

Registration

To register, please visit www.mcs.uni-oldenburg.de. The deadline for registration is **May 15th, 2012**.

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, course material, and, for DAAD grants, travel support) for Bachelor, Master, and Diploma students. Recipients of grants only have to pay a small fee of **100 €**. 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 1st, 2012.**

We also (partially) support the option to register immediately by paying a discounted fee of 800 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-organized 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.



Organization

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

Contact

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

DAAD

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Deutscher Akademischer Austausch Dienst German Academic Exchange Service

EWE STIFTUNG

Summer School

MODERN COMPUTATIONAL SCIENCE

OPTIMIZATION



August 20 – 31, 2012 University of Oldenburg, Germany



Overview

Optimization is a ubiquitous phenomenon, e.g., in business, engineering, or in science. A GPS navigator aims at finding the shortest route from Hamburg to Munich, a refrigerator should minimize energy consumption, the biological evolution leads to creatures being better and better adapted to their environment, and polymers take a state of lowest free energy. Hence, optimization can be found in planning and organization of systems but also in fundamental research.

Computer simulations play a crucial role in optimization problems. With hardware costs continuing to fall and the development of sophisticated algorithms and powerful software packages, many research projects in this field rely heavily on the availability of powerful computers.

This Summer School addresses students from their third year onwards (including PhD students) who wish to learn more about recent developments in Computational Science and the field of optimization, in particular. 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, complexity theory, numerical algorithms, statistical data analysis, etc.) will be given. The second part will be devoted to specific topics in the area of optimization. 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: software engineering, complexity theory, data analysis, Monte Carlo simulations, basic numerical optimization
- Optimization Algorithms: interval methods, evolutionary algorithms, convex optimization, optimization with uncertainty
- Applications: phase transitions in optimization problems, quantum chemistry, bioinformatics, protein folding

External Lecturers

Ernst Althaus, Johannes Gutenberg-Universität Mainz Friedrich Eisenbrand, EPFL Lausanne Simone Garatti, Politecnico di Milano Holger Hermanns, Universität des Saarlandes Helmut G. Katzgraber, Texas A&M University and ETH Zürich Stephan Mertens, Otto-von-Guericke Universität Magdeburg Maria Prandini, Politecnico di Milano Thomas Prellberg, Queen Mary, University of London

Lecturers from the University of Oldenburg

Martin Fränzle, Hybrid Systems Alexander Hartmann, Computational Theoretical Physics Thorsten Klüner, Theoretical Chemistry Oliver Kramer, Artificial Intelligence Oliver Melchert, Computational Theoretical Physics Thomas Schuster, Numerical Analysis

Course Material

Each participant will receive lecture notes at the beginning of the Summer School. Additionally, a 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 22nd, participants will be invited to a barbecue.

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



Jever Brewery



City of Bremen



