later.

Level of English
The course language is English and participants are expected to give a detailed talk about their work and are expected to actively take part in the discussions.

ECTS Credits
Participants having successfully completed the Summer School will receive a certificate of attendance and can obtain 2 ECTS points. 2 ECTS correspond to 50 – 60 hours of work, which covers the preparatory work (reading for keynote lectures, preparation of 3'-speed-talk and poster), 3'-speed-talk and poster presentation as well as full participation during the course. Acknowledgement of the ECTS points in the study programs at home institutions other than the University of Bern is the responsibility of the participants.

Accommodation
We have secured special rates with centrally located 3* hotels, within a short walking distance of the Summer School. Rooms are available on a first come, first served basis. Applicants can indicate if they would like to share with a specific person in the application form. Alternatively applicants can arrange their own accommodation independently at their own cost and/or commute (if applicable).

Price

Single room with breakfast:	1'300 CHF*
Shared twin room with breakfast:	1'100 CHF*
Course only, no accommodation:	540 CHF**

*Included in the price: Fee for course and course material, hotel accommodation incl. breakfast for 5 nights, lunches Mon-Fri, meals on Sunday 11 August and Wednesday 14 August and Apéro on Friday 16 August.

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Travel to Bern

Bern is easily accessible by train and has its own airport (www.bernairport.ch). In addition, there are direct trains from Zurich and Geneva Airport to Bern's main station. For those travelling via Basel Airport, there is a bus to Basel's central railway station. The train ride from Basel to Bern takes roughly one hour. There is no airport pickup service available.

Insurance

Please make sure you have health and accident insurance.

Visa

You are responsible for checking whether you need a visa for Switzerland. Please start the application process early as the visa process will take several weeks to complete. The University of Bern can issue an invitation letter and a confirmation of payment for you. However, we are unable to offer any individual assistance for the application process.