Report on a Scientific Event

Winterschool in Abstract Analysis, Section Topology

30th Jan — 6th Feb 2010

Hejnice, Czech Republic

Summary

The meeting jointly organized by the Czech Mathematical Society, the Center for Theoretical Study and the Mathematical Institute of the Czech Academy of Sciences took place at Hejnice, Czech Republic between 30th January and 6th February 2010.

Out of the 69 registered participants 5 had to cancel their registration leading to a total of **64 participants** from diverse countries.
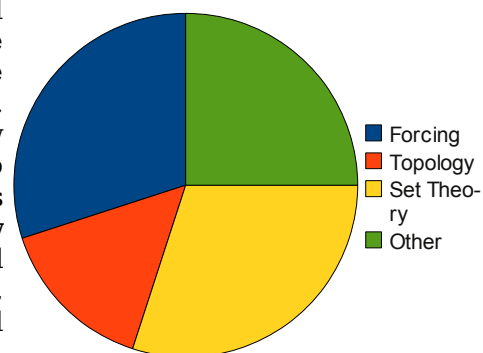
The conference consisted of four series of **tutorial lectures** delivered by the invited speakers, **research presentations** of the participants and **discussion & networking** time. One afternoon was devoted to a trip to the mountains.

The conference took place at the International Center for Spiritual Rehabilitation, an old monastery which was recently renovated and now serves as a conference center with accommodation facilities. The location was ideal since it allowed the participants to stay in a single place and had excellent supporting facilities. We were also able to arrange favourable prices.

Based on the feedback of participants the conference was an **overall success** and the participants have been very enthusiastic about the possibility of the school continuing the tradition next year.

Scientific Content

This year of the tutorial lectures (each tutorial comprising of several 50 minute lectures) were devoted to advanced topics of Set Theory and were delivered by leading experts in the respective fields. Professor **Menachem Magidor** (Hebrew University, Jerusalem) prepared an introduction to the newest developements of **PCF theory** and its applications in five lectures Professor **Alan Dow** (University of North Carolina at Charlotte) had three lectures about the **continuous images of ω^***, the Čech-Stone compactification of the natural numbers and about related combinatorial problems. Professor **Jörg Brendle** (Kobe University, Japan) had a five part tutorial on advanced forcing

techniques with an emphasis on different aspects of the **iteration theory** illustrated by new and old examples. Professor **Sy David Friedman** (Kurt Gödel Research Center, Vienna) concentrated on **forcings preserving large cardinals** in three lectures.

The research presentations were given mainly by younger participants who presented their newest results. The topics included **General Topology, Set Theory, Boolean Algebras and Forcing, Measure Theory, Descriptive Set Theory, Functional spaces and the Theory of Ultrafilters**.

Each day participants had time to discuss their work with colleagues. The topics of the discussions were diverse and included recent developments in set theory (research into **P-**

ideals, generalization of **cardinal characteristics** of the continuum to larger cardinals, recent trends in **set theoretic topology**, **automorphisms of ω***** etc.)

The final program of the conference, presentation slides from the talks and the list of participants can be found at the following address:

<p style="text-align:center">**winterschool.eu/2010**</p>

Results Assessment

There are two main purposes scientific meetings serve. First they are a means of **disseminating knowledge** and presenting current research. Secondly they have a networking effect in bringing together people and **facilitating cooperation**. In both of these aspects the present meeting had fulfilled its goals.

The **tutorials** were an invaluable opportunity for younger researchers to acquaint themselves with topics currently only accessible in research articles or not accessible at all. Time was reserved for questions and the speakers made special effort to present the topics in very clear and intuitive terms.

The research presentations gave a nice overview of **current set theoretic research trends** ranging from combinatorial problems on the natural numbers, descriptive set theory of the reals to large cardinals. It helped **prevent the isolation** which sometimes threatens people working on a very specialized topic.

During discussions people got together to work on problems and progress has been made on some important open challenges (The **Katowice problem**, **Vopěnka's principle** and others).

The conference proceedings to be published in *Acta Universitatis Carolinae Mathematica et Physica* will make the results available to a broader audience.

The conference itself is part of a recently emerging trend of strong set theoretic research in Europe as witnessed by the **INFTY** network or, e.g., the *Young Set Theory Workshop* which took place in Raach one week after the Winter School.

Financial report summary

ESF Funding	
Meals	€ 1400
Accommodation	€ 3040
Administrative costs	€ 560
Total	**€ 5000**
Co-Sponsors	
CTS[1]	€ 1423
MU AVČR[2]	€ 1685
Total	**€ 3108**

---

1 Center for Theoretical Study of the Academy of Sciences and Charles University
2 Mathematical Institute of the Academy of Sciences

Final Programme

<div align="center">MONDAY MORNING SESSION</div>

<div align="center">Jana Flašková</div>

- 9:00-9:50, **I. Juhász**: Convergence and character spectra of compact spaces
- 10:25-10:55, **Sz. Plewik**: On skeletal maps
- 11:10-11:40, **P. Borodulin-Nadzieja**: Measure recognition problems
- 11:55-12:25, **V. Torres Perez**: Weak reflection principle, saturation of the ideal NS, and diamonds

<div align="center">MONDAY AFTERNOON SESSION</div>

<div align="center">Aleksander Blaszczyk</div>

- 15:30-16:20, **M. Magidor**: PCF Theory and Applications
- 16:30-17:20, **J. Brendle**: Aspects of iterated forcing
- 17:35-18:25, **A. Dow**: Moron Automorphisms on P(N)/fin II.

<div align="center">TUESDAY MORNING SESSION</div>

<div align="center">Szymon Plewik</div>

- 9:00-9:20, **A. Kucharski**: Open-Open Game of Uncountable Length
- 9:35-10:25, **S. D. Friedman**:Forcings which Preserve Large Cardinals
- 11:00-11:20, **A. Nowik**: Measurable Hamel Function
- 11:35-12:25, **A. Dow**: Moron Automorphisms on P(N)/fin III.

<div align="center">TUESDAY AFTERNOON SESSION</div>

<div align="center">István Juhász</div>

- 15:30-16:20, **M. Magidor**: PCF Theory and Applications II.
- 16:40-17:10, **W. Kubiš**: Retractive Linear Orderings
- 17:30-18:20, **J. Brendle**: Aspects of iterated forcing II.

<div align="center">**THE PARTY**</div>

<div align="center">WEDNESDAY MORNING SESSION</div>

<div align="center">Martin Weese</div>

- 9:00-9:50, **S. D. Friedman**:Forcings which Preserve Large Cardinals II.
- 10:30-11:20, **J. Brendle**: Aspects of iterated forcing III.
- 11:35-12:25, **M. Magidor**: PCF Theory and Applications III.

<div align="center">**Wednesday Winter School Walk**</div>

<div align="center">Start in front of the building</div>

- 13:30 **Longer trip.** A longer trip round the Ořešník hill, with some steep ascents and probably a lot of snow. Good shoes recommended.
- 14:00 **Shorter trip.** A comfortable walk to Raspenava and back with a pub in the middle. Expect no steep hills and clear roads.

Thursday Morning Session

Aleksandar Pavlovič

- 9:00-9:50, **S. D. Friedman**:Forcings which Preserve Large Cardinals III.
- 10:20-10:50, **R. Honzík**: Lifting arguments
- 11:00-11:30, **A. Brooke-Taylor**: Indestructibility of Vopěnka Cardinal
- 11:40-12:30, **M. Sabok**: Forcing, ideals and degrees of reals

Guided tour in the Basilica

(14:00-15:00)

Thursday Afternoon Session

Magdalena Grzech

- 15:30-16:20, **J. Brendle**: Aspects of iterated forcing IV.
- 16:30-17:05, **M. Staš**: Regularity properties on the real line
- 17:20-17:35, **J. Šupina**: wQN$_*$ and wQN*
- 17:45-18:35, **M. Magidor**: PCF Theory and Applications IV.
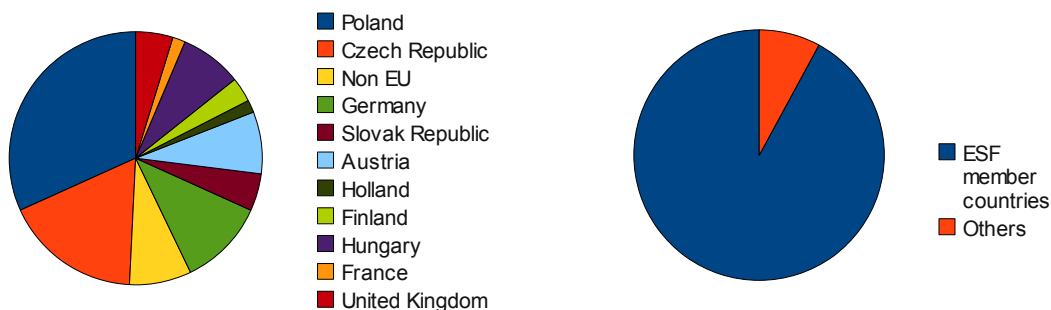
Friday Morning Session

Wieslaw Kubiš

- 9:00-9:50, **M. Magidor**: PCF Theory and Applications V.
- 10:20-10:45, **A. Blaszczyk**: Transversal and independent topologies.
- 10:50-11:05, **Sz. Zeberski**: Inscribing Baire-nonmeasurable sets
- 11:15-11:40, **Z. Kosztolowicz**: Characterizing Chainable and Tree-Like continua
- 11:50-12:30, **D. Soukup**: Cross-like constructions and refinements

Friday Afternoon Session

Petr Simon

- 15:00-15:20, **A. Primavesi**: Extending the Classical Results on Club Guessing
- 15:30-16:20, **J. Brendle**: Aspects of iterated forcing V.
- 16:30-16:50, **R. Ralowski**: Luzinnes on the Real Line
- 17:00-17:30, **P. Krautzberger**: Some new results on union ultrafilters
- 17:40-18:30, **L. Soukup**: The Joy of Elementary Submodels

List of Participants

Breakdown by Country

Name	Institution
Christian Adler	Universität Potsdam
Boris Šobot	University of Novi Sad
Jaroslav Šupina	University of Pavol Jozef Safarik
Bohuslav Balcar	Center for Advanced Studies, Prague
Paweł Barbarski	University of Gdańsk
Aleksander Błaszczyk	University of Silesia
Wojciech Bielas	University of Silesia, Institute of Mathematics
Piotr Borodulin-Nadzieja	Wroclaw University
Jörg Brendle	Kobe University
Andrew Brooke-Taylor	University of Bristol
Lev Bukovský	Institut of Mathematics, University of P. J. Šafárik
David Chodounský	KTIML MFF, Charles University, Prague
Alan Dow	University of North Carolina at Charlotte
Andreas Fackler	Ludwig-Maximilians-Universität München
Barnabas Farkas	Budapest University of Technology and Economics
Jana Flašková	Západočeská univerzita v Plzni
Marta Frankowska	University of Gdańsk
Sy David Friedman	Kurt Gödel Research Center for Mathematical Logic, Vienna
Petr Glivický	KTIML, Charles University, Prague
Michał Gołębiowski	University of Warsaw
Rafal Gruszczynski	Nicolaus Copernicus University
Magdalena Grzech	Politechnka Krakowska
Radek Honzík	Charles University
Michael Hrušák	Universidad de Morelia, Mexico
Istvan Juhasz	Alfred Renyi Institute of Mathematics, Hungarian Academy of Sciences

Name	Institution
Piotr Kalemba	
Kaisa Kangas	University of Helsinki
Teppo Kankaanpää	University of Helsinki
Yurii Khomskii	University of Amsterdam
Adam Kolipiński	University of Warsaw
Zdzisław Kosztołowicz	Instytut Matematyki, UJK KIelce
Peter Krautzberger	Freie Universitaet Berlin
Wieslaw Kubiś	Mathematical Institute, Czech Academy of Sciences
Andrzej Kucharski	Institute of Mathematics
Menachem Magidor	Hebrew University of Jerusalem
Hiroaki Minami	Kurt Goedel Research Center, University of Vienna
Miguel Angel Mota	Kurt Gödel Research Center
Nikodem Mrożek	University of Gdańsk
Andrzej Nowik	University of Gdańsk
Aleksandar Pavlović	University of Novi Sad, Faculty of Sciences, Department of Mathematics and Informatics
Tomáš Pazák	Institute of Information Theory and Automation
Francesco Piccoli	University of East Anglia, Norwich, UK
Szymon Plewik	Instytut Matematyki Uniwersytetu Śląskiego w Katowicach
Alexander Primavesi	University of East Anglia
Robert Ralowski	Wroclaw University of Technology
Růžena Roháčková	Mathematical Institute, AVČR, Prague
Dan Rosendorf	University of Wisconsin, Madison
Marcin Sabok	Wroclaw University
Robin Scholz	Universität Potsdam
Petr Simon	KTIML, Charles University, Prague
Daniel Soukup	Eötvös Loránd University
Lájos Soukup	Alfred Renyi Institute of Mathematics, Hungarian Academy of Sciences
Michal Staš	University of Pavol Jozef Safarik
Victor Torres Perez	University of Paris 7
Slawomir Turek	Instytut Matematyki UJK Kielce
Toshimichi Usuba	University of Bonn
Benjamin Vejnar	KMA, Charles University, Prague
Jonathan Verner	KTIML, Charles University, Prague
Mate Vizer	Central European University, Budapest
Martin Weese	Universität Potsdam
Thilo Weinert	Rheinische Friedrich-Wilhelms-Universität Bonn
Anna Wojciechowska	Silesian University
Lyubomyr Zdomskyy	Kurt Goedel Research Center for Mathematical Logic, University of Vienna
Szymon Zeberski	Wroclaw University of Technology