



MicroSoil 2022

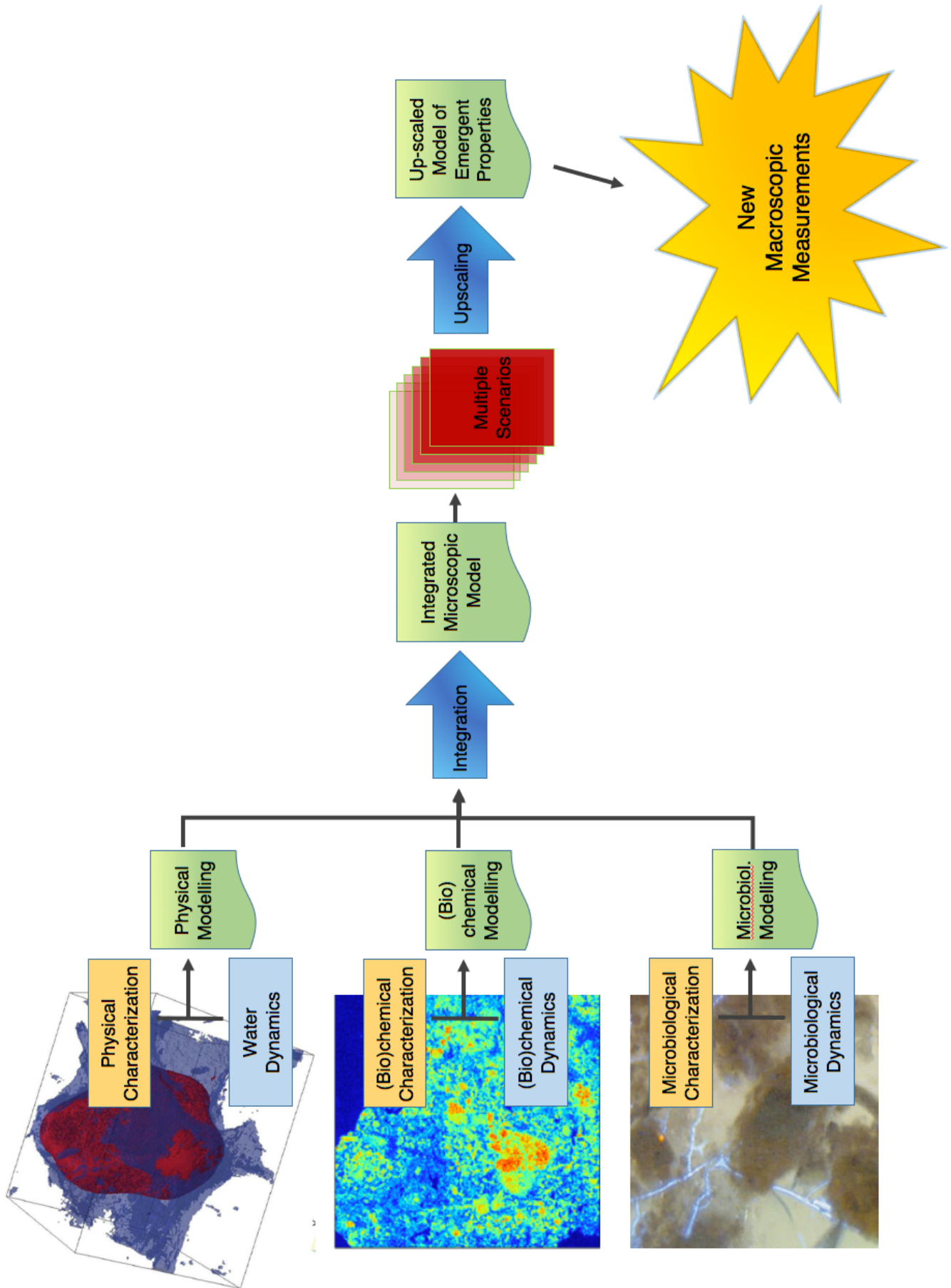
**Workshop on “Elucidating microbial processes
in soils and sediments: Microscale
measurements and modeling”**

**Château de Saint Loup sur Thouet
Saint Loup Lamairé, Deux Sèvres, France**

July 4-8, 2022.



International Union of Soil Sciences 



Program

Monday July 4, 2022

Arrival in Saint Loup Lamairé.

Cocktails in the Park of the Château at 19:00.

Tuesday July 5, 2022

8:00-9:00: Breakfast in the medieval tower of the château of Saint Loup sur Thouet.

9:00-9:30: Welcome and organizational aspects of workshop

9:30-10:30: **“What we are doing and why: The current need and multiple future motivations to study soil processes at the microscale”** Philippe Baveye and Wilfred Otten [40 minutes + 20 minutes of discussion]

10:30-10:45: Coffee break

10:45-11:10: **“Emergent properties of microbial activity in heterogeneous soil microenvironments: An overview”**, General introduction to the workshop. Philippe Baveye [15 minutes + 10 minutes of Q/A]

Session I: Physical description and modelling.

11:10-12:00: **“A holistic perspective on soil architecture is needed as a key to soil functions”**, Hans-Jörg Vogel [40 +10]

12:00-12:30: **“Can multifractal measures help us obtain an accurate microscale model of soil porosity or soil architecture?”**, Edith Perrier [20+10]

12:30-14:00: Lunch (cold buffet in the Orangerie, on the grounds of the château)

14:00-14:30: **“Roundtable discussion on the current state-of-the-science on the structure or architecture of soils”** led by Wilfred Otten [30]

14:30-15:15: **“How mucilage dries in soils: Observations and Mechanisms”**, Andrea Carminati [30+15]

15:15-16:00: **“Efficient numerical simulation of effective diffusion coefficient: Numerical approach and first results”**, Olaf Ippisch [30+15]

16:00-16:30: Coffee break

16:30-17:00: **“4D tomography of soils, and prospects for future research at the Brazilian Synchrotron Light Laboratory”**, Talita Rosas Ferreira [20+10]

17:00-17:30: **“Sharing soil CT images and image analysis software: How do we do it, and should we come up with soil standards?”** 2 short presentations by Marine Lacoste and TBD from Halle UFZ group [30]

17:30-18:00: **“Focused discussion on research needs on the physics of soils at microscale”** led by Hans-Jörg Vogel [30]

Wednesday July 6, 2022

8:00-9:00: Breakfast in the medieval tower of the château of Saint Loup sur Thouet.

Session II: (Bio)chemical characterization and modelling.

9:00-9:45: **“Novel method to image sub-resolution soil organic matter distribution in 3-D without prior staining using a combination of Neutron and X-ray imaging and thermogravimetry”**, John Koestel [30 +15]

9:45-10:30: **“Novel approaches for visualization of oxidative and hydrolytic enzymatic activity, and novel micro-aminography techniques to visualize functional amino-groups distribution in soil”**, Evgenia Blagodatskaya [30 +15]

10:30-10:45: Coffee break

10:45-11:30: **“Undersanding the organic matter stabilisation in soils at nano scale”**, Patricia Ortega [30 +15]

11:30-11:45: **“Focused discussion on research needs on the (bio)chemistry of soils at microscale”** led by Philippe Baveye [15]

Session III: Microbial characterization and modelling.

11:45-12:30: **“Microbiome of the rhizosphere: From structure to functions”**, Yakov Kuzyakov [30+15]

12:30-14:00: Lunch (cold buffet in the Orangerie, on the grounds of the château)

14:00-14:45: **“Heterogeneous substrate in interaction with heterogeneous space may affect organic matter decomposition and microbial activity in soils”**, Naoise Nunan [30+15]

14:45-15:30: **“Do bulk omics help us understand microbial dynamics in soils, and are there good alternatives?”**, Estelle Couradeau [30 +15]

15:30-16:15: **“Where do we stand on the microscale modelling of fungal growth in soils?”** Wilfred Otten and Xavier Portell [20+10]

16:00-16:30: Coffee break

16:30-17:15: **“Bacterial chemotaxis in soils: Where are we, and what are the next questions?”**, José Julio Ortega and Maria Balserio-Romero [30+15]

17:15-18:00: **“Chemotactic bacteria facilitate the dispersion of non-motile bacteria through micrometer-sized pores in simulated soils”**, María Balseiro Romero [20+10]

Thursday July 7, 2022

8:00-8:45: Breakfast in the medieval tower of the château of Saint Loup sur Thouet.

8:45-9:00: Short presentation: **"Impact of bacterial growth and EPS on soil drying dynamics"**, Pascal Benard [10 +5]

9:00-9:35: **"Focused discussion on research needs on the biology of soils at the microscale"** led by Philippe Baveye [25]

Session IV: Integration of disciplinary perspectives

9:35-10:20: **"Habitat geometry in artificial microstructure affects bacterial and fungal growth, interactions, and substrate degradation"**, Edith Hammer [30+15]

10:30-10:45: Coffee break

10:45-11:15: **"Propagation of a microbial consortium in an emulated heterogeneous soil micromodel under unsaturated conditions: Lab-on-a-chip experiment and modelling"**, Chloé Caurel [20+10]

11:30-12:15: **"Linking rhizosphere processes across scales: Overview"**, Andrea Schnepf [30+15]

12:30-14:00: Lunch (hot buffet in the Orangerie, on the grounds of the château)

14:00-14:30: **"Cross-scale analysis of root-microbe-soil interactions"**, Hannes Schmidt [30+15]

14:30-15:00: **"Focused discussion on research needs on the development and use of micromodels, and on integration of microscale analyses in the rhizosphere"** discussion led by Philippe Baveye [30]

Session V: Scenario modeling

15:00-15:45: **"Scenario modelling of carbon mineralization in 3D soil architecture at the microscale: Toward an accessibility coefficient of organic matter for bacteria"**, Patricia Garnier [30+15]

16:00-16:30: Coffee break

Session V: Upscaling

16:30-17:15: **"Micro on a macroscale: relating microbial-scale soil processes to global ecosystem function"**, Philippe Baveye presenting the recent article by Smercina et al. [30+15]

17:15-17:45: **"Focused discussion on research needs on upscaling"**, led by Patricia Garnier [30]

Session VI: Wrapping up

17:45-18:30 **"Where are we, and how do we proceed from here onward?"**, general discussion led by Philippe Baveye [45]

Friday July 8, 2022

8:00-9:00: Breakfast in the medieval tower of the château of Saint Loup sur Thouet.

10:00: Departure from Saint Loup.

List of lecturers:

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