



Sveriges lantbruksuniversitet  
Swedish University of Agricultural Sciences



**EJP SOIL**  
European Joint Programme



## **Soil systems: Analytical methods for integrating the chemical and biophysical interface in soils**

### **PhD course, 3 ECTS**

Date and location:

9<sup>th</sup> November – 3<sup>rd</sup> December 2021,

with four literature meetings and a four-day workshop.

### Background

Soils are one of the most complex systems on earth in terms of their physical structure, chemical constitution and biodiversity. Until recently, soil science has been mainly operated on the basis of rather separate disciplines of physics, chemistry and biology. However, there is now an increasing awareness of the need to integrate these disciplines into a soil system view, i.e. looking at biogeochemical and biophysical interactions in soils. More specifically, soils are integrated complex adaptive system where macroscopic properties depend on interactions at smaller spatial scales. Recent technological advances are now available to discover interactions in the natural soil habitat, i.e. at nano- and micro-scales. Exploring this minute universe and the interactions therein may have profound implications for our understanding of soil functions at field, catchment and regional scales.

### Course content

The aim of this course is to (i) provide an introduction to soil system sciences, (ii) give an overview of emerging micro-analytical techniques and their application to environmental samples; (iii) present examples of soil system sciences to study ecosystem services and (iv) to discuss challenges and the future of this research discipline.

The course consists of two parts:

- 1) Three literature group meetings prior a one-week workshop and one final group meeting after the workshop:
  - 9<sup>th</sup> of November, 9:00 – 12:00: literature meeting I

- 16<sup>th</sup> of November, 9:00 – 12:00: literature meeting II
- 23<sup>rd</sup> of November, 9:00 – 12:00: literature meeting III
- 3<sup>rd</sup> of December, 9:00 – 12:00: literature meeting IV

During these meetings, we will review selected research and review papers. In the concluding meeting, students will give an oral or poster presentations of their research.

2) A workshop at Ultuna will be held between 29<sup>th</sup> of November and 2<sup>nd</sup> of December with participation of international leading scientists in this research area (see below).

Participation in the workshop and group meetings are compulsory! However, due to current Corona restrictions, we will this PhD school will be held digitally.

### Plan for workshop lectures

Lectures (varying starting times due to lecturers from different time zones), including 15-minute morning and afternoon tea breaks and a 1-hour lunch break. The participants are expected to actively participate in the discussions.

Monday, 29<sup>th</sup> of November: *Importance of soil systems for ecosystem services*

Tuesday, 30<sup>th</sup> of November: *Soil interaction in the natural soil habitat – technical advances I*

Wednesday, 1<sup>st</sup> of December: *Soil interaction in the natural soil habitat – technical advances II*

Thursday, 2<sup>nd</sup> of December: *Importance of soil systems for ecosystem services – various spatial scales*

### Preliminarily confirmed lecturers

- Claire Chenu (*AgroParisTech, UMR Ecosys INRA-AgroParisTech, Université Paris-Saclay, France*)
- Markus Kleber (*Oregon State University, Department of Crop and Soil Science, United States*)
- Marco Keiluweit (*University of Massachusetts Amherst, Stockbridge School of Agriculture, United States*)
- Nicholas Jarvis (*Swedish University of Agricultural Sciences, Department of Soil & Environment, Sweden*)
- Anke Herrmann (*Swedish University of Agricultural Sciences, Department of Soil & Environment, Sweden*)
- Mats Larsbo (*Swedish University of Agricultural Sciences, Department of Soil & Environment, Sweden*)

- Sara Hallin (*Swedish University of Agricultural Sciences, Department of Forest Mycology and Plant Pathology, Sweden*)

Please do not hesitate to contact Katharina Meurer if you have any questions regarding the course.

Contact for applications: Dr. Katharina Meurer, [katharina.meurer@slu.se](mailto:katharina.meurer@slu.se)

Deadline for applications: 02/11-2021