

hcm NEWS 1/2018



HAUSDORFF SPECIALS

GLOBALMATH
NETWORK

A worldwide network in mathematics

*Extract of press release of the University of Bonn
(slightly modified) of November 16, 2017*

The GlobalMathNetwork, a new cooperation of the University of Bonn's Cluster of Excellence Hausdorff Center for Mathematics (HCM) with four other world-renowned research institutions, aims to make a research stay abroad easier for young scientists and thus facilitates international networking. As part of a two-day launch event, a public panel discussion will take place on Wednesday, November 22, with high-ranking politicians and scientists on the subject of "Internationalization in Science and Universities".

The GlobalMathNetwork is a collaboration between five of the world's top mathematical research institutions: the Hausdorff Center for Mathematics in Bonn, the École Normale Supérieure in Paris (France), the Universities of Kyoto (Japan) and Beijing (China) and the Courant Institute of New York University (USA). The spokesperson of the HCM and co-initiator of the network, Prof. Dr. Karl-Theodor Sturm, explains: "As cooperation partners we all share the vision of networking internationally in research and training junior scientists."

The GlobalMathNetwork facilitates the exchange of doctoral students between the five collaborating institutions and encourages studies abroad. The director of the Bonn International Graduate School of Mathematics (BIGS), Prof. Dr. Barbara Niethammer, says: "Advancing our doctoral students is the central idea of the agreement. They can spend up to four months at any desired mathematical institute around the world, conduct their research and make contacts in academia." Accommodation and travel expenses are covered by the home universities, while host institutions provide a fully-fledged workplace and waive tuition if necessary.

International networking is important to advance research in mathematics. For this reason, in addition to the doctoral student exchange, and in the pursuit of shared educational goals, the signing parties will also organize joint scientific events in the future.

[Click here to find further information about the GlobalMathNetwork.](#)

New Cooperative Research Center in Economics

German Research Foundation (DFG) supports CRC with about nine million euros.

*Press release of the University of Bonn (translated)
of November 27, 2017*

How can equal opportunities be promoted? How should markets be regulated due to internationalization and digitalization? How can a stable financial system be designed? A new cooperative research center with the participation of the Universities of Bonn and Mannheim will answer these questions. The German Research Foundation (DFG) has given about nine million euros over the next four years to support the new research program.

The new cooperative research center (CRC/TR 224) “Economic Perspectives on Societal Challenges: Equality of Opportunity, Market Regulation, and Financial Stability” consists of three pillars. Family and education policies are the focus of the first pillar. The researchers want to investigate which measures promote the equality of opportunity by reducing the influence of gender and socio-economical background on individual abilities.

The second pillar deals with market regulation in light of internationalization and digitalization of economic activity. In addition to addressing inefficiencies, the focus is on objectives such as protecting consumers, ensuring the access of certain social groups to specific products or services, and reducing environmental damage. One example is the empirical evaluation of concrete measures for the implementation of climate targets.

The third pillar of the new CRC deals with the regulation of financial markets. Specifically, with the interactions between



Prof. Dr. Sven Rady (Department of Economics and HCM)

individual financial decisions, systemic risks, and government interventions in these markets. For example, scientists are investigating to what extent the regulation of certain financial markets leads to a shift of activities and thus risks in less regulated areas.

Broad range of methods with potential for policy proposals

“On the basis of the broad range of methods of theoretical and empirical economic research, the CRC is developing new institutional solutions and policy measures,” says the Spokesperson of the CRC and Professor of Mathematical

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Economics Dr. Sven Rady of the Department of Economics at the University of Bonn. “The two sites in Bonn and Mannheim complement each other excellently and make internationally visible research possible which focuses on economics as a social science and which contributes to coping with societal challenges,” adds Dr. Martin Peitz, the Vice Spokesperson of the CRC and Professor of Economics of the University of Mannheim.

Long-term and intensive research

Collaborative research centers are long-term university-based research institutions, established for up to twelve years, receiving a funding for four years each. They allow researchers to work together on innovative, demanding, and complex research projects. They further institutional priority area development and structural development and consist of a large number of subprojects.



Prof. Dr. Jörg Stoye (Institute for Financial Economics and Statistics and HCM)

EU supports three researchers of the University of Bonn with millions

Prof. Moritz Schularick, Prof. Jörg Stoye and Dr. Hendrik Hildebrandt received ERC Consolidator Grants.

Extract of press release of the University of Bonn (translated and slightly modified) of November 28, 2017

The funding of the European Research Council (ERC) is highly competitive. Now, three researchers of the University of Bonn will receive coveted ERC Consolidator Grants totaling several million euros. This gives the scientists the opportunity to significantly expand their research fields and tackle new projects.

Very tough nuts in statistics

Prof. Dr. Jörg Stoye of the Institute of Financial Economics and Statistics and the Hausdorff Center for Mathematics at the University of Bonn develops new statistical methods. He will receive a total of 1.1 million euros over the next five years. His research is about new methods which allow researchers to determine the accuracy of estimators. “A simple example are estimation errors in opinion surveys,” says Stoye. The researcher tries to crack the very hard nuts in statistics - in extremely tricky situations, where this was impossible or only possible through extremely conservative estimation.

“The Grant allows me to focus on this very difficult research content and also finances the implementation of the results in the form of free software,” he says.

Two more ERC Consolidator Grants went to Prof. Dr. Moritz Schularick from the Institute of Macroeconomics and Econometrics and Dr. Hendrik Hildebrandt from the Argelander Institute for Astronomy.

Great success

The funding line of the ERC Consolidator Grants is aimed at excellent researchers who have already successfully set up their own research group. The aim of the funding is the consolidation of the research team. “Three grants for the University of Bonn at the same time are a great success because, according to experience, only about every tenth application is successful”, says Dr. Ulrike Pag, who advises the researchers at the University of Bonn on questions concerning ERC funding.

[Click here to read the whole press release \(in German\).](#)

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**From left to right:**

Prof. Dr. Marc Alexander Schweitzer (INS/Fraunhofer SCAI), Dr. Martina Pottek (Deputy Equal Opportunity Officer), Clelia Albrecht (awardee), Prof. Dr. Carsten Burstedde (INS), Prof. Dr. Jochen Garcke (INS/Fraunhofer SCAI), Prof. Dr. Ira Neitzel (INS).

Clelia Albrecht received the Ada Lovelace Prize

Promotion of female early career researchers:
Best master's thesis at the Institute for Numerical Simulation

Press release of the University of Bonn (translated) of December 19, 2017

The Institute for Numerical Simulation at the University of Bonn honors the best theses of female early career researchers with the Ada Lovelace Prize. Now, Clelia Albrecht received the award for her master's thesis.

In her master's thesis "Parallelization of Adaptive Gradient Augmented Level Set Methods" Clelia Albrecht looked into the matter of efficient computer simulation of interfaces between different fluids. In many practical applications, for example in process engineering, a prediction which is as accurate as possible of location and shape of such an interface is of vital importance. Clelia Albrecht designed and implemented a method, which permits pinpoint accuracy at low costs. For that purpose, she efficiently used modern parallel computing and successfully amplified the concept of dynamic mesh adaptivity.

The Institute for Numerical Simulation at the University of Bonn created the Ada Lovelace Prize in 2010 and has been awarding it annually since then. The award promotes young female researchers in the area of Numerical Mathematics. The prize is named after the British female mathematician Ada Lovelace (1815 – 1852) and it honors the best bachelor's, master's, or doctoral theses. The endowment for the prize ranges from € 500 for the best bachelor's degree to € 1,000 for the best master's degree to € 2,000 for the best dissertation.



Clelia Albrecht, Dr. Michael Meier (Managing Director HCM).

HAUSDORFF PEOPLE



Dr. Arianna Giunti is a new HCM postdoc in the group of Prof. Dr. Juan Velázquez. She did her PhD at the Max Planck Institute for Mathematics in the Sciences in Leipzig, under the supervision of Prof. Dr. Felix Otto. Her research lies at the intersection between analysis and probability. She is interested in stochastic homogenization, as well as in invariance principles for random walks in random environments and interacting particle systems.



Dr. Karen Habermann is a new HCM postdoc in the group of Prof. Dr. Karl-Theodor Sturm since October. Her research interests lie in Stochastic Analysis and sub-Riemannian geometry. Previously, she obtained her PhD and undergraduate degree from the University of Cambridge, UK.



Since October, **Dr. Torben Krüger** is a new HCM postdoc at the Institute for Applied Mathematics. His mentor is Prof. Dr. Margherita Disertori. The main focus of his research lies on the areas of random matrix theory and mathematical physics. He works on robust mathematical methods in order to rigorously study statistical properties of large complex systems that typically originate from applications in physics or engineering. Before coming to Bonn, he worked at the Institute of Science and Technology Austria.



Since November, **Dr. Van Kien Nguyen** is a new postdoc in the group of Prof. Dr. Markus Bachmayr. Before coming to Bonn, he did his PhD at the Friedrich-Schiller-University Jena and worked with Prof. Erich Novak. His research area is approximation theory and function spaces of dominating mixed smoothness.

HAUSDORFF EVENTS



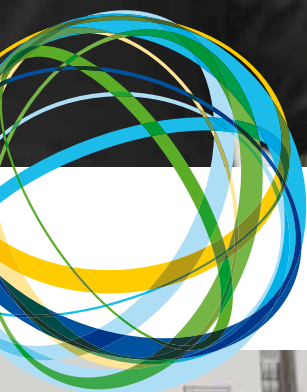
Mathematical Salon

The mathematical salon has been taking place at the HIM since 2008. It consists of a mathematical lecture in the broadest sense and two short musical presentations. On November 2, Prof. Dr. Richter-Gebert from the Technical University of Munich gave a lecture on the topic "On the mathematical difficulty of writing a beautiful text" („Von der mathematischen Schwierigkeit einen schönen Text zu schreiben"). He presented his project on the mathematics of calligraphy, in which he works together with the artist Seb Lester. The evening was accompanied musically by the Jazz sextet jentgens6tett.

HAUSDORFF EVENTS



left: Prof. Tian (Beijing University), Prof. Ben Arous (New York University), and Prof. Hoch (University of Bonn).



Opening Ceremony of the **GlobalMathNetwork**



From left to right: Jan-Martin Wiarda (science journalist and moderator), Prof. Catharina Stroppel (HCM, University of Bonn), Ministerialdirigent Dr. Dietmar Möhler (MKW NRW), Prof. Dorothee Dzwonnek (Secretary General of the DFG), Ministerialdirektor Volker Rieke (BMBF), Dr. Claudia Lücking-Michel (CDU Bonn), and Prof. Karl-Theodor Sturm (HCM, University of Bonn).

Supporting young mathematicians, encouraging them to spend a research period abroad, and creating an even closer international network - these are the goals of the GlobalMathNetwork. On November 22 and 23, the network was officially initiated. Presentations by representatives of all five members of the network were followed by a panel discussion. Here, Prof. Tian (Beijing University), Prof. Ben Arous (New York University), and Prof. Hoch (University of Bonn) presented the internationalization strategies of their universities. Afterwards Prof. Catharina Stroppel (HCM, University of Bonn), Ministerialdirigent

Dr. Dietmar Möhler (MKW NRW), Prof. Dorothee Dzwonnek (Secretary General of the DFG), Ministerialdirektor Volker Rieke (BMBF), Dr. Claudia Lücking-Michel (CDU Bonn), and Prof. Karl-Theodor Sturm (HCM, University of Bonn) discussed on "Internationalization in Science and Universities". The evening was moderated by the science journalist Jan-Martin Wiarda.

If you were unable to attend the panel discussion, you can have a look at it here. The first part is in English, the second part in German.

HAUSDORFF EVENTS

Hausdorff School: presentation training for postdocs

How to present your research comprehensibly and how to keep the audience's attention? As part of the "Soft Skill Program" of the Hausdorff School, Prof. Dr. Matthias Kreck gave a presentation training for postdoctoral researchers (November 29 and December 6). The training consisted of a theoretical part, after which the participants were able to directly apply their newly acquired knowledge.

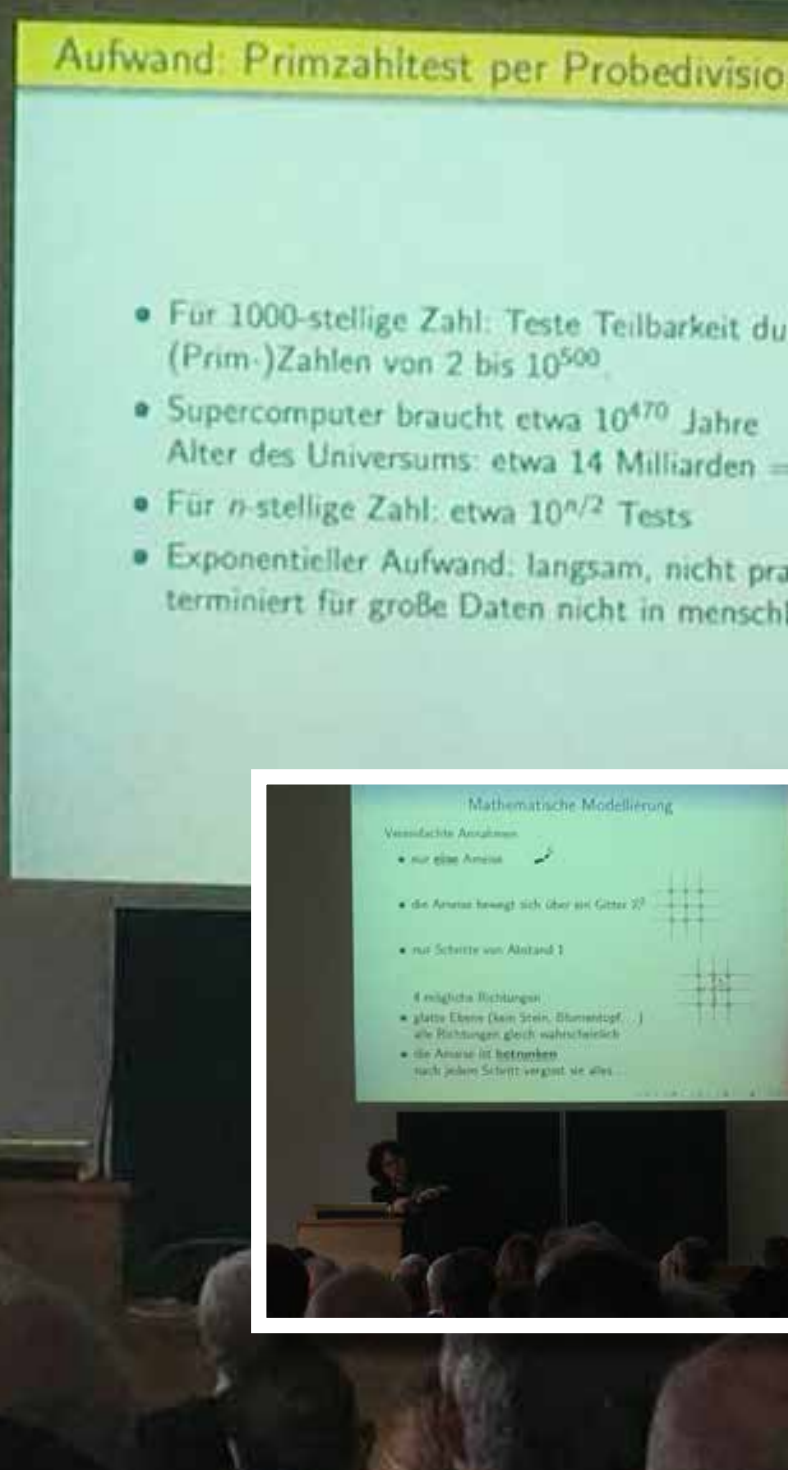


Dies Academicus

"Multiplication, Factorization, and Prime numbers" („Multiplizieren, Faktorisieren und Primzahlen“) - in his inaugural lecture Dr. Olaf Schnürer built a bridge between the multiplication of numbers as they are already being taught in elementary school and modern complexity theory. With the inaugural lecture he completed his habilitation in mathematics. Afterwards, he was awarded the title Privatdozent.

On the occasion of her previous appointment to Bonn, Prof. Dr. Margherita Disertori gave her inaugural lecture "The mathematics of chance: how does the ant find her home?" („Die Mathematik des Zufalls: Wie findet die Ameise ihr Zuhause?"). She explained how to mathematically model the paths of drunken ants, a vivid example of random walks. She presented unexpected connections to physics, recent findings in the field, and open questions on which mathematicians around the world are working at the moment.

What does "competence orientation" in mathematics lessons mean for pupils? Prof. Dr. Rainer Kaenders and Prof. Dr. Ysette Weiss (Mainz University) found quite critical words on today's practices in German mathematics education. A more detailed view on the topic can be found in the following recently published article (in German): Kaenders, R.; Weiss, Y. „Mathematische Schneeschmelze“, Mitteilungen der Deutsche Mathematiker-Vereinigung (DMV) 2/2017, 82-89.



HAUSDORFF CALENDAR

**Toeplitz Kolloquium 2017/18***Walter Purkert (Bonn)***January 8, 4.30 p.m.****Toeplitz Kolloquium 2017/18***Michael Korey (Dresden)**Optional workshop: Der mathematische ‚Königsweg‘***January 22, 2 p.m.****Hausdorff Kolloquium 2017/2018***Susanna Terracini (Torino)**Frances Kirwan (Oxford)***January 24, 3.15 p.m.****Periods in Number Theory,
Algebraic Geometry and Physics**

Hausdorff Trimester Program

January 3 to April 20**Workshop: Periods and Regulators**

Hausdorff Trimester Program Activity

January 15 to 19**Ouroboros: Formal Criteria of Self-Reference
in Mathematics and Philosophy****February 16 to 18****Workshop: Amplitudes and Periods**

Hausdorff Trimester Program Activity

February 26 to March 2**Workshop: Picard-Fuchs Equations
and Hypergeometric Motives**

Hausdorff Trimester Program Activity

March 26 to 30

HAUSDORFF MIXED

Report on the HCM school team in the current issue of the *forsch*

The fact that our HCM school team has made it their mission to get pupils interested in math at an early stage was reported some time ago in the HCM newsletter. Now, an article about their school visits has been published in the fall/winter issue of *forsch*. It can be read online on [page 30](#).



From left to right:
Martin Drees, Manfred Paul,
Branko Juran, Susanne
Armbruster, Adrian Riekert
and Sebastian Meyer.

Six IMO participants in Bonn

Six of the participants of the International Mathematical Olympiad of the last three years are currently studying mathematics in Bonn: Martin Drees (1st semester, Cadolzburg, Bavaria), Manfred Paul (1st semester, Rimpar, Bavaria), Branko Juran (1st semester, Berlin), Susanne Armbruster (3rd semester, Munich), Adrian Riekert (5th semester, Pinneberg, Schleswig-Holstein), and Sebastian Meyer (1st semester, Dresden). And why? Because here “mathematics enjoys a particularly high priority,” says Adrian Riekert, who has been here for the longest time. Susanne Armbruster is also enthusiastic about the city: “I like Bonn. My hometown Munich is

much bigger. Here you can easily reach everything by bike and I only need 10 minutes to the university.” She still is in contact with other IMO participants. Questions can always be clarified quickly together. Sebastian Meyer also appreciates this: “My friends understand my problems. Or they have already experienced them and know a solution.” All of them invest a lot of time in mathematics. For example, Manfred Paul attends lectures for higher semesters, and Martin Drees is happy to pass on his knowledge, for example by preparing students from Qatar for competitive mathematics.

IMPRINT

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