

Conference chair:

Christine Gaßner (Greifswald)

Programme committee:

Zofia Adamowicz (Warsaw)

Franz Baader (Dresden)

Arnold Beckmann (Swansea, chair)

Sam Buss (La Jolla)

Manfred Droste (Leipzig)

Christine Gaßner (Greifswald)

Peter Koepke (Bonn)

Benedikt Löwe (Amsterdam)

Johann Makowsky (Haifa)

Elvira Mayordomo (Zaragoza)

Damian Niwinski (Warsaw)

Wolfgang Thomas (Aachen)

Martin Ziegler (Darmstadt)

Conference venue:

Alfried Krupp Wissenschaftskolleg Greifswald

Martin-Luther-Straße 14

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Registration:

Please register via the following URL only:

www.wiko-greifswald.de/anmeldung

The conference language is English. There will be a limited number of grants available for students and postdocs.

An international conference organized by the Alfried Krupp Wissenschaftskolleg Greifswald, funded by the Alfried Krupp von Bohlen und Halbach-Stiftung, Essen and the German Research Foundation, Bonn.

Computability theory and complexity theory have their origins in logic. Famous names such as Gödel, Turing, Cook, and Kolmogorov connect these areas of computer science to foundations of mathematics. The fundamental goal of this area is to understand the limits of computability (that is analysing which problems can be solved on nowadays and future computers in principle) and efficient computability (that is understanding the class of problems which can be solved quickly and with restricted resources) where the most famous open problem is the $P = NP$ -problem, listed on top of the collection of seven Clay Prize problems. Logic provides a multifarious toolbox of techniques to analyse questions like this, some of which promise to provide deep insights in the structure of limit of computation.

In our workshop, we shall focus on the following aspects: logical descriptions of complexity (e.g., descriptive complexity, bounded arithmetic), complexity classes of abstract, algebraic and infinite structures, barriers in proving complexity results, and Kolmogorov complexity and randomness. Descriptive complexity and bounded arithmetic are two complementary approaches to describe computational complexity in logical terms. The former is focussed on decision problems, while the latter is more concerned with search problems. Both environments render questions about complexity classes in a natural way, leading to important open problems in their areas (e.g. finding logics to capture certain complexity classes, or the separation problem for bounded arithmetic).

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Alfried Krupp Wissenschaftskolleg
Greifswald

Logical approaches to barriers in computing and complexity

International Workshop
February 17–20, 2010

Tuesday, February 16, 2010

4.00 pm – 6.00 pm

Registration at the Alfried Krupp Wissenschaftskolleg

7.00 pm

Welcome meeting in the restaurant „Zur Sonne“

Wednesday, February 17, 2010

9.00 am – 9.15 am

Welcome address

Bärbel Friedrich (Academic Director of the Alfried Krupp Wissenschaftskolleg Greifswald)

Conference chair's address

9.15 am – 10.00 am

Axiomatic approach to barriers in complexity

Antonina Kolokolova (St. John's)

10.00 am – 10.30 am

Polynomial hierarchy, Betti numbers and a real analogue of Toda's theorem

Thierry Zell (Hickory)

10.30 am – 11.00 am

Coffee break

11.00 am – 11.50 am

Shallow circuits with high-powered inputs

Pascal Koiran (Lyon)

11.50 am – 12.30 pm

Contributed Talks

12.30 pm – 2.30 pm

Lunch break

2.30 pm – 3.00 pm

Diagonal sets for real number complexity classes

Klaus Meer (Cottbus)

3.00 pm – 4.00 pm

Contributed Talks

4.00 pm – 4.30 pm

Coffee break

4.30 pm – 5.00 pm

Computable functions on the reals

Katrin Tent (Münster)

5.00 pm – 6.00 pm

Contributed Talks

6.00 pm – 7.30 pm

Buffet at the Alfried Krupp Wissenschaftskolleg

7.30 pm

Public lecture

Das Spektrumproblem von H. Scholz und G. Asser.

Ein halbes Jahrhundert danach.

Johann Makowsky (Haifa)

Moderation: Christine Gaßner (Greifswald)

Thursday, February 18, 2010

9.00 am – 9.50 am

Logical structures, cyclic graphs and genus of proofs

Alessandra Carbone (Paris)

9.50 am – 10.30 am

Contributed Talks

10.30 am – 11.00 am

Coffee break

11.00 am – 11.50 am

Transformations and complexity

Bruno Poizat (Villeurbanne)

11.50 am – 12.50 pm

Contributed Talks

12.50 pm – 2.30 pm

Lunch break

2.30 pm – 3.00 pm

Characterizing algebraically computability and complexity classes over the reals in recursive analysis

Olivier Bournez (Palaiseau)

3.00 pm – 4.00 pm

Contributed Talks (Special Session)

4.00 pm – 4.30 pm

Coffee break

4.45 pm

Excursion to the fusion reactor Wendelstein 7-X

Friday, February 19, 2010

9.00 am – 9.50 am

Fixed point logics, games, and polynomial-time complexity

Erich Grädel (Aachen)

9.50 am – 10.30 am

Contributed Talks

10.30 am – 11.00 am

Coffee break

11.00 am – 11.50 am

The scheme of induction for sharply bounded arithmetic formulas

Leszek Kolodziejczyk (Warsaw)

11.50 am – 12.50 pm

Contributed Talks

12.50 pm – 2.30 pm

Lunch break

2.30 pm – 3.00 pm

Computational complexity in analysis

Klaus Weihrauch (Hagen)

3.00 pm – 4.00 pm

Contributed talks (Special Session)

4.00 pm – 4.30 pm

Coffee break

4.30 pm – 5.00 pm

Ball arithmetic

Joris van der Hoeven (Palaiseau)

5.00 pm – 6.00 pm

Contributed talks

7.30 pm

Dinner in the restaurant „Zur Sonne“

Saturday, February 20, 2010

9.00 am – 9.30 am

Efficient synthesis of exact real number algorithms

Monika Seisenberger (Swansea)

9.30 am – 10.30 am

Contributed talks

10.30 am – 11.00 am

Coffee break

11.00 am – 11.50 am

Hardness of instance compression and its applications

Lance Fortnow (Evanston)

11.50 am – 12.50 pm

Contributed talks

12.50 pm – 2.15 pm

Lunch break

2.15 pm – 3.15 pm

Discussions

3.30 pm

Excursion to the Ozeaneum (Stralsund)