

# COURSE

## 'Advanced methods to study litter decomposition'

13 – 17 July 2020  
Coimbra, Portugal

It has been estimated that the percentage of carbon flowing through detritivore pathways is nearly 70%. The decomposition of organic matter is, therefore, an important ecological process in all ecosystems, from soil to estuaries, lakes and rivers. This course introduces several techniques used in litter decomposition studies. The course is aimed at post graduate students, young researchers and all those interested in the study of litter decomposition. Established researchers will conduct hands-on lab sessions based on the new edition of the Springer book 'Methods to Study Litter Decomposition' (eds: Bärlocher F., Gessner M.O. & Graça M.A.S.).

### Subjects:

1. Measurement of enzymatic activities ( $\beta$ -glucosidase, phenol oxidase, phosphatase) in leaf microbial decomposers;
2. Extraction and quantification of fatty acids from microbial decomposers in leaves;
3. Manipulation of resource quality for invertebrate detritivores and stoichiometry;
4. Use of qPCR to monitor fungal taxa during litter decomposition;
5. Determination of temperature-normalized decomposition rates;
6. Use of meta-analysis in litter decomposition studies.

### Instructors



[Felix Bärlocher](#)  
Mount Allison University, Canada



[Mark O. Gessner](#)  
Leibniz-Institute of Freshwater Ecology and Inland Fisheries & Berlin Institute of Technology, Germany



[Joan Artigas](#)  
LMGE – Laboratoire Microorganismes: Génome et Environnement & University of Clermont Auvergne, France



[Michael Danger](#)  
LIEC – Laboratoire Interdisciplinaire des Environnements Continentaux & University of Lorraine, France



[Julio Arce-Funck](#)  
MARE – Marine and Environmental Sciences Centre & University of Coimbra, Portugal



[Seena Sahadevan](#)  
MARE – Marine and Environmental Sciences Centre & University of Coimbra, Portugal



[Olímpia Sobral](#)  
CFE – Centre for Functional Ecology & University of Coimbra, Portugal



[Verónica Ferreira](#)  
MARE – Marine and Environmental Sciences Centre & University of Coimbra, Portugal



[Manuel A.S. Graça](#)  
MARE – Marine and Environmental Sciences Centre & University of Coimbra, Portugal

## Program

	Groups	A	B
<b>Monday</b>	9:00–10:00	Theoretical: Introduction	
	10:00–11:00	Theoretical: Enzymes	
	11:00–12:30	Enzymes	Fatty acids
	12:30–14:00	Lunch	
	14:00–18:00	Enzymes	Fatty acids
<b>Tuesday</b>	9:00–10:00	Theoretical: Fatty acids	
	10:00–12:30	Fatty acids	Enzymes
	12:30–14:00	Lunch	
	14:00–17:00	Fatty acids	Enzymes
	17:00–18:00	Visit to Joanina library	
<b>Wednesday</b>	9:00–10:00	Theoretical: Stoichiometry	
	10:00–12:30	Stoichiometry	qPCR
	12:30–14:00	Lunch	
	14:00–18:00	Stoichiometry	qPCR
<b>Thursday</b>	9:00–10:00	Theoretical: Molecular techniques	
	10:00–12:30	qPCR	Stoichiometry
	12:30–14:00	Lunch	
	14:00–18:00	qPCR	Stoichiometry
<b>Friday</b>	9:00–10:30	Theoretical: Temperature-normalized decomposition	
	10:30–12:30	Meta-analysis	
	12:30–14:00	Lunch	
	14:00–18:00	Meta-analysis	

Group A and B: students will be divided into two groups that will carry out protocols in parallel. Sessions will be given in English and participants are required to bring their own laptops.

## Registration and payment

You can register for the course by filling the online registration form at:

<https://docs.google.com/forms/u/0/d/e/1FAIpQLSfcljKx02BOG0AFqDsQBfRX5hs20n71svhtyHtyhae1UJDdVw/formResponse>.

The number of vacancies is limited and registrations will be admitted on a first come first serve basis; registrations will be considered complete after due payment of the registration fee (see below). The registration deadline is on 15 March 2020.

Regular registration fee: 500 euros

Special registration fee\*: 400 euros

\*Members of the Iberian Limnological Association (AIL: <http://www.limnetica.net/en/about-ail>) and partner associations (Asociación Argentina de Limnología, Asociación Colombiana de Limnología, Asociación Ecuatoriana de Limnología, Asociación Mexicana de Limnología, Associação Brasileira de Limnologia, Asociación Española de Ecología Terrestre, Centro Ibérico de Restauración Fluvial, Sociedad Chilena de Limnología, Sociedad Ibérica de Ictiología), members of

the Iberian Ecological Society (SIBECOL) and participants at the 9th Plant Litter Processing in Freshwaters Congress (PLPF9: <http://plpf9.org/welcome/>). In all cases, proof of affiliation or registration at the PLPF9 needs to be provided by email.

The registration fee includes the new edition of the Springer book 'Methods to Study Litter Decomposition' (eds: Bärlocher F., Gessner M.O. & Graça M.A.S.; <https://www.springer.com/gp/book/9783030305147>), access to all lab facilities and a writing kit; travel and accommodation will be at the participants' expenses.

The payment of the registration fee should be made by bank transfer (see below), and the proof of payment should be sent by email to [veronica@ci.uc.pt](mailto:veronica@ci.uc.pt). Invoices and receipts will be issued using the information provided in the registration form.

Information for bank transfer:

Recipient name: PROAQUA - Associação para a Promoção do Conhecimento em Ecologia Aquática

Recipient address: Rua da Matemática, nº 49, 1º andar, 3004-517 Coimbra, Portugal

Recipient VAT: 514 039 906

Bank information:

Bank name: Santander Totta

Bank address: Balcão da Universidade de Coimbra, Pólo I, Rua Larga S/N, 3004-516 Coimbra, Portugal

Account number: 0003.45868718020 31 PT

NIB: 0018 0003 45868718020 53

IBAN (international transfers): PT50 0018 0003 45868718020 53

SWIFT/BIC code (international transfers): TOTAPTPL

Mandatory transfer reference: decomp2020

Note: any bank expenses associated with the payment should be supported by the participant.

Information on the course venue, accommodation and travel can be found below.

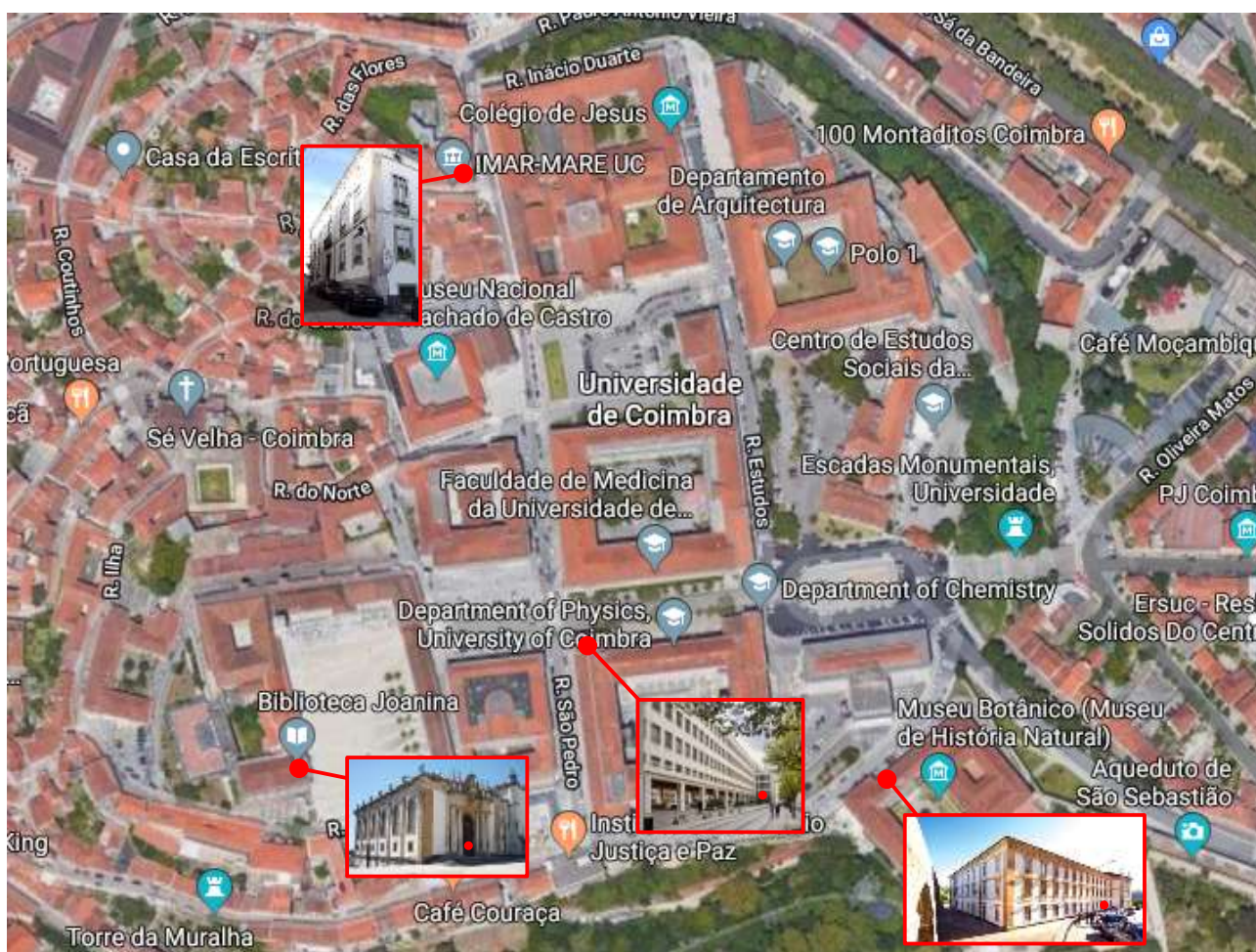
For inquiries, please contact Verónica Ferreira ([veronica@ci.uc.pt](mailto:veronica@ci.uc.pt)).

**Scientific coordination:**      **Organization:**

Verónica Ferreira  
Seena Sahadevan  
Manuel A.S. Graça



## Course venue



## Accommodation at Coimbra

The **course venue** will be at the University campus 'Pólo I', in the city centre, on the following address and nearby buildings:

MARE & Department of Life Sciences

Calçada Martim de Freitas

University of Coimbra

3001-456 Coimbra

(Contacts: Manuel Graça, 00 351 917819116; Verónica Ferreira, 00 351 918435936; Sahadevan Seena, 00 351 931145222)

### Some possibilities for accommodation are listed below:

There is the possibility for accommodation in double rooms at the **University residences** (12 euros/night/person). Registration needs to be made online on the residences' platform at <https://portaldossas.uc.pt/meuprocesso/#/home/pedidoAlojamento>. Reservations will be complete only after payment, which must be made to the University following the instructions supplied when registering.

The organizers of the course are offering **free places in double rooms to two participants**. The participants interested in this possibility should fill in the 'motivation letter' in the registration form. The two participants will be selected by the organizers, and the decision is final and without appeal. The selected participants will need to proceed as described above (register and pay for the accommodation), but will be reimbursed upon arrival.


Alternative accommodation can be easily found through Airbnb (<https://pt.airbnb.com/>), Booking.com (<https://www.booking.com/>) or similar websites.

## Travel: Arrival to Coimbra

If you are arriving to Portugal by plain, you can land in either Lisbon/Lisboa or Oporto/Porto. The best way to go from these cities to Coimbra is by train.

### From Lisbon airport to Coimbra:

**1a.** At the entrance of the airport you can take a **taxi to the train station Oriente** (the trip will take ~ 10 mins and cost ~ 10 Euros).

**1b.** In alternative to the taxi, you can take the **subway from the airport to the train station Oriente** (the trip will take ~ 10 min and cost 1.40 Euros): once you leave the restricted area inside the airport, you should turn right and look for the subway symbol  (still inside the airport); buy a ticket in a self-service machine or at the desk; take the subway and leave 3 stations after (**Oriente**; red line).


**2.** Take the next **train to Coimbra** (either Alfa or Intercidades; 19 – 23 Euros). The trip will take 1h30 – 2h00, and you will leave at **Coimbra-B**.

**3a.** Take a **taxi to your residence**.

**3b.** In alternative, take a **train connection between Coimbra-B and Coimbra** (city centre) using the same train ticket you already have and **walk to your residence**.

### From Oporto airport to Coimbra:

**1a.** At the entrance of the airport you can take a **taxi to the train station Porto-Campanhã**.

**1b.** In alternative to the taxi, you can take the **subway from the airport to the train station Porto-Campanhã** (the trip will take ~ 30 min and cost 1.85 Euros): look for the subway symbol ; buy a ticket in a self-service machine or at the desk; take the subway and leave 19 stations after (**Campanhã**; purple line).

**2.** Take the next **train to Coimbra** (either Alfa or Intercidades; 18 – 23 Euros). The trip will take ~ 1h30, and you will leave at **Coimbra-B**.

**3a.** Take a **taxi to your residence**.

**3b.** In alternative, take a **train connection between Coimbra-B and Coimbra** (city centre) using the same train ticket you already have and walk to your residence.

## Travel: Departure from Coimbra

### From Coimbra to Lisbon:

**1a.** Take a **train** (Alfa or Intercidades: **Coimbra-B – Oriente**). The trip will take 1h30 – 2h00 and cost 19 – 23 Euros.

**1b.** In alternative you can take an **Expresso bus** at Terminal Rodoviário, Rua Fernão Magalhães, Coimbra. This is a good alternative only if you need to be at the airport very early in the morning and need to travel to Lisbon during the night; for the trips made during the night the bus will stop at the departures' entrance of the airport. The trip will take ~ 1h30 and cost ~ 14 Euros.

### From Coimbra to Oporto:

The best way to go from Coimbra to Oporto is by train.

## Travel websites

Portuguese trains (CP): <http://www.cp.pt/>

Expresso Busses (between cities): <http://www.rede-expressos.pt/>

Lisbon subway (Metro): <http://www.metrolisboa.pt/>

Oporto subway (Metro): <http://www.metrodoporto.pt/>

SMTUC (urban busses in Coimbra): <http://www.smtuc.pt/>