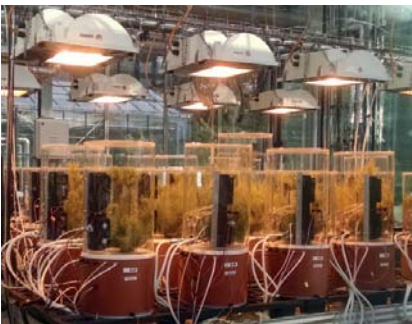




## MICMoR Summer School 2018

Carbon-Nitrogen Interactions across Ecosystems and Scales

Institute of Meteorology and Climate Research  
KIT/IMK-IFU, Garmisch-Partenkirchen, Germany  
August 16-24, 2018



Ecosystem carbon and nitrogen cycles are tightly intertwined through multiple biogeochemical processes, with complicated interactions and important feedbacks to global climate. Several global Earth system models now represent cycles of N as well as C in order to predict future terrestrial CO<sub>2</sub> sinks and emissions of N<sub>2</sub>O; however, model representations are in early stages and performances vary. As basic science, ongoing questions in biogeochemistry seek to understand how N availability affects plant growth and decomposition, and how plant and microbial demand for N governs its retention or loss to streamwater or as N gases. From an applied perspective, human activities have greatly accelerated the global cycles of both C and N, with consequences for air and water pollution and climate change. All of these challenges require increased understanding of ecosystem C-N interactions.



This course will cover fundamentals of C-N interactions in plants and soils, and how these interactions affect key ecosystem processes such as growth, decomposition, and denitrification and other losses of C and N from ecosystems. Biogeochemical principles of energy acquisition and stoichiometry provide an underlying framework. Graduate student participants will gain experience with remotely sensed and field-based methods of measuring canopy N, and will explore how it affects plant physiological processes. They will learn to measure plant and soil C and N processes, isotopic composition, and greenhouse gas emissions, and they will examine model assumptions, structure, and success in representing C-N interactions.



By the end of the course, participants will have gained familiarity with the principles, simulation models, and field measurements of C-N interactions essential for understanding ecosystem function and responses to global change.

### Lecturers

- Prof. Christine Goodale, PhD (Cornell University, Ithaca, NY, USA)  
– organizing lecturer and MICMoR Visiting Scientist
- Prof. Scott Ollinger, PhD (University of New Hampshire, Durham, NH, USA)
- Prof. Dr. Karin Rebel (Utrecht University, NL)
- Dr. Nadine Ruehr (KIT/IMK-IFU, Garmisch-Partenkirchen, Germany)
- Dr. Anne Schucknecht (KIT/IMK-IFU, Garmisch-Partenkirchen, Germany)
- Dr. Ralf Kiese (KIT/IMK-IFU, Garmisch-Partenkirchen, Germany)

### Eligibility

The Summer School is open to 20 PhD students, postdocs and Master students with a research interest in environmental science, ecosystem ecology and biogeochemistry from both measurement and modeling perspectives.

### Contact:

MICMoR Coordination Office  
KIT / IMK-IFU  
Kreuzeckbahnstraße 19  
82467 Garmisch-Partenk.

[www.micmor.kit.edu](http://www.micmor.kit.edu)  
[info@micmor.kit.edu](mailto:info@micmor.kit.edu)

## Application

Applicants must submit a 1-page motivation letter, a CV highlighting their education and research experience, and a letter of recommendation from their advisor or other academic familiar with their work to B. Elija Bleher (elija.bleher@kit.edu). **Priority consideration will be given to applications received by 24 June 2018.** There is no tuition fee and KIT will cover the remaining costs, such as lunches, material and field excursions. However, participants must cover travel and accommodation costs. The Summer School will award 4 ECTS.

## DRAFT COURSE OVERVIEW (as of May 9, 2018)

This course will use a mix of lectures, small group exercises and activities, field, lab, and greenhouse measurements, and exploration of processes represented in earth system models.

- Thurs, 16 August: Principles of C-N Interactions:** Energy acquisition, stoichiometry, element cycles  
Morning: lecture, small-group exercise  
Afternoon: model introduction; small-group exercise
- Fri, 17 August: Canopy N and remote sensing**  
Morning: lecture, small-group activity  
Afternoon: Imaging activity and greenhouse measurements (start)
- Sat, 18 August:** Optional excursion
- Sun, 19 August:** Free day
- Mon, 20 August: C-N Interactions in Plants:** Plant N, photosynthesis, respiration, and belowground C allocation  
Morning: lecture, modeling activity  
Afternoon: greenhouse lab activity (continued)
- Tues, 21 August: C-N Interactions in the Field**  
All-day field trip to TERENO field site -- plant, soil, and gas sampling
- Wed, 22 August: C-N Interactions in Soils:** Decomposition and N mineralization; soil C and N retention  
Morning: lecture & modeling exercise  
Afternoon: lab measurements
- Thurs, 23 August: C & N Losses from Terrestrial Ecosystems:** Greenhouse gas emissions; controls on N and DOC leaching  
Morning: lecture & modeling exercise  
Afternoon: lab measurements
- Fri, 24 August: C & N Integration:** Student synthesis and presentations  
Morning: Small-group project synthesis  
Afternoon: Student presentations

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