

中德科学中心春季学校  
《芯片设计中的数学》招生通知

2009年3月30日-4月8日, 浙江大学, 杭州

**Call for Participation**  
**Spring School on Mathematics of Chip Design**  
**Sponsored by Sino-German Center for Research Promotion**

March 30-April 8, 2009, Zhejiang University, Hangzhou

1. Coordinators and Contact Persons:

**Bernhard Korte**, Professor and Director, Research Institute of Discrete  
Mathematics, University of Bonn  
**dm@or.uni-bonn.de**

**Guochuan Zhang**, Professor, Zhejiang University  
**zgc@zju.edu.cn**

2. Introduction of the School

Microprocessors and computer chips are by far the most complex structures, ever designed and produced by man. On a small silicon chip of the size of a fingernail, billions of transistors have to be placed and connected by many millions of inter-connects. The total length of those nets can be more than a kilometer. Combinatorial Optimization and methods of Discrete Mathematics play an essential role in designing these electronic midgets.

This spring school will have in-depth courses on all fields of chip design (i.e. placement, routing, timing, clock-tree design, gate-sizing, buffering, repeater-tree topologies, and floorplanning). These (sub) problems of chip design can be solved by discrete mathematical methods from the following areas: network flows, min-cost flows, multi-commodity flows, shortest path, Steiner-Tree design, clustering, facility location, min-max resource sharing, matching, and quadratic optimization.

The Research Institute for Discrete Mathematics of the University of Bonn has more than 20 years of experience in applying discrete mathematical methods to chip design. The algorithms and methods developed at this institute, known as BonnTools, are widely used in industry. More than 1500 highly complex chips have been designed by BonnTools. Chip design is a very fascinating and highly important area of application of mathematics. The knowledge of mathematics of

chip design is still somewhat limited. The aim of the spring school is to broaden the knowledge, especially among young mathematicians and computer scientists from China. This field of mathematics is gaining much more interest among young scholars.

As a basic structure, the spring school will have lectures in the morning and (computer-) exercises with BonnTools in the afternoon. Participants at the spring school shall be senior graduate and doctorate students, post-doctors and young researchers. Basic knowledge in the field of discrete optimization is required.

### 3. Lecturers

Main Lecturers:

**Chen, Bo**, Professor of Operational Research at Warwick Business School  
Taishan Scholar Professor of Applied Math, Qufu Normal University

**Hougardy, Stefan**, Professor of Discrete Mathematics, University of Bonn

**Korte, Bernhard**, Professor of Discrete Mathematics, Director of the Research  
Institute for Discrete Mathematics, University of Bonn

**Rautenbach, Dieter**, Professor of Mathematics, TU Ilmenau

**Vygen, Jens**, Professor of Discrete Mathematics, University of Bonn

**Zhang, Guochuan**, Professor, College of Computer Science, Zhejiang  
University

Other Lecturers:

**Brenner, Ulrich**, Dr., Research Institute for Discrete Mathematics, University of  
Bonn

**Held, Stefan**, Dr. Research Institute for Discrete Mathematics, University of  
Bonn

**Maßberg, Jens**, Dipl.Math., Research Institute for Discrete Mathematics,  
University of Bonn

**Müller, Dirk**, Dipl.Inf., Research Institute for Discrete Mathematics, University  
of Bonn

**Nieberg, Tim**, Dr., Jun.Professor, Research Institute for Discrete Mathematics,  
University of Bonn

4. School Language

**English**

5. Participation

The intended participants are **doctoral students, post-docs, young scholars as well as excellent graduate students** in fields related to the themes of the school. Participants should have basic knowledge of discrete optimization. Sponsored by the Sino-German center for Research Promotion, there will be no participation fee, and the school covers the travel expenses and provides free accommodation from March 29 to April 8 for the participants out of Hangzhou. However, **space is limited**. Application of participants with a short CV and description of the current research should be sent to one of the coordinators by e-mail. **A short abstract of a possible talk at the school will be a plus**. Students should also provide a recommendation from their supervisors. **Participants from industry in China (EDA companies, Design Centers, etc.) are also welcomed**. They may participate free of registration fee. However, they have to cover travel and living expenses by their own means. Both coordinators together with the main lecturers will decide about participation. Participants are required to attend all lectures and discussions, and do algorithmic exercises with BonnTools. They are welcome to present short talks about their research.

6. Important Dates

Application Deadline: Feb 23, 2009

Notification: March 2, 2009

Registration: March 29, 2009

School: March 30-April 8, 2009