

THE FIFTH GERMAN-RUSSIAN
WEEK OF THE YOUNG RESEARCHER

“DISCRETE GEOMETRY”



Moscow, September 7–11, 2015

Impressum

Volume of the Conference

“The Fifth German-Russian Week of the Young Researcher”

Moscow, 7–11 September 2015

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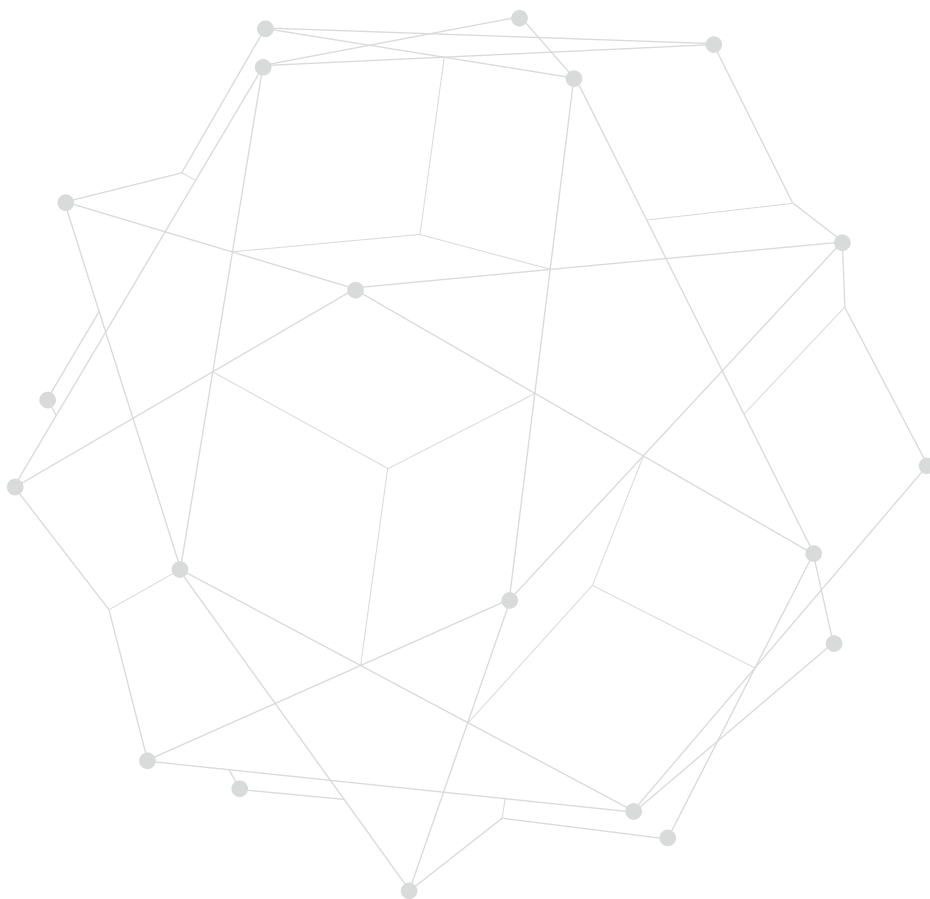


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Welcome to the “Fifth German-Russian Week of the Young Researcher”!

Dear colleagues,

We would like to offer you a warm welcome to this, our “Fifth German-Russian Week of the Young Researcher“! When we convened the “German-Russian Year of Science“ four years ago, the idea was born to invite young researchers from our countries to come together to discuss current topics of mutual interest. Since then it has grown from strength to strength. The success of the first week in Kazan in 2011 encouraged us to turn it into an annual event.

The main goal of these meetings is to foster collaboration among young scientists and researchers who will be setting the agenda of scientific cooperation in the near future. Research organizations and institutions of higher education will be presenting their funding programmes and describing the platforms that they can offer to PhD students or Post Doctoral researchers. The overarching principle behind these presentations is to facilitate collaboration and to broaden international research networks.

After focusing on “Man and Energy“ in Kazan (2011), “Health and Society“ in Yekaterinburg (2012), “Aviation and Space“ in Novosibirsk (2013) and “Global History“ in St. Petersburg (2014), in 2015 we discuss mathematical matters at the Moscow Institute of Physics and Technology. The MIPT was set up in 1946 with the efforts of prominent scholars of the Soviet Academy of Sciences, including the Nobel Prize winners Pyotr Kapitsa, Nikolay Semyonov and Lev Landau. MIPT was to become an elite school for natural sciences and has used a unique system for training young specialists from the very beginning, known as the Phystech System. Amongst MIPT graduates are the Nobel Prize winners of 2010 in Physics, Andrey Geim and Konstantin Novoselov. Today MIPT with its 6.000 students ranks among the top universities in the areas of physics, mathematics, and informatics. In 2009 MIPT was granted the status of a National Research University by the Russian government and therefore belongs to the prestigious group of “Russia’s Leading Universities”.

We would like to express our deepest gratitude to MIPT and its academic hospitality, to the German Embassy for its kind support, as well as to the Mathematisches Forschungsinstitut Oberwolfach (MFO) for their cooperation. And, of course, we thank all of you, the participants, for your involvement and cooperation in this conference.

СПАСИБО ВАМ!

Dr Gregor Berghorn

German Academic Exchange Service
Head of DAAD Office Moscow
Managing Director of DWIH Moscow

DAAD

Dr Jörn Achterberg

German Research Foundation
Head of DFG Office Moscow
Deputy Director of DWIH Moscow

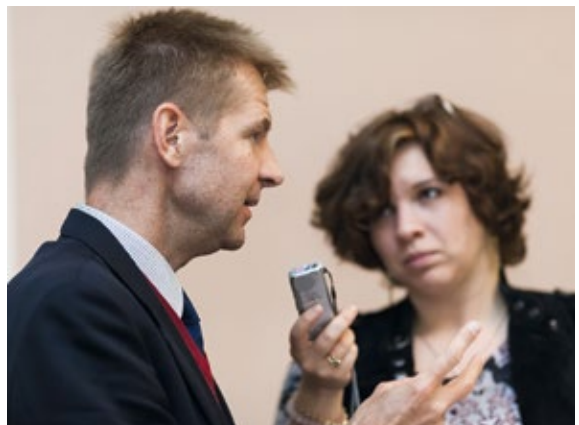
DFG



Dr Gregor Berghorn



Dr Jörn Achterberg





*Dear Ladies and Gentlemen,
dear Participants of the Week
of the Young Researcher!*

Modern science cannot exist without international cooperation. Laboratories led by international teams of researchers are highly efficient due to their active knowledge and experience exchange between colleagues that leads to new solutions and scientific breakthroughs. German universities are long-time partners of MIPT in both science and education. We are cooperating on many levels: our researchers work

in Germany, and many German scientists work here, helping to make the world a better place.

The Russian-German Week of Young Scientists is a great venue for sharing mathematical knowledge. I am sure that many young minds will become inspired to progress in science when listening to renowned scientists from all over the world here.



PROF. DR NIKOLAY KUDRYAVTSEV

Rector

National Research University 'Moscow
Institute of Physics & Technology'

Corresponding Member of the Russian
Academy of Sciences





H.E. RÜDIGER VON FRITSCH

Ambassador of the Federal Republic
of Germany to the Russian Federation

Dear Ladies and Gentlemen!

With the “German-Russian Week of the Young Researcher” the German House of Science and Innovation (DWIH) has established an important and successful key program for German-Russian cooperation in the field of science and research. In this respect I would like to thank the DWIH and all those, who made this event possible, for their support and contribution.

Since 2011, the “German-Russian Week of the Young Researcher” has been organized annually in different cities in Russia, covering various important topics like Health, Energy, Space and Aviation, as well as Global History. This year the focus is set on the mathematical topic of discrete geometry. Mathematics is an integral part of the development of modern technologies. For creating any device and in just every aspect of our life we need mathematics. Therefore, the subject of this year’s week is well chosen.

Technology is developing in breathtaking speed. Cooperating closely, taking benefit of each other’s strengths and skills offers advantages both to Germany as to Russia and keeps us globally competitive. Mathematics is a field where Russia traditionally excels in.

The conference has made a long way through Russia and now reached the capital. I’m grateful that this year’s event is being organized at one of Russia’s leading universities – the Institute of Physics and Technology (MIPT). I would like to thank you for your kind cooperation and hospitality. I hope that the conference will contribute to an ever closer cooperation between the MIPT and German research and educational institutions.

The “young researcher”-program has grown beyond its original designation: Initially it

was meant to bring Russian and German scientists together to exchange their research work and discuss current challenges, but with the encouragement of the DWIH it has grown into a big network of science related cooperation programs, which are used in both countries. The intention is to strengthen the relationship and encourage cooperation between Russia, Germany and other countries in the area of science and research.

We are all aware of the long history and rich tradition of scientific cooperation between Russia and Germany and its great importance. Science is the basis for progressive innovation and for a good future of our society. So let’s support this cooperation and intensify it! Such programs as the “German-Russian Week of the Young Researcher” can help to establish long lasting professional and personal relationships as well as build a foundation for an open dialog between Russia and Germany.

Russia has always been an important partner for Germany in the field of education, science and innovation. It is therefore very important to continue the collegial work in the field of science and education, especially under the current political and economic circumstances. I am sure that our collaboration will continue to bear fruit, thanks to the trust and reliability established over such a long period of time.

In recent years we have seen a number of mutual initiatives in the field of science and education. In 2011/2012 we jointly organized a “German-Russian Year of Education, Science and Innovation” to further intensify our cooperation. 2012/2013 was declared a “German Year in Russia” and included more



than 1000 events. Within the framework of the “EU-Russian Year of Science” 2013/2014 numerous events with the participation both of Germany and Russia were organized. The “Year of German language and literature” in Russia and “Year of Russian language and literature” in Germany respectively 2014/2015 included many events with cultural and scientific background. Starting next year a “German-Russian Year of youth-exchange” is planned to be held. All these activities create a solid foundation for a substantial, trust-based relationship between our two countries, keeping the interests of both sides in mind. The “German-Russian Week of the Young Researcher” is one of the finest examples for this partnership.

All in all the conference is the result of an excellent cooperation, not only between sci-

entists but also between research and funding organizations, represented in Russia. DAAD, DFG and other German science-related organizations, which here teamed up to create the DWIH, contribute to a better and sustainable relationship between Russia and Germany.

On the occasion of the “Week of the Young Researcher” the German Embassy has organized an interactive mathematical exhibition “IMAGINARY”, in which the German scientists, who initiated it, will take part.

May this year’s “German-Russian Week of the Young Researcher” in Russia be successful and further contribute to the continuation of the good tradition of cooperation between German and Russian scientists!



Mr. Andreas Meitzner, Minister, Deputy Head of Mission (Embassy of the Federal Republic of Germany in Moscow)



PROF. DR PETER SCHARFF

Member of the Board of the German Academic Exchange Service / Deutscher Akademischer Austauschdienst (DAAD)

Rector of Ilmenau University of Technology

Dear Prof. Funke, esteemed colleagues, dear young researchers and students!

As one of the representatives of the Board of Governors of the German Academic Exchange Service, the well-known DAAD, and on behalf of the German House for Research and Innovation in Moscow, I bid you a warm and hearty „Welcome“ here in the Moscow Institute of Physics & Technology, one of the most famous universities in this country.

I do this on occasion of the opening of our “Fifth German-Russian Week of the Young Researcher”, which is being hosted in Moscow this year, after we had been to Kazan, Ekaterinburg, Novosibirsk and, last year, to St. Petersburg.

It is with great pleasure that I can see how many young scientists have followed our invitation to this Fifth Week, and I am extremely grateful for your interest and your readiness to come to Moscow and share your research with us. And even more: I feel obliged to express my deep gratitude towards Dr. Roman Karasev, who launched the idea of organising a conference on “Discrete Geometry” and made it possible for us and the DWIH to join in this event with our Fifth Week.

The main and most important mission of all the Houses for Research and Innovation – there are six of them altogether in various countries – is the presentation of Germany as a country of research and science abroad. There are six German research organisations which have joined in the Moscow house, among them, besides DAAD, it is the German Research Foundation (DFG), the Helmholtz-Association and, as the representative of German economy, the German-Russian Foreign Trade Chamber.

It has become obvious for many years, that it is Russia, which, in contrast to all other

countries, has the largest number of applicants for a DAAD scholarship. Due to the high quality of applications Russia regularly gets the largest number of scholarships. On top of that, there is a large amount of bilateral cooperation between Russian universities and research institutions, supported by DAAD, DFG, Helmholtz-Association and others. This already demonstrates the extraordinary intensity of German-Russian relations in the field of education and science. I can imagine, dear Professor Funke, that the DFG could confirm this on the basis of their work as well.

Russia and Germany look back on 1000 years of common history, and this particularly includes the history of science and research. In 1492, when Columbus discovered America, the very first two Russian students were enrolled in a German University – in Rostock. Since then, students, lecturers and scientists of both sides have constantly been to either country, and after 1991 there has even been a flourishing development in the field of education, academic and science exchange. The foundation of the German-Russian Institute of Advanced Technologies in Kazan in 2014 appears to be the most prominent achievement in this respect. My university, the TU Ilmenau, is one of the partners in this project. We can say that relationships in the fields of education and research have proved themselves to be reliable, solid and sustainable.

But why am I mentioning that? At present, unfortunately, we cannot but see dark clouds on the political horizon, which threaten to cast a shadow on our mutual relations, which have lasted for such a long time. It is exactly these good experiences and traditions in the fields of academic exchange and research cooperation acquired



in the course of centuries and particularly within the past 25 years, which we are determined to carry on.

The “Fifth German-Russian Week” offers us the chance to do so. Therefore, we must not put these relations at stake; we must not at all lose the exchange between the young generations. The shadows I mentioned must not endanger our cooperation but should stimulate us to work together even more intensively.

This, dear Rector Kudryavtsev, is why we have to value your academic hospitality of the MFTI even more and are deeply obliged for your readiness to offer us your university as a forum for lectures and discussions within the next days.

Mathematics have been a traditional strength at Russian universities, and thus we are sure that a conference on a mathematical topic and this at your university, Rector Kudryavtsev, can only be excellent. That is why we managed to gain excellent German and Russian scientists and young researchers to take part in the Fifth Week of the young researcher. We are proud and excited to get the chance in joining this conference “Discrete Geometry”.

Finally, I once again express my sincere gratitude to the Rector of the MFTI, Professor Kudryavtsev and for his hosting the Fifth Week at his university. I would like to thank Roman Karasev and the MFTI administration for their friendly support. I have to



thank the German Embassy for organising the exhibition “Imaginary”, and last but not least:

I express my thanks to the members of the DWIH who did all the preparations and background work for our Fifth Week.

Dear guests, dear participants, dear young researchers! I would like to wish you very interesting discussions, new insights and new approaches to the manifold problems of Discrete Geometry. May our Fifth Week be a new boost for deeper cooperation of Russian and German minds and hearts in science, research and education – and beyond.

Thank you!





PROF. DR PETER FUNKE

Vice-President of the German
Research Foundation / Deutsche
Forschungsgemeinschaft (DFG)

Dear Rector Kudryavtsev, dear Rector Scharff, dear colleagues, and above all dear young scientists!

It is a great pleasure and honour for me to welcome you to the Fifth Week of the Young Researcher here at the Moscow Institute of Physics & Technology, the MIPT. I am very happy that so many people have followed the joint invitation of the MIPT, the German Academic Exchange Service, the DAAD, and the German Research Foundation, the DFG. It is the fifth week, and it is also for me – in my function as Vice-President of the DFG – the fifth time that I have the privilege to address to you on behalf of the German House for Research and Innovation, the DWIH in Moscow.

As I have been accompanying the weeks from the very beginning I would like to briefly outline the genesis of these weeks. Why do we organize weeks like this? The idea was born four years ago in 2011, when we convened the German-Russian Year of Science, Education and Innovation. The DAAD and the DFG wanted to bring together young scientists to discuss current topics of mutual interest. The forum was to give young researchers the opportunity to report on their own work as well as to listen to presentations by experienced researchers. So under the auspices of the German House for Research and Innovation we came up with the new format of the Week of Young Researchers.

The purpose of these conferences is to encourage wider networking and stronger partnerships among early career researchers. They incorporate interdisciplinary and forward-looking themes and key issues in bilateral cooperation between Germany and Russia. In recent years, matters regarding life sciences, natural sciences, engineering sciences and even the humanities have been the focus. This year, mathematics with issues from geometry will be touched upon here at MIPT.

The young researcher weeks are held only once each year in Russia. One of our main ideas is that every year we change the topic and the location of the week. For us it is vital that we include the best universities and the biggest research locations all over Russia – and not only in Moscow. We have always wanted to bring German scientists to places, which are sometimes more difficult to get to but in no way less interesting than Moscow. That is why we organized the first three weeks in the regions of Russia.

The first “Young Researcher Week” took place in 2011 at the Federal University of Kazan on the topic of “Man and Energy”, with a second in 2012 at the Federal University of Yekaterinburg which took as its theme the subject of “Health and Society”. In 2013 we went to the State Technical University and to Akademgorodok in Novosibirsk to discuss research approaches on the topic of “Aviation and Space”. So after we had got closer to the Ural mountains and reached out into Siberia, last year we came back to Europe and moved to the “northern capital” of Russia. With our topic of “Global History” we were hosted by St. Petersburg State University. This year with MIPT at Dolgoprudny we are even getting closer to the capital of Russia. And indeed tomorrow evening at long last we will finally arrive at Moscow and hold a reception at the MIPT in the city centre.

Having said all this I would like to sum up and underline the two strategic goals that we follow during our weeks: Firstly, we want to present the high level research of top scientists, and give young researchers a forum to present themselves and mingle with the community. And secondly, we want to establish international networks in all fields of fundamental research with Russia, includ-



ing the most important regional centres and best universities of the Federation.

And your university, dear Rector Kudryavtsev, has indeed been one of the best higher educational institutions of this country since its foundation. What is even more important for the week that we open today is that from the very beginning, the Moscow Institute of Physics and Technology has placed a very special focus on the education of young scientists. MIPT was set up in 1946 with the efforts of prominent scholars of the Soviet Academy of Sciences, including the Nobel Prize winners Pyotr Kapitsa, Nikolay Semyonov and Lev Landau. MIPT was to become an elite school for natural sciences and has used a unique system for training young specialists, known as the Phystech System. Amongst MIPT graduates are the Nobel Prize winners of 2010 in Physics, Andrey Geim and Konstantin Novosyolov. Today MIPT with its 6.000 students ranks among the top universities in the areas of physics, mathematics, and informatics. In 2009 MIPT was granted the status of a National Research University by the Russian government and therefore belongs to the prestigious group of 'Russia's Leading Universities'.

We are very proud to be here today with you, dear Rector Kudryavtsev. Furthermore we would like to express our deepest gratitude to the MIPT for its academic hospitality. We must in addition thank the German Embassy for its kind support and our partner organization, the Russian Foundation for Basic Research (RFBR), for its collaboration. And, of course, we thank all of you, the participants, for your interest and your involvement in this conference. Scientists have come from all over the world to take part in this week. Congratulations to you,

dear Andrey Raygorodsky and dear Roman Karasyov in doing a magnificent job to attract renowned mathematicians such as Günter Ziegler, János Pach, Luis Montejano and Włodzimierz Kuperberg.

I do not want to talk about the topic of this week too much, because I am myself a historian. But I am looking forward to listening to your lectures, as I know that discrete geometry is a classical area of mathematics with great potential for application. And I know that geometry is worth of being funded – like all areas of basic research. And this brings me to my next part of the speech: The DFG, which is the biggest funding agency for basic research in Germany.

But actually, the DFG is the biggest funding agency in Europe and the second biggest in the world to be promoting the development of fundamental research. With a current annual budget of 3 billion Euros we support more than 30.000 projects. With the help of our Russian partner organizations we fund about 300 collaborative research projects that feature the participation of Russian scientists. Russia is particularly significant for the German scientific system and has been a priority country in the DFG's international funding programmes. The DFG has maintained an intensive scientific dialogue with Russia for decades and, since 2003, has supported the development of bilateral cooperation through its own representative office in Moscow.

Europe's scientific relations with Russia are part of a lively centuries-old tradition – and this is a tradition we intend to continue. Germany has been one of Russia's most important partners in international cooperation, possibly even the most significant in the area of science and humanities. With

respect to current political developments I would like to remind everybody that the relationships within research have a long history and – most particularly in politically difficult times – they could help to build bridges. We hope that by organizing this week here at MIPT we can help to keep up the dialogue between our scientific communities and between our civil societies, as – by the way – we already used to do in the 1920s.

Yes, interestingly enough, it was in times of political dissent that the DFG and the Soviet Academy of Sciences agreed on the organization of bilateral science weeks between our two countries. The first weeks were held on Natural Sciences in 1927, on Historical Sciences in 1928, on Technical Sciences in 1929 and on Medical Sciences in 1932. These weeks proved to be an ideal way to foster existing relationships and establish new contacts. And already at that time the promotion of young researchers played a very important role.

If we look at the week today we can proudly say that by following an old format we can build new bridges. Therefore the official opening of the Fifth Week of the Young researcher here at Moscow Institute of Physics and Technology is already a great success for us. I am very grateful to all the participants to have come here, because you maintain the good tradition of the weeks. I hope that next year we will be celebrating the sixth week of the young researchers in the same old fashion!

By way of conclusion I would like to wish all of you some interesting lectures, fruitful discussions and a successful cooperation with MIPT!

Thank you very much for your attention.

“What will we be talking about?”

Introductory Remarks

Vice-President of the DFG, Prof. Dr Peter Funke

*Distinguished Guests,
Dear Colleagues and Friends,
Lieber Herr Kollege Scharff,*

Thank you very much for handing over to me. It is a great pleasure for me to make this introduction together with you, especially because we know that you are actually supposed to be in Kazan right now, where the celebrations of the first anniversary of the first German-Russian University – GRIAT – are taking place. The German Russian Institute of Applied Technologies is a long term project that certainly will be of interest to the audience here as well. We really appreciate your effort to come here and take part in the opening ceremony of this week and hope that the Technical University Ilmenau can add some more useful contacts from MIPT to those in Kazan, too.

Apart from being Rector of Technical University Ilmenau you are a member of the DAAD Executive Committee. I mention this, because from the very first week the DAAD and the DFG have always sent high level representative from their agencies to Russia in order to meet and greet the participants of the week. This surely shows that our weeks have established themselves over the years as a very useful format to foster collaboration among young researchers.

In fact both our organizations – the DAAD and the DFG – hold responsibility for science and the development of fundamental research. And indeed it is this “Week of the Young Researcher” where the two funding agencies DAAD and DFG meet: supporting the mobility of young scientists and their research activities. And especially abroad – here in Russia – It all makes so much sense

to combine the on-site experience of the DAAD and the research expertise of the DFG, who has funded quite a few projects at local research institutions over the last few years. That is why DFG and DAAD originally had the idea to organize such a conference together and that is why we are trying to share this introduction here.

But Rector Scharff has already pointed out that the German Centre for Research and Innovation – das Deutsche Haus für Wissenschaft und Innovation – is host to many more German organizations than just the DFG and the DAAD. That is why I am very happy to see this week here at MIPT representatives from the Alexander von Humboldt-Foundation, the Helmholtz Association of German Research Centres, Elena Yeryomenko the Head of the Moscow-Office, and from the Freie Universität Berlin, Tobias Stüdemann, who will support us during the week. Also we have to be grateful to our partners from the Russian Foundation for Basic Research – RFBR. I especially welcome Mr. Sharipov and Svetlana Sheveryova. And last but not least we would like to point out the strong support of the German Embassy here in Moscow. Special thanks go to Mikhail Rusakov, who has organized the exhibition IMAGINARY and has helped us in many ways! Thank you very much!

But even more grateful we have to be to all the researchers to have come to MIPT. Without your involvement this week would not have been possible. Many thanks to all the German scientists from Berlin, Bonn, Chemnitz, Heidelberg, Ilmenau, Kiel, Oberwolfach, Osnabrück, Rostock – and finally – if I may add...from Münster, because this is where I come from! The German scientists

have mainly been recruited via DFG funded projects. And here we would like to thank Günter Ziegler, who in his function as a member of the senate of the DFG, has shown a very special interest in the week and has taken care of many things!

But this year – in contrast to the four weeks before – we have turned the bilateral German-Russian Week into a truly international conference. Thanks to the personal engagement of Andrey Raigorodsky and Roman Karasev, we can welcome not only Russian scientists from Dolgoprudny, Moscow, St. Petersburg, Tula and Yaroslavl, but also scientists from all over Europe and the rest of the world. So it is a great pleasure to see among us scientists from research institutions in the Czech Republic, England, France, Hungary, Israel, Mexico, Serbia, South Korea, Switzerland, Wales and the USA.

During my words of welcome you have heard that the DFG is the central, self-governing research funding organization in Germany. But why has the DFG been active in Russia for many decades now? We believe that there is considerable research potential to be gained in many areas of science and the humanities. We have always put a special focus on countries that allow scientific cooperation to be carried out on an equal footing.

Within our agreements and bilateral programmes with the Russian Academy of Sciences, the Russian Foundation for Basic Research – RFBR, and the Russian Foundation for Humanities – RFH, and the new Russian Science Foundation – RSE, innumerable conferences, symposia, visits and research



projects have been implemented in all areas of research, often leading to sustainable integrated networks. Our liaison office in Moscow, as one of only seven DFG offices world-wide, underlines the fact that Russia plays a key role as one of our most important strategic partners. But I will stop here at this point because my colleagues Jörn Achterberg, Jürgen Bretkopf and Frank Kiefer will go into detail later this week and present how the DFG fosters international collaboration, facilitates cooperation among young researchers and supports mathematicians all over the world.

We have heard now – why the DFG is in Russia. And we have heard – why we are here at MIPT today. Moreover we have already heard why we focus on the support of young researchers this week. But we have not yet heard about the actual topic of this conference! Why did we choose “Discrete Geometry” as a major topic? Let me briefly explain why, because actually we did not choose the topic – it was the scientists themselves who chose the topic! And there are good reasons for it!

First of all we wanted to find a field of general interest that we had not touched upon. For a change of topic we decided on mathematics, because this is an area where Germans and Russians have been working together very successfully for a very long time. Mathematics is one of the most fundamental areas in science and mathematics has great potential for application and innovation in all fields of science. When we told Günter Ziegler about our plans for a bilateral week in mathematics he immediately suggested that Roman Karasyov should organise a workshop at MIPT. Thus we rose to the occasion and



teamed up with MIPT. As a result we got the topic “Discrete Geometry” and an international conference.

As a matter of fact this changed the idea of our German-Russian Week. The participation of the week at MIPT here is much more international and the topic is much more specific. In contrast to the weeks before the topic is less interdisciplinary. But this is already the second point why we agreed on “Discrete Geometry” as a major theme.

Usually it was the interdisciplinary aspect that allowed us to invite many different researchers from many different disciplines to set up broad networks. But we have had the experience, that at the end of the weeks young scientists came to us and said that it was all very nice, but the topic was a little too broad. And we know how difficult it is to set up a dialogue between economists,

physicists, chemists and engineers. Today we only have mathematicians among us and we hope that instead of diversity it will be the homogeneous character of the week that will be a source for finding new ideas and approaches.

So, also this week of young researchers will be a platform to exchange our ideas, to enter an academic dispute and real dialogue. In such a way this week will help us to intensify the scientific cooperation between us and between our countries – a cooperation, we need more than ever to bridge the gap between our countries and to strengthen our common friendship.

But now Rector Scharff and I have talked a lot and we do not want to repeat ourselves here. I promise you will not have to listen to us again this week. So it is high time for us to finish and let the young scientists speak!

“What will we be talking about?”

Introductory Remarks

Rector of Ilmenau University of Technology, Prof. Dr Peter Scharff

*Dear Professor Funke,
Esteemed colleagues,
Dear young researchers and students!*

Before commencing this year’s “Fifth German-Russian Week of the Young Researcher” on Discrete Geometry and listening to your lectures, we would like to share some more general information with you about who we are and what we do.

Let me start with some words about DAAD. DAAD is the organization of German higher education institutions, devoted to internationalizing the system of scientific research and innovation. By awarding scholarships and providing customized programs which promote transnational cooperation and university partnerships, DAAD provides students, researchers and instructors the chance to study, work and conduct research at the best institutions in Germany. These efforts correspond to the goals of German cultural diplomacy, education and research policy, as well as development cooperation.

We want to offer scholarships for the best: building on its long-term success in supporting outstanding students and researchers, DAAD wishes to prepare students to take their place as the responsible professionals and leaders of tomorrow. In addition to forming a sustainable network throughout the world, DAAD will place more focus on strengthening the academic and cultural bonds between its scholarship holders and alumni in the future.

We keep our doors open for international cooperation: DAAD will develop its programs in such a way that universities can use them to implement their own internationalization strategies. To ensure that Germany retains its position as one of the most popular destinations for internationally mobile students, we need to attract 350,000 international students by 2020. The aim is to raise their academic success rate to that of German students. By the end of this decade, we wish to ensure that one of every two German graduates gains substantial academic experience abroad. DAAD is a standard-

bearer for German as a language of science and scholarship and advocates multilingualism everywhere.

We form expertise for academic collaboration: DAAD’s activities are based on extensive and differentiated knowledge about the structures of university cooperation and the systems of higher learning and research throughout the world. DAAD relies on the professional experience of its employees and its worldwide network of branch offices, information centers and lecturers. This expertise is updated on a continual basis





and made available for strategic decision-making purposes. Based on this expertise, DAAD will play a more active role in advancing the internationalization of the academic system.

This is why DAAD enhances the dialogue between academic and civil societies as an instrument for mutual understanding. Why is this important? Looking back upon the last century we see a century full of wars, catastrophes and the highest death toll mankind ever paid for the lack of communication or the denial of it. The main reason why DAAD was founded in 1924/25 was to resume the broken communication with Germany's neighbor states and World War I opponents. On the other side the 20th century has brought about a completely new phenomenon, globalisation, which opens new opportunities as well as new challenges.

We all know that science and research play a significant role in this respect and are to find answers and reactions to the challenges of the 21st century. Therefore Germany invests considerable financial means into research and has developed a differentiated landscape of research institutions. Besides universities, which combine teaching and research, there is a good deal of organisations doing research by themselves or financing it.

The most well-known organizations, both in Germany and abroad, are the Deutsche Forschungsgemeinschaft – DFG – (Ger-

man Research Foundation), the Max Planck Society, the Leibniz Society, the Helmholtz Association and the Fraunhofer Society. All these organizations support science and research as such, finance projects, materials, expeditions, technology, experiments and the scientific personnel involved.

As science and research have become more and more vital for development, society, progress and stability – alongside the globalization of ideas and economy – Germany has introduced the idea of a new branch of foreign policy, the “Außenwissenschaftspolitik”. We may translate it by “foreign policy for science and research”. It was Frank Walter Steinmeier, Minister of Foreign Affairs, who, in 2007, had announced this new branch of foreign policy and developed the idea of establishing German Centers for Research and Innovation – DWIH – to represent Germany as the country of research and innovation abroad. This is why we now have Centers in scientifically prospective countries, such as USA/New York; India/New Delhi, Japan/Tokyo, Brazil/Sao Paulo, Egypt/Cairo and Russia/Moscow.

Science and research are inevitable prerequisites for innovation and technological progress, but innovation itself requires management skills and capabilities in addition to economic experience and know-how, to be successfully launched. Therefore, besides the organizations of research, the German economy is integrated into the concept of the Centers.

The mission of the Center in Moscow is to establish a forum, on which German research can be represented, on which a German-Russian dialogue can be practiced. Research institutions and innovative enterprises should be presented, strategic topics may be discussed. There will be marketing for German research; and the Center offers information for Russian and German scientists in various forms. Outstanding German scientists are invited for lectures, science talks are arranged, workshops organized, and the Moscow Center takes part in conferences. A particularly important goal of the Moscow Center is to bring together young researchers from Germany and Russia as future colleagues. Thus the idea of the “German-Russian Week of the Young Researcher” was developed.

Starting with the “First German-Russian Week of the Young Scientist” in Kazan in 2011, followed by the Second Week in Ekaterinburg in 2012 and the third in Novosibirsk in 2013, topics ranging from Energy and Health to Aviation and Spaceflight have been discussed. Last year, in St. Petersburg, we took up a historic topic and held the Fourth Week as “Global History – German-Russian Perspectives on Regional Studies”.

Today, I am glad to welcome you to the Fifth Week which is dedicated to problems to tackle with “Discrete Geometry”.

Thank you for your attention and for your participation in the Fifth Week!

Interview with Günter M. Ziegler (Freie Universität Berlin), Roman Karasev (MIPT) and Frank Kiefer (DFG)

Günter Ziegler and Roman Karasev, you are members of the Organizing Committee and have helped a great deal in getting the Fifth Week of the Young Researcher started. The topic of the conference is “Discrete Geometry”. You have been active in this field of research for ages now – but can you please explain to an absolute beginner what “Discrete Geometry” is all about!

Karasev: In my opinion, discrete geometry is one of the branches of geometry in general, that is the science of spaces, points, lines, etc. Compared to other branches of geometry, the focus of discrete geometry is shifting from considering various spaces themselves to considering figures in spaces, preferably many figures constituting dense packings, optimal coverings, or other nice configurations. For complete beginners, I would mention that discrete geometry is found in the foundations of consumer technologies such as computer graphics, computer aided design, and geographical information systems.

Ziegler: I have worked in the theory of polyhedra for 20 years now. This is an exciting area of discrete geometry, which in ancient Greece produced amazing structures such as the Platonic Solids and which continues to produce extraordinarily beautiful structures, some that one can build in models in wood or paper (or in the Computer), but also some in high dimensions that cannot even be visualized.

Frank Kiefer, you are the Programme Director within the DFG Division of Physics, Mathematics and Geosciences, and are responsible for all scien-



tific areas of mathematics. What are the biggest projects in the field of mathematics that the DFG is funding at the moment and how does “Discrete Geometry” do in this respect?

Kiefer: Aside from our so called Clusters of Excellence funded within Germany’s Excellence Initiative – there is only one cluster centered in mathematics at the University of Bonn – on a smaller but still considerable scale we fund collaborative research centers as our largest coordinated programmes within DFG’s ordinary funding portfolio. We have some of these centers also for mathematical research and there is in particular the SFB/TRR 109 “Discretization in Geome-

try and Dynamics” funded since 2012 where some of the workshop participants from Germany are members and where Discrete Geometry plays an essential role.

Roman Karasev, you initiated the conference and invited leading mathematicians from all over the world to your university. We know that MIPT is one of the leading universities in Russia in physics, mathematics and computer science. Can you please tell us more about the past, the present and the future of research in mathematics at MIPT? What role do contacts to German research institutions and scientists play in the development of international co-operation?



Karasev: Since its foundation in 1946 (as a faculty of Moscow State University), MIPT has been primarily devoted to physics and engineering. Later MIPT started to develop some applied and computational mathematics. Here I should mention that the “PhysTech system” resulted in intensive training of students at MIPT (Dolgoprudny) during their 1-3 years of study and the specialized training in the institutions of the Academy of Sciences and industrial research centers. Therefore it is not quite correct to speak about “Research at MIPT”. Nevertheless there were remarkable mathematicians working at MIPT. Boris Delaunay, one of the founders of the field of “discrete geometry” was the first head of department of higher mathematics. Andrey Bolibruch, who made the major contribution to the solution of Hilbert’s 21st problem, was also teaching at MIPT.

At present the focus is shifting towards developing scientific research at MIPT campus in Dolgoprudny. We make some effort to combine a good teaching of mathematics with doing a world-class research together with our students. One of the organizers of the event, Andrey Raigorodskii, is the Head of the new department of discrete mathematics; he is putting an enormous effort to develop research in this field at MIPT.

Of course, we have personal contacts with people from Germany, for example, with Professor Ziegler and Professor Martini. I co-authored some research papers with Pavle Blagojević, working at Freie Universität Berlin in Günter Ziegler’s group. So far

the co-operation has not reached the institutional level.

Günter Ziegler, in your capacity as Leibniz Prize Recipient you have recently been twice to Russia to hold lectures on geometry. Can you, please, tell us about your interest in Russia and your personal collaboration with Russian mathematicians! How do you rate the level of research in mathematics here in Russia?

Ziegler: Russian Mathematicians have always played a great role, also for me. One of my early papers was with Nikolai Mnev from Petersburg, who is a wonderful mathematician (and artist); one of my recent ones

was published in the Transactions of the Moscow Mathematical Society, because I presented it at a Symposium celebrating the 70th birthday of Victor Buchstaber.

Russian Mathematics was amazing in the twentieth century, and it produced many extraordinary results and theories, led and guided by giants like Alexandrov and Kolmogorov, Arnold, Gelfand, and many others – some of who I still had the honor to meet. As it is well known, Mathematics in Russia suffered a lot from the “brain drain” after the end of the Cold War, when many mathematicians senior (and younger) excellent mathematicians left to the West.





But now I see a new generation of younger coming along, and they are assuming leading roles in the field. This is very visible in my field, Discrete Geometry, in which there is a large group of them, with excellent technical knowledge, intuition, and results – among them are in Roman Karasev (if I may say so in his presence), Alexander Gaifullin, Andrei Raigorodskii, Arsenyan Akopyan, and others. It's exciting to see them take the stage.

Günter Ziegler, Roman Karasev and Frank Kiefer, how would you estimate the scientific results of the week? Did you get any feedback from the participants? Could you or your colleagues broaden



their networks, establish new contacts or find new ideas for further collaboration?

Karasev: I am very satisfied with the scientific content of the week. It is always a pleasure for me to learn something new in mathematics.

Ziegler: For me this was an extraordinarily good and successful week. My personal scientific highlight was the lecture by Arkadiy Skopenkov, which announced further progress on counter-examples to the Topological Tverberg Conjecture: This was one of the great Mathematics breakthroughs of this year 2015, due to Florian Frick from Berlin based on intensive work by Isaac Mabillard and Uli Wagner in Vienna, and it was a

(pleasant) surprise to me to learn that Skopenkov, Mabillard and Wagner are making further break-thoughts there.

This kind of week has the lectures, but beyond those it is also a networking event, and I think as such it was also extremely successful. There were lots of good discussions, problems, and ideas for further work. I think we will see lots of excellent German-Russian work in the next few years that was started here.

Kiefer: This conference was comparatively focused and therefore led to a quite intense exchange between scientists at different career stages. By the time I returned to my office in Bonn I had already received numerous requests concerning possible concrete joint Russian German research projects as the results of the discussions during the conference.

Günter Ziegler and Roman Karasev, it was a Week of the Young Researcher. What did you think about the scientific level of their presentations? Did you notice any difference between Russians or Germans or other researchers? What are your recommendations to the young researchers that plan a scientific career?

Ziegler: The first question perhaps is the easiest one. The level was very high, this was an excellent workshop in an exciting part of Mathematics!

Karasev: There are several questions in one, let me answer one of them. I see some differ-



ence between Russian and German young researchers, maybe not always, but on average. Russian young mathematicians usually prefer to study problems that look elementary and may be, in principle, attacked with elementary techniques. German young mathematicians tend to study deep theories which are less accessible to wide audience. But I see no problem here, both directions must co-exist in my opinion.

Ziegler: If I may add – I think that the combination of elementary problems and ideas

and techniques with, say, deep topological tools, has a lot to offer. It's the combination that makes this exciting.

As for observations, and possible recommendations: I think it is good and important not only to do great work, but also to put a lot of effort into the presentation of your work, on how you explain it – not for your own benefit, but for everyone else's.

Kiefer: I completely agree with everything which has been said above. The differences one sees probably come from different math-

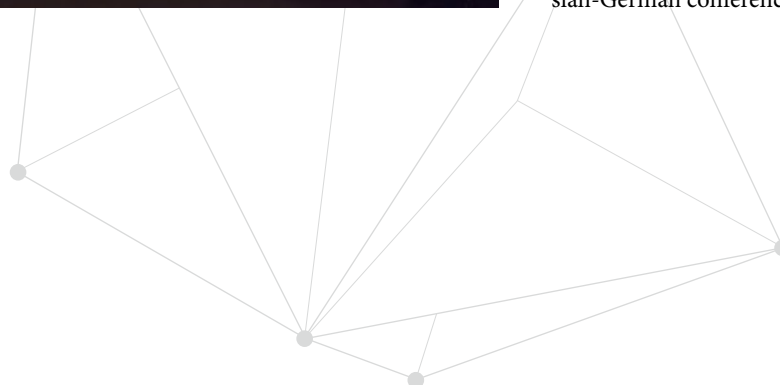
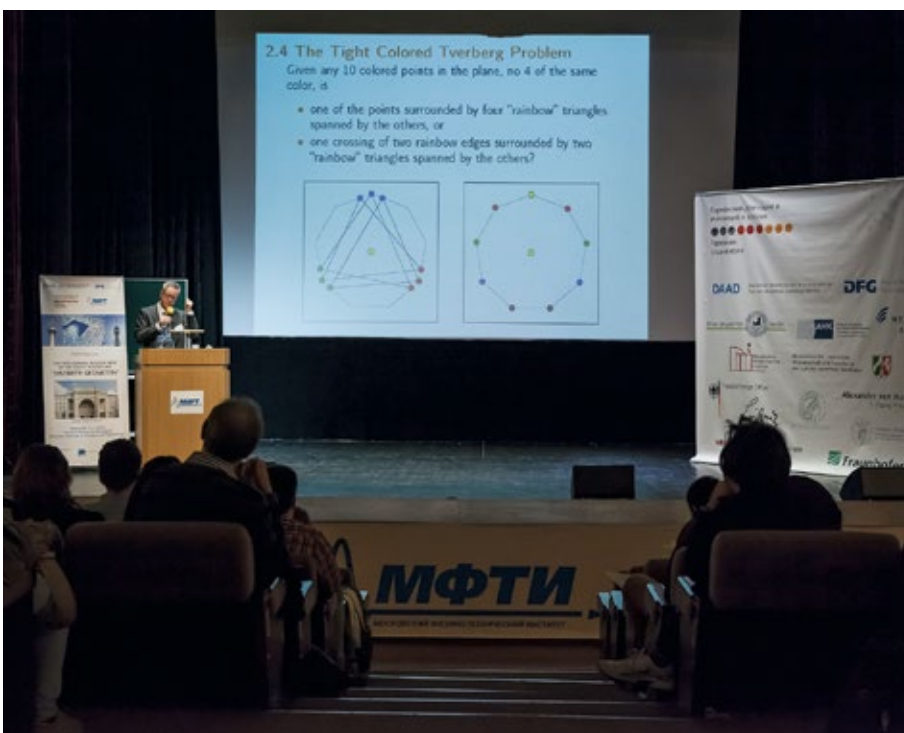
ematical schools and cultures which have developed over generations. But joining the different perspectives can really lead to new insights and offers incredible chances.

Günter Ziegler, Roman Karasev and Frank Kiefer.
What was your general impression of the week, especially concerning the format and the programme? How did you and the other participants like the conference location, the host university and your stay in Russia? Will you come back for more?

Karasev: My impression is that I was very tired even before the event started and was tired all the week. I hope that the participants enjoyed the event, at least I have not heard much of complaints.

Ziegler: Roman did great work in putting it together, so it became a great week – and he has every right to be tired. Of course the programme was very full, and it had lots to offer in terms of the scientific program, but also in the other presentations. In all parts of it the most interactive things were the best, in my opinion – lectures with many questions from the audience, as well as the presentations and discussions about funding possibilities. There are so many opportunities around, so it's important to know about them, and not to miss them.

Kiefer: The conference was very well organized. I felt very comfortable during my stay – both scientifically and personally – and I am therefore looking forward to further Russian-German conferences at this level.



PARTICIPANTS OF THE WEEK OF THE YOUNG RESEARCHER

SENIOR SCIENTISTS



Karim Adiprasito
Professor
Einstein Institute for Mathematics
Hebrew University of Jerusalem

HODGE THEORY FOR COMBINATORIAL GEOMETRIES

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: We prove the hard Lefschetz theorem and the Hodge-Riemann relations for a commutative ring associated to an arbitrary matroid M . We use the Hodge-Riemann relations to resolve a conjecture of Heron, Rota, and Welsh that postulates the log-concavity of the coefficients of the characteristic polynomial of M . We furthermore conclude that the f -vector of the independence complex of a matroid form a log-concave sequence, proving a conjecture of Mason and Welsh for general matroids.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, it was very nice! I knew most of the attendants though, so there was not too much new contacts. However, I was able to work with some colleagues.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: The scientific program was very good, the politic program took too much time. Furthermore, there was no good possibility to just skip the non-scientific part and work with colleagues, as the way to the hotel was somewhat non-nice. Moscow was very nice, the location of the workshop not so ideal.

SENIOR SCIENTISTS



Gergely Ambrus
Research Fellow
Combinatorics and Discrete Mathematics
Alfred Renyi Institute of Mathematics
Hungarian Academy of Sciences, Budapest

SMALL SUBSET SUMS

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: My talk was about the following problem: Given a collection of unit vectors in a general normed space whose sum is the origin, we can always select subsets with arbitrary prescribed cardinality, so that the sum of the vectors in the subset has small norm. We establish general bounds as well as sharp estimates for special cases.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: The scientific exchange has been good, with plenty of opportunities for socializing and discussions.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: The conference location was adequate, and the organization has been excellent. The amount of formal speeches could be a bit decreased (although that is a specialty of the informal character of mathematical conferences).



CUTTING, EMBEDDING, BOUNCING CHARACTERISTIC CLASSES

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: The properties of the regular representation bundles over the configuration space of k distinct points in the Euclidean space has classically been studied extensively by F. Cohen, R. Cohen, Chisholm, Handel, Kuhn, Neisendorfer, V. Vassiliev, and many others. Motivated by geometric problems we present new computations of twisted Euler classes, Stiefel-Whitney classes and their monomials as well as corresponding Chern classes of these bundles. Thus, we not only extend and complete previous work, supplying for example a proof for a conjecture by Vassiliev, but also make progress in solving and extending variety of problems from Discrete Geometry, among them

- the conjecture by Nandakumar and Ramana Rao that every convex polygon can be partitioned into k convex parts of equal area and perimeter;
- Borsuk's problem on the existence of " k -regular maps" between Euclidean spaces, which are required to map any k distinct points to k linearly independent vectors;
- Ghomi and Tabachnikov's problem about the existence of " l -skew smooth embeddings" from a smooth manifold M to a Euclidean space E .

This lecture was based on the joint work with Imre Bárány, (Frederick Cohen, Wolfgang Lueck, Roman Karasev, András Szűch and Günter M. Ziegler).

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: The conference allowed me to discuss several problems with my colleagues from Russia and Hungary. Also, I got acquainted with colleagues whom I did not know personally.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: All organizers of the conference put a lot of work in the organization of the conference and I personally appreciated this. It is my impression that young Russian mathematician did not use this opportunity to meet and get acquainted with established mathematicians all over the world. They could have profited much more from this event. I am fully aware of the cultural heritage and habits since my background is similar, but this kind of events have to be used.



Pavle Blagoević

Professor

Discrete Geometry Group
Mathematical Institute
Freie Universität Berlin

SENIOR SCIENTISTS



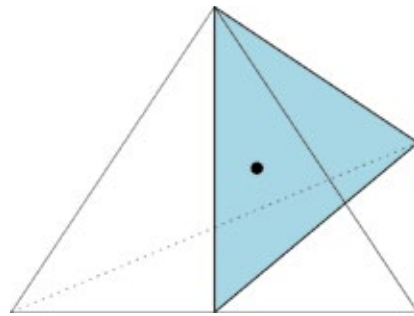


Hauke Dirksen
PhD Student
Department of Mathematics
University of Kiel

SECTIONS OF THE REGULAR SIMPLEX – VOLUME FORMULAS AND ESTIMATES

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: Mathematically speaking, I derive a general formula for the volume of k -dimensional sections of the regular simplex. Using this formula I prove, that for hyperplane sections with small distance from the centroid, the one containing $n-1$ vertices is maximal. Simply speaking I answer the following question: How do I have to cut a pyramid through its center, such that the cutting area is largest possible?



Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Subsequent to my talk I had several conversations. People mentioned different links of my results to their work or that they were working on similar questions by their own.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: It was my first time to visit Russia, so it was very interesting for me. During the event we were taken care of very prudently.



Moritz Firsching
PhD Student
Discrete Geometry Group
Mathematical Institute
Freie Universität Berlin

ENUMERATING SIMPLICIAL POLYTOPES

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: Polytopes can be defined as the convex hull of a set of points. In 3-dimensional space they have been studied for more than 200 years: The 5 regular convex polytopes were known to Euclid. We consider two polytopes to be combinatorially equivalent, if they have isomorphic face lattices. A polytope is simplicial if all its faces are simplices. Previously, the complete classification of 4-polytopes was only known up to 9 vertices. We classified all 4-polytopes with 10 vertices: There are 162004 combinatorial types. This classification was made possible in part by massive computer calculations.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, it was interesting to talk to the Russian colleagues.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: I liked the week very much. The format was great, I especially enjoyed the talks about math. The university was a great location to have the conference.



AFFINE SYMMETRIES OF ORBIT POLYTOPES

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: I gave the talk about a theory I developed in joint work with my colleague Frieder Ladisch. To a finite affine group G we assign a collection of polytopes called orbit polytopes, and to each polytope we assign its affine symmetry group. Combining both steps, we get a family of affine groups containing G . It turns out that most of them are similar to a single group, which we call the generic closure of G . One of our main results is a characterization of purely in terms of G . We use this result to classify all abstract groups which arise as affine symmetry groups of orbit polytopes. Thereby, we answer a question of Babai's from 1977.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, absolutely. Since this was my first presentation of our theory at a conference, I was really glad to receive the positive feedback. I had the

impression that some participants were interested in our researches. At the conference I met many new colleagues, who I got to know during the various evening events.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: I really enjoyed the Fifth German-Russian Week of the Young Researcher. My stay in Moscow was extremely comfortable, due to the amazing organization. The organizers took great care of the housing, the transport, and the catering, so we did not need to worry about anything. I was impressed by the very comprehensive programme, which consisted not only of scientific talks, but also of presentations that offered a number of wholesome advices for scientific work. I would like to thank all the organizers for their enormous efforts, and especially the students of MIPT who supported us in all aspects, and who took us around the city of Moscow during their spare time.



Erik Friese

Research Assistant
Institute for Mathematics
University of Rostock





Albert Haase

PhD Student

Discrete Geometry Group

Mathematical Institute

Freie Universität Berlin

THE HYPERPLANE MASS PARTITION PROBLEM

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: I consider the following Problem: Given n bodies in d -dimensional space, can they be simultaneously sliced into 2^k equal pieces by making k cuts? Take 2 apples for example (here $n=2$, $d=3$, and $k=2$): By making 2 well-chosen cuts with a “knife”, we can simultaneously slice the 2 apples into 4 equal pieces each, leading to a total of 8 pieces. In my talk, I presented recent results concerning a generalized version of the Problem. This is joint work with Florian Frick (Cornell), Pavle V. M. Blagojević (FU Berlin), and Günter M. Ziegler (FU Berlin).

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, certainly.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: The week presented a good opportunity to meet with fellow researchers, get a picture of DFG, DAAD, and DHWI, and learn a bit about research in Russia. Meeting and presenting results to researchers in smaller groups, of say 5 people, would have improved communication and made it easier to get to know and communicate especially with the Russian researchers. Personally, I would have liked to get to know more about the Russian culture by taking (guided) tours of Moscow (city, museums, landmarks) and through other forms of cultural exchange (meetings, social events, discussions).





ORTHOGONAL COLORINGS OF THE SPHERE

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: The talk concerned the proper colorings of the orthogonality graph of lines in the three dimensional space, which has been studied in relation to the Kochen-Specker from quantum mechanics. It is known that this graph has chromatic number four and my talk focused on the problem of characterizing the possible 4-colorings of the orthogonality graph.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, the conference led to several rewarding exchanges.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: The conference was well-organized and most of the scientific talks were very interesting. The local organizers were very friendly and the conference location and accommodations for the participants were commendable. In conclusion, my stay in Russia was great!



Andreas Holmsen

Associate Professor

Department of Mathematical Sciences
Korea Advanced Institute of Science
and Technology, Daejeon

SENIOR SCIENTISTS

THE CENTER PROBLEM IN STRICTLY CONVEX PLANES

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

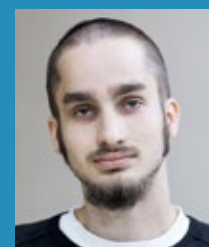
A: The talk addressed the problem of finding the disk of minimum radius containing a given finite set of points in the plane. Although it was posed originally for the Euclidean norm, this so-called center problem can be formulated for arbitrary norms. For the class of strictly convex norms, a simple iterative procedure based on a classification of triangles can be used to solve the problem in a finite number of steps.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, I participated in mathematical discussions during the short coffee breaks and I got to know many colleagues.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: The organizers did a great job before and during the conference, and I like idea behind the Week of the Young Researcher. The broad range of topics covered by the talks was interesting, even though staying focused was hard from time to time. Altogether, I enjoyed the warm atmosphere at the conference (despite the cold weather). Moscow is an impressive city and my stay was delightful.



Thomas Jahn

PhD Student

Faculty of Mathematics
Technical University Chemnitz

SENIOR SCIENTISTS



Martina Juhnke-Kubitzke

Junior Professor

Institute for Mathematics

University of Osnabrück

BALANCED GENERALIZED LOWER BOUND INEQUALITY FOR SIMPLICIAL POLYTOPES

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: I gave the talk about a theory I developed in joint work with my colleague Frieder Ladisch. To a finite affine group G we assign a collection of polytopes called orbit polytopes, and to each polytope we assign its affine symmetry group. Combining both steps, we get a family of affine groups containing G . It turns out that most of them are similar to a single group, which we call the generic closure of G . One of our main results is a characterization of purely in terms of G . We use this result to classify all abstract groups which arise as affine symmetry groups of orbit polytopes. Thereby, we answer a question of Babai's from 1977.

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Lukas Katthän

Postdoc

Institute for Mathematics

University of Osnabrück

RECENT RESULTS ON LOCAL H-VECTORS

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: The local h -vector of a subdivision of a simplex is a numerical invariant. It is used to study how the usual numerical invariants of a simplicial complex, say the f -vector, change under a subdivision. I talked about a joint project with Martina Juhnke-Kubitzke and Richard Sieg, where we aim to extend the known results on local h -vectors to more general types of subdivisions.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: I had many inspiring discussions with the other participants and could establish some new contacts.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: My general impression of the week was very positive. The program was very interesting and diverse, as were the speakers. Also, the conference location was really nice. So, I really enjoyed my stay in Russia and would like to thank once again the organizers for making this possible.



VERTEX-TRANSITIVE POLYHEDRA

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: I talked about “Vertex-Transitive Polyhedra” in three-dimensional (Euclidean) space. The question is whether we can still find new polyhedra with certain symmetries. The polyhedra in question have “holes”, or higher genus, and I looked in particular at the interplay of topological and geometric conditions with the symmetry.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: I met plenty of new people, I got some questions for my presentation and was also able to obtain answers to a few of my questions.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: There was a wide variety of interesting talks, and I think it was a good idea to have scientific talks as well as talks about funding opportunities (especially important for young researchers). Everything ran smoothly, the host university and accommodation were very good choices. Last but not least, I enjoyed the food, and everyone on the organizational team was very helpful, too!



Undine Leopold

Postdoc

Faculty of Mathematics

Technical University Chemnitz

SENIOR SCIENTISTS

ABOUT LOWER BOUND FOR THE NUMBER OF FACETS OF A K-NEIGHBORLY POLYTOPE

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: In the 3-dimensional space, there is only one example of a 2-neighborly polytope. It is a tetrahedron. Every two its vertices form an edge of a polytope (it is a definition of a 2-neighborliness). Already in 4D, there are infinitely many 2-neighborly polytopes.

Polytopes with this property are common in the field of combinatorial optimization (planning, scheduling, optimization of production processes). So it is useful to know some of its properties, for example, the number of facets. I try to estimate the minimal number of facets of such a polytope.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, the conference was useful for me. I have an opportunity to discuss my ideas with Professor G. M. Ziegler. And I have established new contacts with people, who are doing the same math.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: The organization of the conference was excellent! Everything was thought over to trifles. Good work!



Aleksandr Maksimenko

Associate Professor

Delone Laboratory of Discrete and Computational Geometry

Yaroslavl State University

SENIOR SCIENTISTS



Horst Martini

Professor

Faculty of Mathematics

Technical University Chemnitz

DISCRETE GEOMETRY IN MINKOWSKI SPACES

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: This talk referred to results and interesting open problems from the field described by the title. This research area, i.e., the intersection between Minkowskian Geometry (theory of finite dimensional Banach spaces) and Discrete Geometry, was mainly developed within the last two, three decades. Examples presented in the talk refer to universal covers in normed planes, norm-dependent generalizations of Helly-type theorems, Discrete Differential Geometry in normed planes, and problems from Location Science as well as convexity notions like Completeness and Reducedness modified for general norms.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, due to this conference I could exchange scientific ideas and even start collaboration with two young Russian scientists: Dr. Alexandr Polyanskii (Assistant Professor, Moscow Institute of Physics and Technology; State University) and Dr. Grigory Ivanov (Assistant Professor, also at MIPT). We plan a joint DFG research project starting soon, on problems from Minkowskian Geometry.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: The conference was very interesting, various talks (not only) from the Russian side opened new possibilities of mathematical contacts. The organization was perfect, the host university and accommodation were perfectly chosen, and the program was balanced and of high quality. I enjoyed my stay in Moscow very much!





SOLVING MORDELL-EQUATIONS VIA THE SHIMURA-TANIYAMA CONJECTURE

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: The Mordell equation $y^2 = x^3 + a$ is a classical diophantine equation, which is relevant in number theory because of its connection to the classification of elliptic curves. My talk was about a new practical algorithm to solve these equations, and in particular I tried to show what kind of ideas from discrete geometry we used.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, both. This conference was a great opportunity to meet other researchers, to get an update on what others are currently interested in, and of course to discuss maths. This week was very productive. And I even got some good feedback on my own rather number theoretic project.

Q: What was your general impression of the week, especially concerning the format and the programme?

How did you like the conference location, the host university and your stay in Russia?

A: It was a great week, full of interesting talks and participants. And it was perfectly organized: thanks to Roman Karasev and to all involved institutions and people. Besides, it was a particularly interesting time to visit Russia, and I am glad that the conference could take place despite the political tension.



Benjamin Matschke

Researcher
Max Planck Institute for Mathematics,
Bonn

SENIOR SCIENTISTS

VARIATIONS OF THE NERVE THEOREM AND MESHULAM–SPERNER TYPE RESULTS

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: My talk was about relations between a classic theorem in algebraic topology and a classic theorem in Discrete Geometry and the relations to some other results.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, with several people from Russia, Germany, Korea and Mexico.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: It was excellent.



Luis Montejano Peimbert

Professor
Institute for Mathematics
National University of Mexico

SENIOR SCIENTISTS



Ilya Nekrasov

Student

Mathematics and Mechanics Department
Saint Petersburg State University

VOLUME AND LATTICE POINTS COUNTING FOR THE CYCLOPERMUTOHEDRON

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: Generally, my talk about one of the most popular part of the discrete geometry – the geometry of integer polyhedrons. My research stays on border between discrete geometry, combinatorics and the theory of polygonal linkages.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: During the conference I have had a lot of invaluable discussions with other participants of the conference. Also, I can't help but mention that during the conference my work team from St. Petersburg has established new contacts with colleagues from Germany, Russia and Serbia. And we all hope that the Week of the Young Researcher 2015 is just a beginning

of a great and extremely fruitful mathematic cooperation.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: First of all, I want to thank the DFG, DAAD, MIPT university and all other sponsors for a fabulous organization of the conference. All features including the location, the host university, organization of the lectures and entertainment part of the conference were on the highest level. Furthermore, I owe special thanks to the organizers because the Week of Young Researcher 2015 was for me the first international conference. As for general impression, it is an unbelievable communication which can be of benefit to young researchers and grand experts in discrete geometry all around the world. It was exciting!





ACCIDENTAL MEETINGS

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: I talked about the combinatorial structure of tangencies between continuous curves in the plane, and its relevance in discrete and computational geometry. In particular, I sketched the proof of a joint result of mine with N. Rubin and G. Tardos, according to which if there are at least $100n$ tangencies between n curves in the plane, then the number of crossings between them should be much larger. As a corollary, we proved an old conjecture of Richter and Thomassen, which states that the number of intersection points between n closed curves in the plane, no three of which pass through the same point, is at least roughly the square of n .

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, apart from old friends and colleagues working in my field, I met many young researchers from Russian and Germany, and had fruitful scientific discussions with them.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: I liked the conference location and the format of the meeting a lot. I should add that I also like MIPT's (less elegant, but completely appropriate) dormitories, where I stayed during a previous visit. I found the information about funding opportunities quite useful, but I suggest that next time we better concentrate the nonscientific part of the program. We could have just one panel discussion, followed by a reception.

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: I am a PhD student at Freie Universität Berlin and in the graduate program Berlin Mathematical School. As part of the working group Discrete Geometry, I do my research under supervision of Prof. Günter M. Ziegler and Prof. Pavle Blagojević. Especially interesting for me in mathematics is the interplay of topology, geometry and combinatorics. In particular, we try to solve geometric or combinatorial problems using tools from algebraic topology.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: The Fifth Week of the Young Researcher in Moscow offered me a great opportunity to meet a number of researchers from the area and I hope that the new contacts can lead to some future collaborations. Moreover, the talks presented the latest results and developments in this field of mathematics, which gave me a good overview of the current research.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: I am very grateful for the chance to take part in this conference and to visit the host university and Moscow.



János Pach

Professor

Chair of Combinatorial Geometry

École Polytechnique Fédérale
de Lausanne

SENIOR SCIENTISTS



Nevena Palić

PhD Student

Discrete Geometry Group

Mathematical Institute

Freie Universität Berlin

SENIOR SCIENTISTS



Gaiane Panina

Professor

Saint-Petersburg Institute for Informatics and Automation RAS

CYCLOPERMUTOHEDRON

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: Assume we have the set of numbers $\{1,2,\dots,n\}$. One can partition this set into pieces, and after that put the pieces either on the line, or on the circle. In both cases there appears an interesting combinatorics related to these ordered partitions. One can play with these partitions: some of them are coarser than the other, some of them are incomparable, some of the partitions allow further subdivisions, etc. If we play with the line, the corresponding combinatorics is encoded in a convex polytope called “Permutohedron”, which is already old (more that 100 years old!) and classical. Surprisingly, the permutohedron appears as Jack-in-a-box in a variety of problems originating in mathematics and physics. If we play with the circle the corresponding polytope is Cyclopermutohedron. Informally, the cyclopermutohedron can be viewed as “permutohedron with diagonals”. It is a young object, just one year old, and in my talk I gave its construction and described the aforementioned combinatorics of partitions.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?



A: It was a nice opportunity for me and for my younger colleagues to learn more, to exchange scientific ideas, and also to establish new contacts at the conference. This was done not only during the talks, but also during informal conversations, which I highly estimate. Sometimes a half an hour of informal chat gives one some clues and tells more than one can learn from books and papers, say, in a week.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: To my opinion, it was a top level workshop, very well organized in all respects.



MULTILEVEL POLYNOMIAL PARTITIONS



Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: I talked about partitioning finite set of points by zero sets of polynomials, where the parts of the partition have further favorable properties.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, I could exchange ideas with my colleagues.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: First, it was a good idea to organize such a focused conference. The week was perfectly organized and Roman and the others did great work. However, it would be nice if there were chairs and tables outside the lecture room where the participants can sit and exchange scientific ideas. I would also appreciate if we got a map of Moscow at the first day since it was not easy to get them in Moscow directly, especially if you don't speak Russian. To conclude I enjoyed my first stay in Russia.



Zuzana Pátaková

Junior Researcher

Computer Science Institute

Charles University in Prague

SENIOR SCIENTISTS

INVARIANT ZONONDS AND L_1 SPECTRAL RADIUS OF MATRICES

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: We address the problem of computation of the joint spectral characteristics of matrices. This problem has lots of applications in many areas, such as functional analysis, discrete geometry, probability, etc. On the other hand, it is known to be computationally hard. We develop an approach based on geometric ideas, basically, on properties of convex polyhedra.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Yes, I had several fruitful discussions during the conference.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: Everything was very friendly and well-organized. I cannot spot any weak point of the work of organizers. Thank you very much!



Vladimir Protasov

Professor

Faculty of Mechanics and Mathematics

Moscow State University

SENIOR SCIENTISTS



Andrei Raigorodskii

Professor

Chair of Discrete Mathematics

Moscow Institute for Physics & Technology

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: I did not give a talk at the conference, since I was among the organizers. Of course, at least one of my fields of interests is very close to the subject of the workshop. I am working on various questions concerning “colorings” of different spaces and partitionings of sets in the same spaces into parts with some restrictions. Many of my students at MIPT and other universities work on the same type of problems, and some of them have given talks: A. Berdnikov (MIPT), M. Tikhomirov (MIPT), Ph. Pushnyakov (MIPT), L. Shabanov (Higher School of Economics).

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Many of prominent mathematicians in my field came to MIPT: G. Ziegler, J. Pach, H. Martini, etc. Of course, it was a very good chance to see their new results and to show them the recent successes of our school.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: I am happy that we managed to make the program well-balanced, and thus the scientific part was supported by instructive presentations as well as by interesting social events.



Edgardo Roldan-Pensado

Postdoc

Institute of Mathematics,

Universidad Nacional Autonoma de Mexico

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: My talk was based on joint work with M. G. Dobbins, H. Kim, and L. Montejano. We embed a closed curve in a high-dimensional Euclidean space and study the possible shape of its shadows from three different light sources. We show, in the generic case, that they cannot be all paths.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: For me, the conference was a great opportunity to reunite with old collaborators and friends.

Since people working in our area are spread out around the world, these opportunities are not so common.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: I had never visited Russia before and I really wanted to, I liked Moscow very much. Overall, the conference went well and I enjoyed the mathematical talks, the only bad part is that the time for sightseeing was limited. I hope to have the opportunity to visit again in the future.

SHADOWS OF A CIRCLE



A GENERAL EQUILIBRIUM APPROACH TO THE MULTIDIMENSIONAL TIEBOUT HYPOTHESIS

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: People live somehow in a city. There are several places where swimming pools (stadiums, etc) locate. Each citizen chooses a swimming pool to use; the closer – the better, however there are entry costs inversely proportional to the mass of users. That way each person compares different places and chooses the one where total costs are minimal. However, migration choices change masses, hence we are at the position to determine equilibrium group structures. Our result is very general existence of such an equilibrium; plus some stability properties.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: Well, some of them. Plus, I was happy to meet people whom I knew before!

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: Everything was great. Russia is great, MIPT is great, and the conference was great!



Aleksey Savvateev

Associate Professor

Faculty of Innovation of High Technologies

Moscow Institute of Physics & Technology

SENIOR SCIENTISTS

FUNCTIONAL AFFINE-ISOPERIMETRY AND AN INVERSE LOGARITHMIC SOBOLEV INEQUALITY

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: It is joint work with S. Artstein, B. Klartag and E. Werner. We give a functional version of the affine isoperimetric inequality for log-concave functions which may be interpreted as an inverse form of a logarithmic Sobolev inequality for entropy. A linearization of this inequality gives an inverse inequality to the Poincaré inequality for the Gaussian measure.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: It was a very enjoyable conference. I met a number of colleagues that I have not met before. In particular, I enjoyed very much that there were a big number of young scientists giving excellent talks.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: The conference was very well organized and the working conditions were exceptional. I am very glad I attended that meeting and I learned a lot.



Carsten Schütt

Professor

Department of Mathematics
University of Kiel

SENIOR SCIENTISTS



Georgy Sharygin

Associate Professor

Faculty of Mathematics and Mechanics,
Moscow State University

LOCAL FORMULAS FOR THE CHERN CLASSES OF TRIANGULATED S^1 -BUNDLES

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: Roughly speaking, the title of my talk is self-explanatory. If you want more detail, then I would begin with the old theorem, due to R. Thom (dating back to 1958), which claims that Pontrjagin classes of an oriented PL-manifold, in particular of a triangulated manifold, can be defined, when the triangulation is known, i.e. they do not depend on the smooth structure. However, this theorem being a pure existence theorem, the method to define this class is very indirect. So, ever since that time there have been many attempts to make this construction more explicit, i.e. to obtain a formula for a cochain representing Pontrjagin classes of a manifold. In 1972 Levitt and Rourke proved a theorem, in which they showed that not only such formulas exist, but that they can be made local, i.e. such that values of the representing cochain on a simplex will depend only on the structure of the link of this simplex. In my talk,

based on a joint work with N. Mnev (POMI), I addressed a similar, but a little bit different problem of finding similar local formulas for the characteristic classes of triangulated sphere bundles (e.g. sphere bundles of complex or real vector bundles): one can show, that Pontrjagin classes of a PL-manifold are equal to characteristic classes of a sphere bundle, associated to the manifold in a functorial way. Still more particularly my talk was devoted to the case when the dimension of the fibre is equal to 1, i.e. to the characteristic classes of triangulated circle bundles. I gave a very explicit construction expressing the cochain that represents the first Chern class c_1 and its powers in terms of the triangulation; this formula is local in the sense explained earlier.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: I had very little opportunity to establish many new contacts during the conference, since the conference took place during my workdays, so that I couldn't spend much time attending it. However I managed to talk to some of my colleagues (in particular, G. Panina from St. Petersburg and R. Karasev from MIPT) while at the conference and discuss Mathematics with them.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: My general impression of the week is limited to the short time while I attended the conference. However what little I saw produced a very good impression on me as to the organization and the scientific level of this event. I also enjoyed the location very much, Dolgoprudny being one of the rare student towns in Russia.





SOME ANALOGS OF FAIR DIVISION PROBLEMS

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: I considered two types of such problems: the problem of small negligible sets and corresponding non-additive analogs of measures, and the problem on smoothing of infinite number of criteria.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: At the conference I made many interesting scientific contacts.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: I am very grateful to organizers for this interesting program. Many talks were interesting for me. The host university gave me very good impressions.



Fedor Stonyakin

Assistant Professor

Department of Algebra and Functional Analysis

Vernadsky Federal University

SENIOR SCIENTISTS

ARRANGEMENTS OF HOMOTHETS OF A CONVEX BODY

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: It was about joint research with Marton Naszodi and Janos Pach (also participants of the Week). A convex body is a shape without any indentations, such as a triangle, a circle, or an ellipse in the plane, or a polyhedron, sphere, or ellipsoid in three-dimensional space. We are especially interested in very high dimensions. A homothet of a convex body is just a scaling of the convex body, without changing the orientation. I talked about the number of homothets in certain special arrangements of homothets of a fixed convex body. We found upper bounds for the number of homothets, which answered an old question of Furedi and Loeb that arose from certain covering theorems of measure theory. This topic and other closely related ones are also of interest in computational geometry.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: This conference was very stimulating. In fact, in further discussions with my co-workers during that week we were able to further improve some of the results in my talk.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: This was the first time that I visited Russia. Moscow is extremely impressive. Although the conference location was a bit out of the center, it was at a very prestigious university and the conference was very well organised. This was the first time that I have participated in a conference of this type, with a mixture of scientific presentations and presentations about research foundations and how to apply for funds. For me there was a bit too much information about research funding and I would have preferred to have only pamphlets. However, I understand that this aspect is important for the young Russian and German mathematicians who attended.



Konrad Swanepoel

Associate Professor

Department of Mathematics,
London School of Economics
and Political Science

SENIOR SCIENTISTS



Géza Toth

Researcher

Alfred Renyi Institute of Mathematics,
Hungarian Academy of Sciences, Budapest

SATURATED 1-PLANAR GRAPHS

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: A graph is 1-planar if it can be drawn in the plane such that each edge is crossed at most once. The maximum number of edges of a 1-planar graph of n vertices is known to be $4n-8$. However, recently Brandenburg et al. observed a very interesting phenomenon: there are maximal 1-planar graphs with much fewer edges. This is in sharp contrast to planar graphs, since all maximal planar graphs have exactly $3n-6$ edges. In this talk we improve the bounds of Brandenburg et al. for the number of edges of maximal 1-planar graphs.

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: I talked to many people and heard some very interesting and useful talks.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: It was a very well organized and very good conference, I am very grateful that I could participate. The location was great! Probably the only thing I would change is that there were a little bit too many long non-mathematical talks, and we had very little free time to have discussions and walk in the city.



Siniša Vrećica

Professor

Faculty of Mathematics
University of Belgrade

SYMMETRIC MULTIPLE CHESSBOARD COMPLEXES AND SOME THEOREMS OF TVERBERG TYPE

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: Generalizing the notion of chessboard complexes, we introduced the notion of the multiple chessboard complexes and their symmetrised version, the symmetric multiple chessboard complexes. We examined their topological and combinatorial properties and in some cases determined their connectivity and established their shellability. I tried to emphasize the significance of these objects by showing how they appear in many different mathematical situations. As an example, we showed how we were able to use the properties of these complexes to establish some new Tverberg type, and colored Tverberg type theorems. One of them confirms a conjecture of Blagojević, Frick and Ziegler about the existence of «balanced Tverberg partitions».

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: There were a lot of possibilities for exchanging the ideas with our old colleagues and also for establishing new contacts, especially with younger scientists. I believe the meeting was very useful for all of us, and it succeeded in achieving its goal.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: There were many interesting lectures of distinguished specialists in the field, as well as the ideas for the future work. The atmosphere at the meeting was friendly, and I enjoyed my stay in Moscow and Russia very much. The organizers both from MIPT and from DFG did an excellent job.



THE HYPERPLANE MEASURE EQUIPARTITION PROBLEM REVISITED

Q: What was the title of your presentation during the week? Could you please briefly explain what you talked about primarily?

A: The problem of proving the existence of balanced partitions (equilibriums) is interesting both theoretically and in applications (in mechanics, economics, social choice theory, etc.). This is the area where very often sophisticated topological methods are indispensable. My lecture gave an overview (covering two decades of research including the most recent results) of the model problem in this area, the equipartitions of mass distributions in Euclidean spaces by hyperplanes (linear constraints).

Q: Were you able to exchange your scientific ideas with other participants or could you establish new contacts at the conference?

A: As a senior participant and invited speaker I had the opportunity to meet many young mathematicians at an early stage of their career. I certainly had the opportunity to establish new con-

tacts. They are too numerous to be all listed here. Among them were students of Gaiane Panina (from Saint Petersburg), students of Luis Montejano Peimbert (Mexico), and many others. I also had the opportunity to continue earlier established contacts with friends and colleagues from Berlin, Moscow, Budapest, etc.

Q: What was your general impression of the week, especially concerning the format and the programme? How did you like the conference location, the host university and your stay in Russia?

A: I had the opportunity before to participate in meetings that were organized both in Berlin and Moscow. The program was very ambitious, being part of a greater German-Russian collaboration effort. I think that it was a great privilege to participate in such event. As far as the location is concerned, MIPT is an institute with a long and noble tradition. The stay in Moscow was very pleasant and altogether we would like to congratulate the organizers for a memorable conference.



Rade Živaljević

Professor

Dynamical Systems, Geometry
and Combinatorics Center

Mathematical Institute of the Serbian
Academy of Sciences and Arts,
Belgrade

SENIOR SCIENTISTS



“IMAGINARY – THROUGH THE EYES OF MATHEMATICS”

Dear Participants of the Fifth Week of the Young Researcher!

We are happy to introduce you the IMAGINARY Exhibition, which was organized by the German Embassy in Moscow in collaboration with the Mathematisches Forschungsinstitut Oberwolfach (MFO). It was the 10th exhibition organised in Russia. It presented three interactive touch screens and a picture gallery showcasing modern mathematics and current mathematical research. The interactive stations included the program SURFER, a real-time ray-tracer of algebraic surfaces developed at the MFO, the program Morenaments, a mathematical ornament drawing program in connection with the 17 symmetry groups in the Euclidean plane, developed by TU Munich, and the program jReality, a 3D visualization game for minimal surfaces, developed by Matheon / TU Berlin. The exhibition opened with an inauguration speech by Mikhail Rusakov (German Embassy Moscow), Günter

Ziegler (Freie Universität Berlin, Chair of the Scientific Committee of MFO Oberwolfach) and Andreas Matt (MFO Oberwolfach). Trained students of MIPT were present during the opening hours, to explain the underlying mathematical concepts to all visitors.

This exhibition followed previous IMAGINARY exhibitions in Moscow, Ulyanovsk, Yaroslavl, Novosibirsk, Pushchino, Tomsk, Orenburg and Krasnoyarsk. Further exhibitions are planned in Russia.

IMAGINARY first opened in Moscow in 2011, and was then exhibited in Ulyanovsk, Yaroslavl, Novosibirsk, Pushchino, Tomsk, Orenburg and Krasnoyarsk followed. The popularity of the exhibition demonstrates the high value of mathematics in Russia.

IMAGINARY is a prize-winning mathematics outreach project, initiated by the Mathematisches Forschungsinstitut Oberwolfach (MFO) in 2007 that aims to communicate modern mathematics to a broad public in an aesthetic, interactive and collaborative way.

IMAGINARY offers an open-source platform for interactive and participative maths communication. The platform www.imaginary.org currently hosts over a hundred exhibits in form of image galleries, mathematical films, interactive programs and hands-on exhibits. This includes the two successful exhibitions: “IMAGINARY – through the eyes of mathematics” and “Mathematics of Planet Earth”. Since 2008, the exhibitions have been shown in more than 135 cities in 35 countries and in 21 languages and they have attracted several million visitors. IMAGINARY is funded by the Klaus Tschira Stiftung (2011–2016) and has projects supported by the German Federal Ministry of Education and Research (2008–2009, 2014–2016) and UNESCO (2015–2016).



Opening of the IMAGINARY exhibition with Günter M. Ziegler, Andreas Matt (both MFO Oberwolfach) and Mikhail Rusakov (German embassy in Moscow).



The key features of IMAGINARY are:

- It is close to mathematics research and mathematicians, in as much as working mathematicians develop and communicate content in all areas of mathematics.
- It is international and multilingual by cooperating with research institutions, universities, and museums worldwide.
- It is free, open access, and open source as all IMAGINARY content is available under an open source license: free of cost, free to use, if possible with source code.
- It is physical and interactive through the organization of real events, exhibitions, workshops, and conferences, cooperation with museums and schools, online and offline.
- It is appealing, aesthetic, advanced as it combines aesthetic and attractive design with advanced technology for high profile presentations.
- It is participatory by creating an international network where everybody can use the IMAGINARY content and contribute their own content and ideas.

IMAGINARY at MIPT, Moscow 2015.

About the Mathematisches Forschungsinstitut

Oberwolfach (MFO): The Mathematisches Forschungsinstitut Oberwolfach (MFO) is one of the most renowned institutes of its kind. Each year it hosts about 2500 mathematicians from all over the world, who use it as a convention and research center. It is appreciated in the scientific community as an institution setting high standards for its workshop and research program. Even though most mathematical research is published through electronic media, the personal contact between researchers retains its importance. This is particularly true for mathematics, where the high degree of abstraction in the subject enhances the central role of ideas exchange and personal communication. The institute

invites internationally renowned experts, together with more junior scientific talents, to work together for a short, intensive time. The remote location of the institute offers ideal conditions for research activities meant to influence and stimulate the future development of a research field. The scientific programs of the MFO are designed to encompass the entire breadth of mathematics, including its scientific and technical applications. The importance of modern mathematics for today's society is often underestimated, since it is often hiding behind the many technological and societal applications. It is astounding how much mathematical know-how from fields such as number theory, graph theory or optimization has

been applied in everyday things such as mobile phone, credit cards and cars.

The MFO is also partner of a unique museum: the museum for minerals and mathematics (MiMa) in Oberwolfach. The MiMa invites you to explore the wonderful world of mathematics and minerals. Not only does it host unique mineral treasures of the area, or provide artistic views into mathematics, but it shows the captivating link between the two areas. Installations on the themes of symmetry and crystallography will give you new insights into these two fields.

More information: www.mfo.de and www.mima.museum

PUBLISHING SCIENTIFIC RESEARCH IN JOURNALS AND BOOKS



Erdmuthe Raufelder

Journal Coordination
Manager

Springer-Verlag GmbH,
Heidelberg

Some key facts about Springer. Founded in 1842 Springer is a leading global scientific publisher providing researchers in academia, scientific institutions and corporate R&D departments with quality content via innovative information products and services. Each year Springer publishes some 2,400 English-language journals and more than 9,000 books in the fields of science, technology, medicine, business, transport. SpringerLink is one of the leading internet science portals offering over 9 million documents. Springer numbers more than 200 Nobel Prize laureates among its authors of books and journal articles. Today Springer is present in some 25 countries worldwide.

Why publish, and why publish in English? Publishing is an integral part of research aiming to present and share new and original results or methods. It is the obligation of scientists to advance scientific knowledge and help to enhance the scientific progress. To be able to participate in scientific communication a good command of English as the international language of science is prerequisite.

Status of scientific publications in Russia. Research output measured by number of citable docu-

ments per year is growing in Russia. However, comparing with neighboring regions or countries with similar population size the output and growth rate of research output in Russia is lagging behind. With 50,430 documents published in 2014 Russia ranks 15 in the Scimago Country¹ ranking after Brazil, South Korea and the Netherlands.

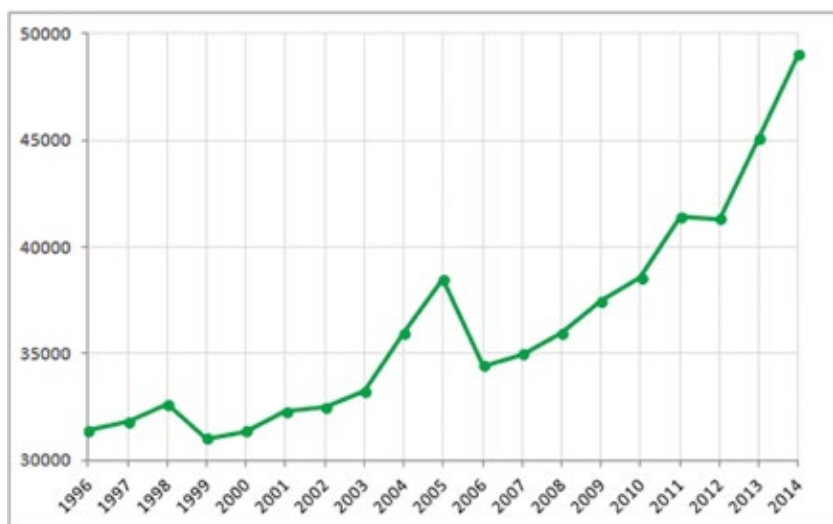
Current trends in scholarly publishing – Open Access.

Open Access publishing is digital, online, free of charge and free of most copyright and licensing restrictions². Increasingly universities, research institutions and funding agencies have adopted open access mandates. Researchers are required to provide open access to their peer-reviewed research articles by depositing them in open access repositories.

Over the last ten years the number fully open access journals has seen a steep growth from under 2000 in 2005 to over 10,000 in 2015 from over 130 countries and a total of over 2 million articles. Springer publishes over 550 fully Open Access journals under its brands BiomedCentral and SpringerOpen. In addition, authors can choose to publish their articles Open Access in traditional journals under its Open Choice program.

Springer's role in the value chain. Journal editors are key players in the publishing value chain. They are responsible for the scientific quality of the journal as a cornerstone of its reputation. The scope of the journal is defined in the Aims & Scope published on the journal's homepage.

For authors the most important factors to select a journal include the journal's reputation, the



¹ SCImago. (2007). SJR — SCImago Journal & Country Rank. Retrieved October 30, 2015, from <http://www.scimagojr.com>

² Peter Suber <http://www.earlham.edu/~peters/fos/overview.htm>



quality of the papers published, the quality of peer review, the international scope, the speed of publication and the coverage in abstracting and indexing services.

In addition to the reference list of the paper intended for submission Springer offers a helpful tool: Springer Journal Selector <http://www.springer.com/gp/authors-editors/journal-author>.

The Instructions For Authors guide authors in the preparation of the manuscript. Special attention should be given to the wording of the title, the spelling of author names and consistency in affiliations. The abstract should contain a summary of the objective and results including the key message of the paper. Keywords serve as search terms in search engines. Ideally they should not repeat terms from the title.

Research evaluation. There is much debate over Impact Factors in the scientific community, particularly with regard to the fairness of the system. However, there is no doubt that an Impact Factor is seen as a benchmark of quality of the journal in many academic communities. As an example the 2014 is calculated using the formula below:

Number of citations in 2014 to articles published in 2012 + 2013

Total citable articles published in 2012 + 2013

The Impact Factor is discipline specific depending on the publishing and citation behavior, the size of the field, the number of articles published per year, etc.

Other metrics include Google Scholar, Microsoft Academic Search, and the Scimago Journals Ranking (calculated according to a similar formula but based on journals listed in SCOPUS).

However, getting a paper in Web of Science or Scopus should not have higher priority than publishing in a reputable venue, which brings your research to scientists in your field. In Russia and Kazakhstan the number of publications in dubious journals is increasing.

Book publishing. Academic books have a different purpose from academic journals. An academic book is a complete scholarly work on a specific topic. Book chapters fulfill a similar role to re-

view articles, with books representing a collection of manuscripts on related topics whereas review articles published in journals are usually unrelated to all of the other articles in the same issue. Books include a large bibliography, recommended readings, summaries, an index and sometimes exercises.

Different types of books include monographs, edited volumes, textbooks, professional texts, reference works, handbooks, popular science books and proceedings.

The publisher's evaluation is based on a short description of the planned book, its aims & scope, main emphasis, main target group, prerequisites needed to understand the book, and its relation to other publications in the area.

Furthermore, the publisher needs a table of contents, including a rough page estimate and a short summary of the main chapters (like for a conference paper) as well as some information on the book authors or editors. For an edited book a list of contributors will be helpful. Lastly, an estimated submission date should also be included.

Editorial contacts and helpful information on how to prepare book and journal manuscripts can be found on the publisher's homepage at <http://www.springer.com>.

In Russia we are working via our authorized agent 100K20 LLC, please feel free to contact their Moscow office in case of any questions.



Matthias Aicher

SpringerNature
Representative Russia

Springer is the Number 1 global scientific publisher, founded in 1842 and providing researchers in academia, scientific institutions and corporate R&D departments with quality content via innovative information products and services. With more than 200 Nobel Prize winners among the authors of our books and journal articles, it is safe to say that Springer has earned its place among the world's foremost STM publishers. Largest open access portfolio worldwide, with over 500 open access journals.

SpringerLink – One of the leading internet science portals, including more than 8.5 million documents, an eBook Collection with more than 170,000 titles, journal archives digitized back to the first issues in the 1840s and more than 30,000 Protocols and more than 400 Reference Works. <http://link.springer.com/>

Springer's role in the journal value chain



SCIENTIFIC ORGANIZATIONS



MOSCOW INSTITUTE OF PHYSICS & TECHNOLOGY (NATIONAL RESEARCH UNIVERSITY)



Dr. Tagir Aushev

Vice-Rector for Scientific
Affairs and Strategy

Moscow Institute of Physics and Technology (MIPT) is one of the world's most prestigious educational institutions and a top Russian research university. It trains highly qualified specialists in theoretical and applied physics, applied mathematics, informatics, biotechnology and related disciplines.

MIPT was founded in 1951 by Nobel laureates: Pyotr Kapitsa, Nikolay Semyonov, and Lev Landau. From the outset, MIPT has used an unique system of education, which commonly known as the "Phystech System". The general principles of the system are rigorous selection of gifted and creative young individuals, extensive education

in fundamentals, involvement of leading scientists in students' learning process, and deploying the best research laboratories in the country to teach in an atmosphere of scientific discovery and innovative engineering.

For 60 years, the legendary "Phystech System" has trained thousands of distinguished scientists who have taken prominent positions in the international scientific community and received worldwide recognition.

Today MIPT is synonymous with high-quality education and graduate demand. There are ten Nobel Prize winners and a number of prominent Russian businessmen among MIPT alumni, as well as key members of the Russian Academy of Sciences – whose president, Vladimir Fortov, is similarly an MIPT alumnus. The MIPT brand is well known among our international partners – global technical universities and research centers. Their leaders form the International Board of MIPT. Over 650 international students from 25 countries are trained now at MIPT.

Our mission is to serve as a key center for Russia's integration with global science and to become a new growth point of national science and technology. Every research university around the world has mutual interests in discussing and solving the same high-priority issues. We share the mutual objective of attracting stellar students. Our common mission is guide their passion as it matures into their profession.





THE GERMAN HOUSE FOR RESEARCH AND INNOVATION (DWIH) MOSCOW

The German Houses of Research and Innovation (DWIH) provide a platform for the German research and innovation landscape, showcasing the accomplishments of German science, research, and research-based companies and promoting collaboration with Germany and innovative German organizations. They are part of the Internationalization Strategy of the German Federal Government and the Federal Foreign Office's Research and Academic Relations Initiative. The Federal Foreign Office is implementing this project in cooperation with the Federal Ministry of Education and Research and in close collaboration with the Alliance of German Science Organizations, which includes the Alexander von Humboldt Foundation, Fraunhofer-Gesellschaft, German Academic Exchange Service (DAAD), German Council of Science and Humanities (WR), German National Academy of Sciences Leopoldina, German Rectors' Conference (HRK), German Research Foundation (DFG), Helmholtz Association, Leibniz Association, Max-Planck-Gesellschaft – as well as the Association of German Chambers of Industry and Commerce (DIHK).

The houses were created for various goals:

- Promote Germany as a research location
- Provide a forum for international dialogue and scientific exchange
- Provide support and services (advising for international researchers; organizing educational events; facilitating collaboration)

The German House for Research and Innovation in Moscow goes back to a June 2009 meeting between Germany's then Foreign Minister Frank Walter Steinmeier and his Russian counterpart Sergey Lavrov, when both agreed with expanding the institute under the leadership of the DAAD. In 2011 a joint declaration between Dr. Guide Westerwelle and Sergey Lavrov on the establishment of a German House of Research and Innovation in Moscow was signed. Currently the DWIH project in Moscow is lead jointly by the German Academic Exchange Service (DAAD) and the German Research Foundation (DFG)

and comprises partners with a representation/ representative in Moscow like the Helmholtz Association of German Research Centres (HGF), Alexander von Humboldt-Foundation (AvH), the Freie Universität Berlin and the German Historical Institute (DHI) Moscow. The German-Russian Chamber of Foreign Commerce (AHK) and the Ministry of Innovation, Science and Research of Northrhine-Westfalia are also members of the DWIH. DWIH Moscow's current director is Dr. Gregor Berghorn (DAAD).

In its various activities the DWIH Moscow focuses mainly on the topics of the German-Russian Modernization Partnership, i.e. climate, energy, health care, resource management, logistics and legal cooperation. Beside these, it has established an event portfolio on additional fields of German Russian scientific interest as aviation and space, energy saving technologies in constructing, bioenergy and several more. The DWIH regularly organizes and supports German-Russian events like e.g.:

- Science Lectures of outstanding German scientists
- Science Talks with high-ranked representatives of German and Russian
- The „German-Russian Week of the Young Researcher“, once a year on varying subjects in the Russian regions
- Regular meetings with rectors of leading Russian universities
- Symposia/Conferences on current scientific topics
- Information seminars in centres of scientific and innovative research in Russia
- Economy and innovation: participation in economic conferences on innovative topics
- Round table talks with scientists and journalists
- Participation in fairs in the field of German research marketing

In 2014, the German House of Research and Innovation in Moscow participated in more than 40 events and organized itself several high-ranked scientific events.

Deutsches Wissenschafts- und Innovationshaus – Moskau



Deutschland
Land der Ideen



Dr. Gregor Berghorn
Managing Director
of DWIH Moscow



Dr. Martin Krispin
Project Coordinator



Dr. Jürgen Breittkopf
Programme Director
Group of Research Careers

DEUTSCHE FORSCHUNGSGEMEINSCHAFT GERMAN RESEARCH FOUNDATION

The Deutsche Forschungsgemeinschaft (German Research Foundation) is the biggest funding agency in Europe for the development of fundamental research with an annual budget of approximately 3 billion Euro. Its membership consists of German research universities, non-university research institutions, scientific associations and the Academies of Science and the Humanities. The DFG has expanded its presence in other research regions around the world with its 7 liaison offices. The office Russia/CIS was opened in Moscow in 2003. Framework agreements on the co-funding of research projects and researcher mobility exist with the following partners: the Russian Academy of Sciences (RAN), the Russian Foundation for Basic Research (RFFI), the Russian Foundation for the Humanities (RGNF) and the Russian Science Foundation.

How does the DFG promote young researchers? Creative and intelligent minds are the key to successful science and research. That is why the Deutsche Forschungsgemeinschaft (German Research Foundation) places a special focus on promoting young researchers. We are committed to helping young talents pursue cutting-edge investigations in top-level settings and help them to become independent early on in their careers.

Flexible individual funding and customised excellence programmes give young researchers the opportunity to advance in their careers and undertake projects from all branches of science and the humanities. The DFG accepts funding proposals from researchers with a doctoral degree (PhD) who live and work in Germany or plan to do so in the future. PhD students are not supported individually, but can be, indirectly through the funding of programmes and projects.

Project-based doctoral and post-doctoral qualifications. For doctoral researchers, who like working in a team and value a well-designed framework, a Research Training Group (RTG) may be the right choice. It combines an ambitious research

programme with target-oriented supervision and academic freedom to form an ideal environment for a successful doctorate. Post-docs help design the research and qualification programmes of an existing RTG and explore new research topics for your future career.

Following completion of the doctorate there is the possibility to assume responsibility as an investigator in an existent DFG-funded project. This will give young researchers the opportunity to advance their qualifications and improve their career prospects by gaining experience and by building new networks.

The Temporary Position is a funding mechanism that provides young researchers with funding for a temporary post-doctoral position in conjunction with a proposal for a research grant. Researchers may select the scientific setting in Germany that they think will provide the best conditions for their project.

Excellence programmes. The Emmy Noether Programme is aimed at outstanding scientists and academics with at least two and no more than four years of post-doctoral research experience (or up to six years for licensed medical doctors). It allows young researchers to head their own independent junior research group that will work on a project for five or, in exceptional cases, six years. It offers a fast-track opportunity to qualify for a leading position in research.

For young researchers, who have all the qualifications for a professorship, the Heisenberg Programme may be the right option. This programme provides them with funding for up to five years so they can distinguish themselves further academically. There are two variations of the programme: the portable Heisenberg fellowship, which also allows one to go abroad for some time; and the Heisenberg professorship, which offers the prospect of acquiring a tenured position at a German university, provided the candidate receives a positive review.



THE GERMAN ACADEMIC EXCHANGE SERVICE (DAAD)



The German Academic Exchange Service (DAAD) is the largest funding organisation in the world supporting the international exchange of students and scholars. Since it was founded in 1925, more than 1.5 million scholars in Germany and abroad have received DAAD funding. It is a registered association and its members are German institutions of higher education and student bodies. Its activities go far beyond simply awarding grants and scholarships. The DAAD supports the internationalisation of German universities, promotes German studies and the German language abroad, assists developing countries in establishing effective universities and advises decision makers on matters of cultural, education and development policy.

Its budget is derived mainly from the federal funding for various ministries, primarily the German Federal Foreign Office, but also from the European Union and a number of enterprises and organisations. Its head office is in Bonn, but the DAAD also has an office in the German capital, Berlin, to which the famous Berlin Artists-in-Residence Programme (Berliner Künstlerprogramm) is closely affiliated. It maintains contact with and provides advice to its main partner countries on every continent via a network of regional offices and information centres.

In 2014, the DAAD funded more than 120,000 German and international scholars worldwide. The funding offers range from a year abroad for undergraduates to doctoral programmes, from internships to visiting lectureships, and from information gathering visits to assisting with the establishment of new universities abroad. Voluntary, independent selection committees decide on the funding. The selection commit-

tee members are appointed by the DAAD's Executive Committee according to certain appointment principles. The DAAD supports the international activities of German institutions of higher education through marketing services, publications, the staging of events and training courses.

The DAAD's programmes have the following five strategic goals:

- to encourage outstanding young students and academics from abroad to come to Germany for study and research visits and, if possible, to maintain contact with them as partners lifelong;
- to qualify young German researchers and professionals at the very best institutions around the world in a spirit of tolerance and openness;
- to promote the internationality and appeal of Germany's institutions of higher education;
- to support German language, literature and cultural studies at foreign universities;
- to assist developing countries in the southern hemisphere and reforming countries in the former Eastern Bloc in the establishment of effective higher education systems.



Dr. Gregor Berghorn
Head of DAAD Office
Moscow





HELMHOLTZ ASSOCIATION OF GERMAN RESEARCH CENTRES MOSCOW OFFICE



Dr. Jelena Jeremenko

Head of Helmholtz
Moscow Office

www.helmholtz.ru

The Helmholtz Association researches major challenges to secure the future of our society. With almost 38,000 staff and an annual budget of almost €4 billion, the Helmholtz Association is Germany's largest scientific organization. The Helmholtz Association brings together 18 scientific-technical and biological-medical research centers.

The Helmholtz Association contributes to solving large-scale challenges which face society, science and industry – by undertaking top-rate research in strategic programs in the fields of Aeronautics, Space and Transport, Earth and Environment, Energy, Health, Matter as well as Key Technologies. We research systems of great com-



plexity with our large-scale facilities and scientific infrastructure, cooperating closely with national and international partners. As Germany's largest scientific research community we contribute to shaping our future by combining research and technology development with perspectives for innovative applications and provisions for tomorrow's world.

To answer these challenges, the Association combines knowledge and resources from various disciplines and centers and creates strategic inter-

national alliances. Cooperation and networking with national and international partners from science and research, and especially from the universities and industry, are its key to producing outstanding research findings – more efficiently and quickly.

An excellent research infrastructure – in some cases with unique major scientific facilities and instrumentation – clearly demonstrates the strength which has made the Helmholtz Association a much sought-after research partner. Each year, several thousand visiting scientists from all around the world use the research opportunities which the Helmholtz Centers offer. The Association acts as a core focal point for worldwide research project – whether in the observation and study of the global climate or in the field of basic research in physics.

The Helmholtz Association aims to be an active and driving force in establishing the research area worldwide. This is why Helmholtz opened branch offices in Brussels, Moscow and Beijing. The Helmholtz Association chose Russia to be one of its key strategic partners to jointly face the challenges of the future through scientific cooperation. Partners in Germany looking for specific information about Russia and Russian seeking contacts in Germany have an excellent starting point in identifying the right people for their special interests. The transfer of new technologies and the exchange of promising young research talent hold great potential for the future development of both Germany and Russia.

The Moscow Office represents the interests of Helmholtz Association as a whole in Russia. It serves both Helmholtz scientists and Russian researchers interested in mutual cooperation. Its main tasks are to provide help for scientific partners to establish contacts, to promote joint projects and to foster the exchange of scientists, with the goal of helping initiate and establish new strategic networks of scientific excellence between Russia and Germany.



THE ALEXANDER VON HUMBOLDT FOUNDATION



Alexander von Humboldt
Stiftung/Foundation

The Alexander von Humboldt Foundation promotes academic co-operation between excellent scientists and scholars from Germany and abroad. AvH research fellowships and research awards allow scientists to come to Germany to work on a research project they have chosen themselves together with a host and a collaborative partner. As an intermediary organization for German foreign cultural and educational policy AvH promotes international cultural dialogue and academic exchange.

What is important to us? Only one thing is important to becoming a member of the Humboldt Family: your own excellent performance. There are no quotas, neither for individual countries nor for particular academic disciplines. AvH selection committees comprise of academics from all fields of specialisation and they make independent decisions based solely on the applicant's academic record. So in this case people are supported, specific not projects. After all, even in times of increased teamwork, it is the individual's ability and dedication that are decisive for academic success.

Roots of the AvH: Alexander von Humboldt was a discoverer and cosmopolitan. He was a fighter for the freedom of research, a humanist and a patron of excellent academic talent. Shortly after his death, the Alexander von Humboldt Foundation for Nature Research and Travel was established in 1860.

Today's Alexander von Humboldt Foundation was established by the Federal Republic of Germany on 10 December 1953. With Humboldt as a model, the Foundation maintains an international network of academic co-operation and trust. It links more than 25,000 Humboldtians throughout the world together, including 49 Nobel Laureates. The Foundation is funded by the Federal Foreign Office, the Federal Ministry of Education and Research, the Federal Ministry for Economic Co-operation and Development, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety as well as a number of national and international partners.

Become a Humboldtian: Whether you are a young post-doctoral researcher at the beginning of your academic career, an experienced established academic, or even a world authority within your discipline – our research fellowships and research awards offer you sponsorship specifically tailored to you and your career situation.

Key Sponsorship Programmes:

- Research Fellowships for post-doctoral researchers and for experienced researchers (up to 24 months of stay in Germany).
- Awards (Sofja Kovalevskaja Award, Friedrich Wilhelm Bessel Research Award, Humboldt Research Award, Alexander von Humboldt Professorship and others)
- German Chancellor Fellowships to prospective leaders from the USA, the Russian Federation and China who have shown an outstanding potential for leadership in their careers thus far. For representatives of all professions and disciplines, giving special preference to the humanities, law, social science and economics.



Professor Dr Vladimir Tishkov

Ambassador Scientist
of Humboldt Foundation
Moscow State University,
Faculty of Chemistry




Tobias Stüdemann

Liaison Office
of the Freie Universität
Berlin in Moscow

FREIE UNIVERSITÄT BERLIN

The 5th week of the Young Researcher stands in an already long line of conferences, dedicated to bringing together young academics from Russia and Germany. Fostering scientific careers by developing professional networks is one of the key elements of Freie Universität Berlins career path model. Career development of young researchers is a cornerstone of the „International Network University“ concept, successful in the German Excellence Initiative in 2007 and 2012. It is therefore no surprise that Freie Universität Berlin has been present at all prior weeks and has actively taken part with about half a dozen key note speakers and more than a dozen doctoral students and young scientists. Interdisciplinary topics like „Men and Energy“, „Men and Health“, „Global History“, and „Discrete Geometry“ are core research fields of Freie Universität and the conference weeks therefore have been actively supported by the Moscow liaison office from the very outset.

Discrete Geometry – the topic of the 2015 week of the young researchers – as part of mathematics represents a main focus of the Berlin-Brandenburg region, being one of the biggest mathematical network areas in the world. Not only is Berlin hosting the Berlin Mathematical School (BMS), a joint graduate school of the mathematics departments of the three major Berlin universities, Technical University Berlin, Freie Universität Berlin, and Humboldt-Universität zu Berlin. Berlin is as well the place of the „Research Center Matheon. Mathematics for Key Technologies“ and unites not only the above mentioned three Berlin universities, but also the Weierstrass Institute for Applied Analysis (WIAS) and Stochastics and the Zuse Institute Berlin (ZIB).

It is therefore not surprising, that the first issue of the journal of the Einstein Foundation „Albert“ is dedicated to mathematics, since one of the centers, supported by the Berlin Einstein foundation is the Einstein Center for Mathematics Berlin (ECMath), the common platform for excellent mathematics in Berlin. It unites the

above-mentioned universities and organizations with the German Center for Teacher Education in Mathematics (DZLM), the Research Campus Modal, and several Collaborative Research Centers (CRCs) or Transregional Research Centers (TRs) – underlining the importance of mathematics for the German capital.

Having attended all five weeks of the young researchers since 2011, it is a good opportunity to take a closer look at how these networking events are utilized by the Russian and international participants. The three main events – opening session, keynote lectures by experienced Russian and international scientists and short presentations of young researchers – are open to all interested specialists and even students, being actively involved in the conference or just wanting to get a first impression on how conferences conducted entirely in English „feel“. Especially with the background of the rising demand to be internationally integrated into the scientific community, the weeks of the young researcher offer





a great possibility to gain first experience during a whole week. A lot of opportunities – not only during the lectures and scientific sessions, but also during excursions, evening receptions and coffee breaks – are included to allow socializing and networking.

As part of the open door policy of the events, all Russian co-organizing universities shared their auditoriums for these weeks and provided an excellent infrastructure. Nevertheless, it seems that they have missed an opportunity to get their own researchers closely involved in the event and support their integration into the international scientific community. Some young participating researchers were not able to stay for lectures of colleagues as they were required to be elsewhere. Even during the opening event only the participants from the outside were present.

On different levels Russian higher education institutions and research entities are being urged to invite foreign students and scholars, to publish in high ranked peer review journals and, at the end of the day, integrate themselves into the international community. All these efforts are closely monitored by the authorities, like by the

yearly monitoring on effectiveness of the Russian Ministry of Science & Education, or by the support of the Program 5-100-2020, striving to lift at least five Russian universities into the top 100 of the international rankings before the year 2020. In light of these efforts the conference weeks should have been a logical next step forward.

Invited Russian and foreign scholars are usually highly ranked – such as, for example, the winner of the DFG Leibniz and Communicator prizes Prof. Ziegler, of the Department of Mathematics and Computer Science of Freie Universität Berlin this year – and would be expected to attract special interest by professors, young researchers and advanced students to join for at least some of the sessions, to get a first glimpse, a free impression on how these people work and the rare opportunity to get in contact with them. For the next conference Weeks Of The Young Researcher – organized by the Russian hosts and German funding organizations – I would love to see this opportunity utilized to its full extent – especially in times of economic difficulties, budget cuts, and political differences, there is no easier way to become internationally connected than during such a high ranked event at home.



LIST OF PARTICIPANTS

THE GERMAN-RUSSIAN WEEK OF THE YOUNG RESEARCHER: DISCRETE GEOMETRY

Moscow, September 6–11, 2015

TITLE	LAST NAME	FIRST NAME	STATUS / INSTITUTION
Dr.	ACHTERBERG	Jörn	Head of DFG Office Moscow, Deputy Head of DWIH Moscow
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Dr.	ALIEV	Iskander	Senior Lecturer, Cardiff School of Mathematics, Cardiff University
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Prof. Dr.	BÁRÁNY	Imre	Research Professor, Combinatorics and Discrete Mathematics, Alfred Renyi Institute of Mathematics, Hungarian Academy of Sciences, Budapest
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Mr.	DANESHPAJOUH	Hamid Resa	PhD Student, School of Mathematics, Institute for Research in Fundamental Sciences, Tehran
Prof. Dr.	DEREVNINA	Anna	Vice-Rector for International Relations, Moscow Institute of Physics and Technology
Mr.	DIRKSEN	Hauke	PhD Student, Department of Mathematics, University of Kiel



TITLE	LAST NAME	FIRST NAME	STATUS / INSTITUTION
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Mrs.	ILINA	Julia	Project Manager, DFG Office Moscow
Mr.	JAHN	Thomas	PhD Student, Faculty of Mathematics, Technical University Chemnitz
Mrs.	JELIĆ	Maria	PhD Student, Faculty of Mathematics; University of Belgrade
Dr.	JUHNKE-KUBITZKE	Martina	Junior Professor, Institute for Mathematics, University of Osnabrück

TITLE	LAST NAME	FIRST NAME	STATUS / INSTITUTION
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Prof. Dr.	KARASEV	Roman	Professor, Department of Mathematics Moscow Institute of Physics and Technology
Dr.	KATTHÄN	Lukas	Postdoc, Institute for Mathematics, University of Osnabrück
Dr.	KIEFER	Frank	Programme Director, Group of Physics, Mathematics, Geosciences, DFG Bonn
Dr.	KRISPIN	Martin	Project Coordinator, DWHI Moscow
Prof. Dr.	KUDRYAVTSEV	Nikolay	Rector, Moscow Institute of Physics and Technology; Corresponding Member of Russian Academy of Sciences
Prof. Dr.	KVARDAKOV	Vladimir	Deputy Chairman of the of the Board, Russian Foundation of Basic Research, Moscow
Dr.	KUPAVSKII	Andrei	Postdoc, Faculty of Innovation of High Technologies, Moscow Institute of Physics and Technology
Dr.	LEOPOLD	Undine	Postdoc, Faculty of Mathematics, Technical University Chemnitz
Dr.	MAGAZINOV	Aleksandr	Postdoc, Combinatorics and Discrete Mathematics, Alfred Renyi Institute of Mathematics, Hungarian Academy of Sciences, Budapest
Dr.	MAKSIMENKO	Aleksandr	Associate Professor, Delone Laboratory of Discrete and Computational Geometry, Yaroslavl State University
Prof. Dr.	MARTINI	Horst	Professor, Faculty of Mathematics, Technical University Chemnitz
Dr.	MATSCHKE	Benjamin	Researcher, Max Planck Institute for Mathematics, Bonn
Dr.	MATT	Andreas	Assistant, Mathematical Research Institute (Forschungsinstitut für Mathematik), Oberwolfach
Mr.	MEITZNER	Andreas	Minister, Deputy Head of Mission, Embassy of the Federal Republic of Germany to the Russian Federation, Moscow



TITLE	LAST NAME	FIRST NAME	STATUS / INSTITUTION
Prof. Dr.	MONTEJANO PEIMBERT	Luis	Professor, Institute for Mathematics, National University of Mexico
Dr.	NASZÓDI	Márton	Assistant Professor, Department of Geometry, Loránd Eötvös University, Budapest
Mr.	NEKRASOV	Ilya	Student, Mathematics and Mechanics Department, Saint Petersburg State University
Prof. Dr.	PACH	János	Chair of Combinatorial Geometry, École Polytechnique Fédérale de Lausanne
Mrs.	PALIĆ	Nevena	PhD Student, Discrete Geometry Group, Mathematical Institute, Freie Universität Berlin
Academician, Prof. Dr.	PANCHENKO	Vladislav	Chairman of the Board, Russian Foundation for Basic Research, Moscow
Prof. Dr.	PANINA	Gaiane	Professor, Saint-Petersburg Institute for Informatics and Automation RAS
Dr.	PATÁKOVÁ	Zuzana	Junior Researcher, Computer Science Institute, Charles University in Prague
Prof. Dr.	PROTASOV	Vladimir	Professor, Faculty of Mechanics and Mathematics, Moscow State University
Mr.	PUSHNYAKOV	Philipp	Student, Faculty of Innovation of High Technologies, Moscow Institute of Physics and Technology
Prof. Dr.	RAYGORODSKII	Andrei	Chairman, Chair of Discrete Mathematics, Moscow Institute of Physics and Technology
Mrs.	RAUFELDER	Erdmuthe	Journal Coordination Manager, Springer-Verlag GmbH, Heidelberg
Dr.	ROLDAN-PENSADO	Edgardo	Postdoc, Institute of Mathematics, Universidad Nacional Autónoma de México
Mr.	RUSAKOV	Mikhail	Economic and Science Department, Embassy of the Federal Republic of Germany to the Russian Federation, Moscow
Mrs.	SAVOSTINA	Anna	Project Coordinator, DWIH Moscow

TITLE	LAST NAME	FIRST NAME	STATUS / INSTITUTION
Dr.	SAVVATEEV	Aleksei	Associate Professor, Faculty of Innovation of High Technologies, Moscow Institute of Physics and Technology
Prof. Dr.	SCHARFF	Peter	Rector, Ilmenau University of Technology; Member of DAAD Executive Committee
Prof. Dr.	SCHÜTT	Carsten	Professor, Department of Mathematics, University of Kiel
Mr.	SHABANOV	Lev	Student, Faculty of mathematics, Higher School of Economics, Moscow
Dr.	SHARYGIN	Georgy	Associate Professor, Faculty of Mathematics and Mechanics, Moscow State University
Mrs.	SHEVEREVA	Svetlana	Deputy Head of the International Relations Department, Russian Foundation for Basic Research, Moscow
Mr.	SHIPILOV	Aleksey	Project Coordinator, Helmholtz Association, Moscow Office
Prof. Dr.	SKOPENKOV	Arkady	Professor, Faculty of Innovation of High Technologies, Moscow Institute of Physics and Technology; Independent University of Moscow
Dr.	STONYAKIN	Fedor	Assistant Professor, Department of Algebra and Functional Analysis, Vernadsky Federal University
Prof. Dr.	STRAUSZ SANTIAGO	Ricardo	Professor, Institute for Mathematics, Universidad Nacional Autonoma de Mexico
Mr.	STÜDEMANN	Tobias	Head of the Liaison Office of Freie Universität Berlin in Moscow
Dr.	SWANEPOEL	Konrad	Associate Professor, Department of Mathematics, London School of Economics and Political Science
Prof. Dr.	TARDOS	Gábor	Professor, Combinatorics and Discrete Mathematics, Alfred Renyi Institute of Mathematics, Hungarian Academy of Sciences, Budapest
Mr.	TIKHOMIROV	Mikhail	PhD Student, Faculty of Innovation of High Technologies, Moscow Institute of Physics and Technology



TITLE	LAST NAME	FIRST NAME	STATUS / INSTITUTION
Prof. Dr.	TISHKOV	Vladimir	Ambassador Scientist of Humboldt Foundation; Faculty of Chemistry, Moscow State University
Prof. Dr.	TIMORIN	Vladlen	Professor, Faculty of Mathematics, Higher School of Economics, Moscow
Prof. Dr.	TÓTH	Géza	Researcher, Alfred Renyi Institute of Mathematics, Hungarian Academy of Sciences, Budapest
Prof. Dr.	VERESHCHAGIN	Nikolai	Professor, Faculty of Mathematics, Higher School of Economics, Moscow
Mr.	FREIHERR VON FRITSCH	Rüdiger	Ambassador of the Federal Republic of Germany to the Russian Federation, Moscow
Mr.	VOYNOV	Andrey	PhD Student, Faculty of Mechanics and Mathematics, Moscow State University
Dr.	VOLOVIKOV	Aleksei	Associate Professor, Department of Higher Mathematics, Moscow State Institute of Radio-Engineering, Electronics and Automation
Prof. Dr.	VREĆICA	Siniša	Professor, Faculty of Mathematics, University of Belgrade
Dr.	ZHUKOVA	Alena	Senior Lecturer, Faculty of Liberal Arts and Sciences, Saint Petersburg State University
Prof. Dr.	ŽIVALJEVIĆ	Rade	Professor, Dynamical Systems, Geometry and Combinatorics Center, Mathematical Institute of the Serbian Academy of Sciences and Arts, Belgrade
Prof. Dr.	ZIEGLER	Günther	Discrete Geometry Group, Mathematical Institute, Freie Universität Berlin; Chair of the Scientific Committee, Mathematisches Forschungsinstitut Oberwolfach

PROGRAMME

SEPTEMBER 6, SUNDAY

- Arrival of Participants Transfer from Sheremetyevo Airport (SVO) to Hotel**
- 19:00 **Buffet Dinner and Words of Welcome** to the participants of the week by
- Dr. Gregor Berghorn, DAAD Moscow
 - Dr. Jörn Achterberg, DFG Moscow
 - Dr. Roman Karasev, MIPT

SEPTEMBER 7, MONDAY

- 09:00 **Transfer from Hotel**
- 09:30 **Registration of Participants** at MIPT
- 10:00 **Official Opening of the Week at MIPT Moscow Institute of Physics and Technology**
with welcome addresses by
- Prof. Dr. Nikolai Kudryavtsev, Rector of MIPT
 - Mr. Mikhail Rusakov, Embassy of the Federal Republic of Germany in the Russian Federation
 - Prof. Dr. Peter Funke, Vice-President of the DFG
 - Prof. Dr. Peter Scharff, Member of DAAD Executive Committee,
Rector of Ilmenau University of Technology
- 10:45 **Presentation of National Research University Moscow Institute of Physics and Technology**
- 11:00 **Opening Lecture** “Equivariant Methods in Discrete Geometry: Problems and Progress”
Professor Dr. Günter Ziegler
Mathematical Institute, Discrete Geometry Group,
Freie Universität Berlin
– Discussion –
- 12:15–12:45 **Official Opening of travelling exhibition “IMAGINARY – through the eyes of mathematics”**
- Prof. Dr. Günter Ziegler, Chair of Scientific Committee of MFO (Mathematisches
Forschungsinstitut Oberwolfach – Oberwolfach Research Institute for Mathematics)
 - Dr. Andreas Matt, Curator of “Imaginary”, MFO Oberwolfach
 - Mr. Mikhail Rusakov, Embassy of the Federal Republic of Germany in the Russian Federation
- The opening will be followed by a standing reception (including **light lunch**).
- 14:00 **Introductory Remarks to the 5th German-Russian Week of the Young Researcher**
- Prof. Dr. Peter Funke, Vice-President of the DFG
 - Prof. Dr. Peter Scharff, Member of DAAD Executive Committee
- 14:30–17:15 **Scientific Lectures**
Chair:
- Prof. Dr. Günter Ziegler, Freie Universität Berlin
 - Prof. Dr. Roman Karasev, MIPT



- 14:30–15:10 **Professor Dr. Pavle Blagojević**,
Mathematical Institute, Discrete Geometry Group,
Freie Universität Berlin
“Cutting, Embedding, Bouncing Characteristic Classes”
– Discussion –
- 15:15–15:35 **Moritz Firsching** (FU Berlin):
“Enumerating Simplicial Polytopes”
- 15:40–16:00 **Albert Haase** (FU Berlin):
“The Grünbaum-Hadwiger-Ramos Hyperplane Mass Partition Problem”
- 16:00 **Coffee Break**
- 16:30–16:50 **Arkadiy Skopenkov** (MIPT and Independent University of Moscow):
“A Classification of Link Maps of Graphs to \mathbb{R}^3 and Polyhedra to \mathbb{R}^m ”
- 16:55–17:15 **Alexey Volovikov** (Moscow State Institute of Radio-Engineering,
Electronics and Automation):
“Borsuk-Ulam Type G-Spaces”
- 17:30 **DWIH Science Lecture** on the occasion of the opening of IMAGINARY
“Geometry in Interactive Mathematics Communication – Examples and Adventures”
Dr. Andreas Matt,
Mathematisches Forschungsinstitut Oberwolfach
(Oberwolfach Research Institute for Mathematics)
- 18:30 **Transfer to Hotel and Dinner**
- 20:00 **Transfer to Moscow, Red Square**
Free time for sightseeing
- 22:30 **Transfer to Hotel**

SEPTEMBER 8, TUESDAY

- 08:30 **Transfer from Hotel**
- 09:00 **DWIH Moskau**
Deutsches Haus für Wissenschaft und Innovation / German House for Research and Innovation
• Dr. Gregor Berghorn, DAAD Moscow
• Dr. Jörn Achterberg, DFG Moscow
- 09:30 **DFG – Deutsche Forschungsgemeinschaft / German Research Foundation**
Dr. Frank Kiefer,
Programme Director,
Group of Physics, Mathematics, Geosciences, DFG Bonn
- 10:00–12:40 **Scientific Lectures**
Chair:
• Prof. Dr. Carsten Schütt, University of Kiel
• Prof. Dr. János Pach, École Polytechnique Fédérale de Lausanne
and Alfred Renyi Institute of Mathematics, Budapest

- 10:00–10:40 Professor Dr. János Pach,**
Chair of Combinatorial Geometry,
École Polytechnique Fédérale de Lausanne and Alfred Renyi Institute of Mathematics, Budapest
“Accidental Meetings”
– Discussion –
- 11:10–11:50 Professor Dr. Carsten Schütt,**
Department of Mathematics, University of Kiel
“Functional Affine-Isoperimetry and an Inverse Logarithmic Sobolev Inequality”
– Discussion –
- 11:55–12:15 Konrad Swanepoel** (London School of Economics and Political Science):
“Arrangements of Homothets of a Convex Body”
- 12:20–12:40 Hauke Dirksen** (University of Kiel):
“Sections of the Regular Simplex – Volume Formulas and Estimates”
- 12:40 Lunch**
- 14:00–16:25 Scientific Lectures**
Chair:
• Prof. Dr. Pavle Blagojević, Freie Universität Berlin
• Dr. Alexander Gaifullin, Steklov Mathematical Institute
- 14:00–14:20 Andreas Holmsen** (KAIST, Daejeon and EPFL, Lausanne):
“Orthogonal Colorings of the Sphere”
- 14:25–14:45 Thomas Jahn** (TU Chemnitz):
“The Center Problem in Strictly Convex Planes”
- 14:50–15:10 Undine Leopold** (TU Chemnitz):
“Vertex-Transitive Polyhedra”
- 15:15–15:35 Martina Juhnke-Kubitzke** (University of Osnabrück):
“Balanced Generalized Lower Bound Inequality for Simplicial Polytopes”
- 15:40–16:00 Lukas Katthän** (University of Osnabrück):
“Recent Results on Local h-Vectors”
- 16:05–16:25 Gergely Ambrus** (Alfred Renyi Institute of Mathematics, Budapest):
“Small Subset Sums”
- 16:30 Transfer to Hotel**
- 17:30 Transfer to the Evening Reception**
- 19:00 Evening Reception at MIPT Moscow**
With welcome addresses by
• Representative of MIPT
• Mr. Andreas Meitzner,
Minister, Deputy Head of Mission,
Embassy of the Federal Republic of Germany in Russian Federation



SEPTEMBER 9, WEDNESDAY

- 08:30 **Transfer from Hotel**
- 09:00–12:30 **Scientific Lectures**
 Chair:
 • Prof. Dr. Horst Martini, TU Chemnitz
 • Dr. Imre Bárány, Alfred Renyi Institute of Mathematics
- 09:00–09:40 **Professor Dr. Luis Montejano,**
 Institute for Mathematics,
 National University of Mexico
 “Variations of the Nerve Theorem and Meshulam-Sperner type results”
 – *Discussion* –
- 09:45–10:25 **Professor Dr. Horst Martini,**
 Faculty of Mathematics,
 Technical University Chemnitz
 “Discrete Geometry in Minkowski Spaces”
 – *Discussion* –
- 10:30–10:50 **Márton Naszódi** (Loránd Eötvös University, Budapest):
 “Proof of a conjecture of Bárány, Katchalski, and Pach”
- 10:50 **Coffee Break**
- 11:20–12:00 **Professor Dr. Vladimir Protasov,**
 Faculty of Mechanics and Mathematics, Moscow State University
 “Invariant Zonoids and L1 Spectral Radius of Matrices”
 – *Discussion* –
- 12:05–12:25 **Erik Friese** (University of Rostock):
 “Affine Symmetries of Orbit Polytopes”
- 12:30 **DFG – Deutsche Forschungsgemeinschaft**
 Funding Opportunities for Young Scientists:
 “Promoting Early Research Careers”
 Dr. Jürgen Breitkopf, Programme Director,
 Group of Research Careers, DFG Bonn
- 13:30 **Lunch**
- 14:30–16:30 **Scientific Lectures**
 Chair:
 • Dr. Benjamin Matschke,
 Max Planck Institute for Mathematics, Bonn
 • Prof. Dr. Vladimir Protasov, Moscow State University
- 14:30–14:50 **Georgy Sharygin** (Moscow State University):
 “Local Formulas for the Chern Classes of Triangulated S^1 -Bundles”

- 14:55–15:15 **Mikhail Tikhomirov** (MIPT):
"On Computational Complexity of Length Embeddability of Graphs"
- 15:20–15:40 **Lev Shabanov** (Higher School of Economics, Moscow):
"Distance Graphs in the Plane"
- 15:45–16:05 **Dmitry Gorbachev** (Tula State University):
"Asymptotic Lower Bound and Parametric Family of Weighted Spherical Designs"
- 16:10–16:30 **Aleksei Berdnikov** (MIPT):
"The Chromatic Numbers of Metric Spaces with Several Forbidden Distances"
- 16:30 **Coffee Break**
- 16:45–18:15 **SPRINGER-Workshop**
"Publishing scientific research in journals, conference proceedings and books"
Mrs. Erdmuthe Raufelder,
Springer-Verlag GmbH, Heidelberg
- 18:15 **Transfer to Hotel**
- 19:00 **Transfer to Bowling Club „Kosmos“**
Dinner and Bowling Evening
- 22:30 **Transfer to Hotel**

SEPTEMBER 10, THURSDAY

- 08:30 **Transfer from Hotel**
- 09:00–12:30 **Scientific Lectures**
Chair:
• Dr. Andrei Kupavskii, MIPT
• Prof. Dr. Karim Adiprasito, Einstein Institute for Mathematics,
Hebrew University of Jerusalem
- 09:00–09:40 **Professor Dr. Karim Adiprasito,**
Einstein Institute for Mathematics,
Hebrew University of Jerusalem
"Log-Concavity of Whitney Numbers of the First Kind"
– Discussion –
- 09:45–10:25 **Dr. Benjamin Matschke,**
Max Planck Institute for Mathematics, Bonn
"Solving Mordell Equations Via the Shimura-Taniyama Conjecture"
– Discussion –
- 10:30–10:50 **Alexander Gaifullin** (Steklov Mathematical Institute, Moscow):
"Volumes of Flexible Polyhedra in Lobachevsky Spaces"
(Steklov Mathematical Institute, Moscow)
- 10:50 **Coffee Break**
- 11:20–11:40 **Ricardo Strausz** (Universidad Nacional Autonoma de Mexico):
"On the MacPhersonian"



- 11:45–12:05 **Iskander Aliev** (Cardiff University):
“A Quantitative Doignon-Bell-Scarf Theorem”
- 12:10–12:30 **Nikolay Vereshchagin** (Higher School of Economics, Moscow):
“On Tilings of the Plane by Polygons”
- 12:30 **Lunch**
- 13:30 **Presentations of Members of DWIH Moscow**
German Academic Exchange Service (DAAD)
Helmholtz Association of German Research Centres
Alexander von Humboldt-Foundation
- 14:30–18:05 **Scientific Lectures**
Chair:
• Prof. Dr. Andreas Holmsen, Korea Advanced Institute of Science and Technology
• Prof. Dr. Iskander Aliev, Cardiff University
- 14:30–15:10 **Gaiane Panina** (Saint-Petersburg Institute for Informatics and Automation):
“Cyclopermutohedron”
- 15:15–15:35 **Ilya Nekrasov** (Saint Petersburg State University):
“Volume and Lattice Points Counting for the Cyclopermutohedron”
- 15:40–16:00 **Alena Zhukova** (Saint Petersburg State University):
“Discrete Morse Theory for the Moduli Space of a Flexible Polygon,
or Solitaire Game on the Circle”
- 16:00 **Coffee Break**
- 16:30–16:50 **Zuzana Patáková** (Charles University in Prague):
“Multilevel Polynomial Partitions”
- 16:55–17:15 **Edgardo Roldan-Pensado** (Universidad Nacional Autonoma de Mexico):
“Shadows of a Circle”
- 17:20–17:40 **Andrey Kupavskii** (MIPT):
“Translative Covering of the Space with Slabs”
- 17:45–18:05 **Aleksander Maksimenko** (Yaroslavl State University):
“About Lower Bound for the Number of Facets of a k -Neighborly Polytope”
- 18:15 **Transfer to Hotel and Dinner**

SEPTEMBER 11, FRIDAY

- 08:30 **Transfer from Hotel**
- 09:00–13:00 **Scientific Lectures**
Chair:
• Prof. Dr. Rade Živaljević, Mathematical Institute of the Serbian Academy of Sciences and Arts
• Prof. Dr. Gaiane Panina, Saint-Petersburg Institute for Informatics and Automation
- 09:00–09:40 **Professor Dr. Siniša Vrećica**
Faculty of Mathematics, University of Belgrade
“Symmetric Multiple Chessboard Complexes and Some Theorems of Tverberg Type”
– Discussion –

- 09:45–10:25 **Professor Dr. Rade Živaljević**
Mathematical Institute of the Serbian Academy of Sciences and Arts
“The Hyperplane Measure Equipartition Problem Revisited”
– Discussion –
- 10:30–10:50 **Alfredo Hubard** (Institute National de Recherche en Informatique
et an Automatique, Sophia-Antipolis):
“Limits of Order Types”
- 10:55–11:15 **Vladlen Timorin** (Higher School of Economics, Moscow):
“Maps That Take Lines to Plane Curves”
- 11:15 **Coffee Break**
- 11:40–12:00 **Aleksander Magazinov** (Alfred Renyi Institute of Mathematics, Budapest):
“Half-Space Depth of a Line”
- 12:05–12:25 **Géza Tóth** (Alfred Renyi Institute of Mathematics, Budapest):
“Saturated 1-Planar Graphs”
- 12:30–12:50 **Gábor Tardos** (Alfred Renyi Institute of Mathematics, Budapest):
TBA
- 13:00 **Lunch**
- 14:00–16:00 **Scientific Lectures**
Chair:
• Prof. Dr. Andrei Raigorodskii, MIPT
• Prof. Dr. Konrad Swanepoel, London School of Economics and Political Science
- 14:00–14:20 **Alexei Savvateev** (MIPT):
“A General Equilibrium Approach to the Multidimensional Tiebout Hypothesis”
- 14:25–14:45 **Alexey Glazyrin** (University of Texas Rio Grande Valley, Brownsville):
“Linear and Semidefinite Relaxations for Spherical Codes”
- 14:50–15:10 **Andrey Voynov** (Moscow State University):
“Self-Affine Convex Bodies and Bounded Semigroups of Affine Operators”
- 15:15–15:35 **Fedor Stonyakin** (Vernadsky Federal University):
“Some Analogues of Fair Division Problem”
- 15:40–16:00 **Philipp Pushnyakov** (MIPT):
“Around Turán’s Theorem for Some Distance Graphs”
- 16:00 **Coffee Break**
- 16:15–17:15 **DWIH-Workshop and Panel Discussion**
with participants of the week
• Dr. Gregor Berghorn, DAAD Moscow
• Dr. Jörn Achterberg, DFG Moscow
• Dr. Jürgen Breitkopf, DFG Bonn
• Tobias A. Stüdemann, Freie Universität Berlin, Moscow
- Closing remarks**
- 17:30 **Transfer to Hotel and Dinner**

