# Registration

To register, please visit www.mcs.uni-oldenburg.de. The deadline for registration is **June 1, 2010.** 

All participants are asked to complete a questionnaire stating their fields of interest and previous knowledge.

We offer a limited number of grants (including accommodation, breakfast, dinner, and course material) for Bachelor, Master, and diploma students. Recipients of grants only have to pay a small fee of **100 EUR**. For details about the application process, see www.mcs.uni-oldenburg.de. Notification about the success of the applications will be sent out until **June 15, 2010**.

We also (partially) support the option to register immediately by paying a discounted fee of 650 EUR (including accommodation in a 3-star hotel, breakfast, dinner, and course material). As a third option, you can register for a fee of 250 EUR (including dinner and course material, but with self-organised accommodation, e.g. youth hostel).

### Accommodation

Room reservations (including breakfast) have been made in a 3-star hotel in the city center. The registration fee also includes dinner at the Wechloy Campus.

The dining facilities at the Wechloy Campus (same building) or at the Haarentor Campus (a 15-minute walk away) offer a variety of lunch choices.



## Organisation

Prof. Dr. Alexander K. Hartmann, University of Oldenburg Dr. Reinhard Leidl, University of Oldenburg

#### Contact

mcs@uni-oldenburg.de Please refer to the website www.mcs.uni-oldenburg.de for updates and more detailed information.

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# Summer School MODERN COMPUTATIONAL SCIENCE



**August 9 – 20, 2010** University of Oldenburg, Germany

#### Overview

Computer simulations play an ever-increasing role in many areas of pure and applied science. With hardware costs continuing to fall and the development of sophisticated algorithms and powerful software packages, many research projects in biology, chemistry, computer science, applied mathematics, and physics rely heavily on the use of modern computer systems. This Summer School addresses students from their third year onwards (including PhD students) who wish to learn more about recent developments in computational science. Participants should have a basic knowledge of a higher programming language like C/C++ or Fortran. In the first part, an introduction into basic tools and methods (programming, data structures, numerical algorithms, statistical data analysis, etc.) will be given. The second part will be devoted to specific topics. The lecturers will present results at the forefront of research from their respective areas of expertise. Practical computer exercises will complement the lectures, enabling the participants to deepen their knowledge in a hands-on approach.

## Topics

- Fundamentals: algorithms, software engineering, differential equations, data analysis, Monte Carlo simulations
- Computational Fluid Dynamics: wind energy, Navier-Stokes equations, turbulence
- Quantum Chemistry: ab initio and density functional theory, surface photochemistry
- Bioinformatics: phylogenetic trees, sequence alignments, maximum likelihood
- Ecological Communities: plankton, chaos, stochastic dynamics, neutral theory

## **External Lecturers**

Helmut G. Katzgraber, Computational Physics, Texas A&M University Alexandros Stamatakis, Bioinformatics, TU Munich

### Lecturers from the University of Oldenburg

Olaf R. P. Bininda-Emonds, Systematics and Evolutionary Biology Bernd Blasius, Mathematical Modelling of Biosystems Ulrike Feudel, Theoretical Physics/Complex Systems Jan Freund, Theoretical Physics/Complex Systems Thorsten Klüner, Theoretical Chemistry Thomas Kneib, Statistics Rainer Koch, Computational Chemistry Joachim Peinke, Turbulence > Wind Energy > Stochastics; ForWind Michael Sonnenschein, Environmental Computer Science Hannes Uecker, Applied Analysis Ute Vogel, Environmental Computer Science

## **Lecture Notes**

Each participant will receive lecture notes at the beginning of the Summer School. Additionally, a free copy of the book *A Practical Guide to Computer Simulations* by A. K. Hartmann will be handed out to each participant.

#### Venue

The Summer School will be held at the Wechloy Campus of the University of Oldenburg, offering a pleasant environment and plenty of nearby amenities.

## Social Events

On Wednesday, August 11, participants will be invited to a Summer School dinner.

Excursions will be organised on Wednesday afternoons and on the weekend.



Isle of Norderney





wind turbine



City of Bremen

