Summer School 2026:

First Steps in Biosphere-Atmosphere Modelling

10th to 21st August 2026 in Lahti, Finland

University of Helsinki, Institute for Atmospheric and Earth System Research (INAR), Lappeenranta-Lahti University of Technology, Department of Computational Engineering and Lahti University Campus are pleased to announce the summer school "First steps in Biosphere-Atmosphere Modelling" to be held at University of Helsinki Lahti campus, from 10th to 21st August, 2026.

Time

10th to 21st of August 2026

Location

University of Helsinki Lahti-campus, Niemenkatu 73, 15140 Lahti, Finland

Course description

In this course you will not run any existing model or analyze data from a model but you will get a basic and detailed knowledge on how to write an atmospheric model from scratch. During the course, everyone will program his or her own 1-dimensional atmospheric boundary layer model

with equations of flow for the atmospheric boundary layer, chemical kinetics by systems of differential equations, emissions of biogenic volatile organic compounds (BVOCs) from vegetation, deposition of gases and aerosols and numerical solutions for aerosol formation and growth. The model will be coded in FORTRAN, one of the most common and efficient programming languages in atmospheric modelling.

Additionally, we will include lectures on possible applications of machine learning and artificial intelligence techniques in atmospheric science. Most of the models describing the atmosphere rely on mathematical concepts such as partial differential equations (PDEs). These PDEs usually are enriched by some data and then numerically solved in the computer to obtain a model output, which in turn can be analyzed by atmospheric scientists. Considering this procedure, it appears to be mandatory for everybody, who deals with mathematical models, to understand how these models work. This is necessary to set up models correctly and to draw accurate conclusions from model output. Thus, we will discuss some of the most common mathematical concepts that are needed to understand models in atmospheric sciences and illuminate their respective strengths and weaknesses.

Requirements

A basic knowledge of programming and plotting in some computer language (e.g., Fortran, C++, Python, Matlab) is required. In the course, we will only provide a small amount of Fortran-lectures to teach the basics of Fortran and programming. You will also need to bring your own laptop. You don't need to be a programmer to enjoy and benefit from this course!

Pre-course activities

There will be a Fortran online-teaching material available and pre-exercises to be solved before the course. The lectures and tasks will be sent per email to the participants after the selection in June 2026. In case you don't have Fortran programming environment on your laptop, we will advise and help in the installation of before the course starts.

Exam and assessment

This is an intensive course where most of the work is done in the form of coding the atmospheric model. After the course you will write a short scientific report based on the results of your model simulations and send the report to the teachers. There is no exam.

Credits

5 ECTS, Helsinki University (no grades – only Pass or Fail)

Teachers

Corresponding teacher : Petri Clusius (PhD, University of Helsinki, Finland)
Other teachers include:
• Professor Michael Boy (UHel & Lappeenranta University of Technology, Finland)
• Dr Putian Zhou (University of Helsinki, Finland)

• Professor Heikki Haario (Lappeenranta University of Technology, Finland)
• Associate Professor Zhi-Song Liu (Lappeenranta University of Technology, Finland)
• Jenni Köykkä (Lappeenranta University of Technology, Finland)
• Wenqing Peng (University of Helsinki, Finland)

Social activities

• Get together / Outdoor activities & Picnics
• A dinner will be arranged for all course participants in the last evening
• Additional events are in planning and will be organized

Costs

The course fee is 800 EUR. This fee covers
• All academic and social programs during the course
• Lunch and coffee break on all course days
• A lot of work and fun
Note: Unlike in previous years, the course fee does not include accommodation or travels!

Students and post-doctoral researchers from LUT and UH can apply for a special course fee by contacting Michael Boy.

The fee does not cover

Accommodation, travel expenses to and from Lahti, personal health, and civil liability insurance, personal expenses such as drinks, telephone, photocopies, etc. during the course.

Insurance

The organizers of the course cannot accept liability for personal accident or loss or damage to private property of attending students, which may occur either during or arise from the course. Participants are therefore advised to arrange their own appropriate insurance coverage.

Registration

Applicants must register to the course before the **31st of May 2026** by filling in the form in the link below. We welcome applications from participants from all over the world.

Registration: https://elomake.helsinki.fi/lomakkeet/138713/lomake.html

If you have any question concerning the course, please don't hesitate to contact Petri Clusius (petri.clusius@helsinki.fi).

Feedback from the participants of previous summer schools and a selection of pictures are available at:
https://www.helsinki.fi/en/researchgroups/multi-scale-modelling/first-steps-in-biosphere-atmosphere-modelling