

## Seminar announcement:

# An Introduction to the Large-Eddy Simulation Model PALM

A seminar to be held at the Institute of Meteorology and Climatology, Leibniz Universität Hannover (LUH), 9am to 6pm, September 25-29, 2017.

*PALM has been continuously developed at the Institute of Meteorology and Climatology (IMUK), Leibniz Universität Hannover, Germany, since 1997. It is applied by different groups of researchers all over the world to study micro- and mesoscale turbulent boundary layer flows in the atmosphere and the ocean, with the possibility to couple atmosphere and ocean. Compared with many other LES models, PALM includes a number of advanced features like topography, non-cyclic horizontal boundary conditions including turbulent inflow generators, an embedded Lagrangian particle model allowing explicit treatment of cloud droplet physics, different wind turbine models for simulating complete wind parks including wake effects, or an interface for adding user defined code. An advanced urban surface model and a nesting feature will be available soon. Data output is in NetCDF format. PALM is optimized for high performance on all kind of state-of-the-art processor architectures and it scales on up to several tens of thousands of processors. PALM is free software and can be redistributed and/or modified under the terms of the GNU General Public License (v3). Download information and a detailed online documentation is available under <https://palm.muk.uni-hannover.de>.*

### Seminar contents

The one week seminar gives an overview of PALM, and demonstrates how to carry out runs - on Linux notebooks provided by the participants or by IMUK-LUH. Seminar contents comprise e.g. a general introduction to large-eddy simulation, an overview of PALM's governing equations, applied numerical methods, the various PALM features and application examples. Besides a brief introduction to the PALM installation, the main focus of the seminar is on how to set up PALM simulations, how to run them using the bash-shell scripts provided with PALM, and how to analyze the output. Setups for several standard applications will be explained in detail (e.g. convection, flow around buildings, etc.). Further attention is given to topics like how to extend PALM by user-generated code and how to debug the code.

Besides the theoretical lessons given in the morning, there will be hands-on sessions in the afternoon, where participants carry out exercises under the guidance of the lecturers.

### Requirements

**Participants should have a solid background in CFD modeling, Fortran 2003, MPI, and Linux/Unix.** Due to the expected large number of participants this year, we kindly require that participants - if possible - use their own Linux notebooks with at least a dual-core processor for running PALM during the seminar. It is expected that the following software has been installed on the notebook by the participants **in advance**: a *Fortran-2003 compiler*, an *MPI library*, the *NetCDF library* (version  $\geq 3.6.3$ ), graphics software to display *NetCDF* data (*ncview*, *NCL*), the *bash shell* (*bash*), as well as *subversion* (a revision control system necessary to download the PALM code). *subversion* is already a part of many Linux distributions (e.g. *openSuSe*). The successful software installation can be verified by installing PALM via the provided automatic installer (see <https://palm.muk.uni-hannover.de/trac/wiki/doc/install/automatic>).

Please contact us well in advance, if you have problems installing the required software on your notebook. There won't be any time to handle these problems during the seminar.

### Costs / fee

The fee for participants from outside LUH will be: 600€ for commercial companies, 300€ for educational/research institutions. This includes tuition and seminar handouts. Accommodation costs, meals, and transport costs are not included. **The total number of participants is limited to 30 persons.**

### Further information and Registration

For application, please enter following information to the attached Excel sheet

- Name, status (master student, PhD student, etc.), current affiliation
- Will you bring your own notebook?
- Which applications (wind energy, urban climate, clouds,...) and technical feature (non-cyclic boundary conditions, Lagrangian particles, large-scale forcing, nesting,...) are of special interest to you?

and send it to Steffen Vanselow ([vanselow@muk.uni-hannover.de](mailto:vanselow@muk.uni-hannover.de)), not later than **July 31, 2017**. Registered participants will receive more detailed information (method of payment, location plan, schedule, etc.) by mid of August 2017.