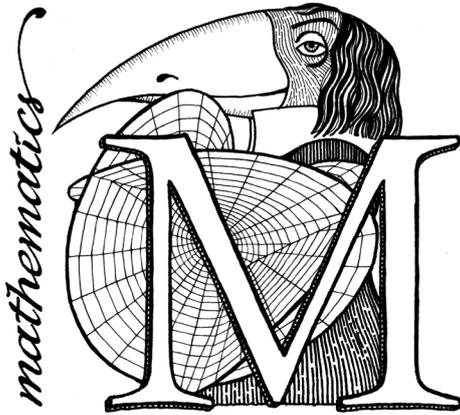


"Mathematics knows no races or geographic boundaries;  
for mathematics, the cultural world is one country."

— David Hilbert



Mathematics is the language of patterns and relationships; it's the basis of any part of human knowledge that can be quantified and our Faculty of Mathematics proves the rule. In his interview Professor Lando mentioned that the parameters laid in the original model of their department were seven years later used in the overall structural university reform. Thus we can say that in a way our Faculty of Mathematics was a successful pilot project that became a role model for other faculties later. In the first issue of 2015 we bring our mathematicians into the spotlight with the idea of forming a proper trend for the new year – so that it is as genuinely logical and consistent as mathematics is.

**Director of Internationalization  
Yulia Grinkevich**

## “Mathematics was a niche for talented people who didn't want to deal with ideology”

**The Dean of the Faculty of Mathematics,  
Professor Sergei Lando, talks about mathematics  
and mathematical education in Russia then and now  
and about the life of the faculty that he heads.**

**Sergei Lando** graduated from Moscow State University where he later defended his thesis at the graduate school. In 2005 the Steklov Mathematical Institute of the Russian Academy of Sciences awarded Professor Lando the degree of Doctor of Sciences (an academic degree awarded in recognition of advanced research qualifications and sustained contribution to scientific knowledge). Professor Lando has worked as a researcher in quite a number of institutes in Perm, Pereslavl-Zalessky and Moscow, including the Institute for System Research of the Russian Academy of Sciences. As a mathematician his interests lie in the fields of algebraic geometry, theory of singularities, low dimensional topology, and combinatorics. Professor Lando is a member and a Vice-President of the Moscow Mathematical Society, a member of the American Mathematical Society and of the Moscow Mathematical Journal editorial board. Free time is not something that Professor Lando has in abundance. He rests no more than ten days a year, but when he does, he escapes to Finland to do some canoeing on one of the country's lakes.

### **Mathematics in Russia**

Russia is one of the world leaders in mathematics. Despite the fact that this status has been decreasing slightly since 1970s, we are still at quite a high level. One of the reasons why we reached such a level was that mathematics as a science does not carry any ideological burden. As a result, in the Soviet Union mathematics had the role of a social niche for talented people who didn't want to deal with ideology. The state also was interested in giving its citizens a decent mathematical education because a large number of these citizens were supposed to be hired for work in the defense sectors of the Soviet Union. The average quality of mathematical education at schools was also quite good; mathematics was given plenty of classroom hours.

During the Soviet era in Russia and in the former Soviet republics, a very well-developed system of in-depth mathematical education was formed, in schools and beyond. This system included school and university mathematical study groups, competitions, boarding schools under the auspices of the leading universities, even summer and winter mathematical camps. The uniqueness of this system was that it was decentralized and heterogeneous. Because of the involvement of numerous enthusiastic math teachers, every circle or study group had its own individual face. Luckily, this system turned

out to be very viable and despite the challenges faced by science in the 1990s, parts of it survived and even thrived and developed because many limitations ceased to exist in the new Russia. The number of school graduates with a high level of mathematical training, and the level of this training itself, are far higher than the results seen in other countries. I mean not only the results demonstrated by students during competitions but also their ability to master a creative approach to the standard mathematical school programme. One of the characteristics of our school education in mathematics is that gifted kids are given specially-tailored study programmes that help them to cut their way into modern mathematical science.

### Faculty

The HSE administration initiated the Faculty of Mathematics in 2007. It was based on the grounds of the Independent University of Moscow at first – a small non-governmental institution founded during perestroika in 1991, one year prior to the formation of HSE. So the initial professorial body of our faculty consisted of nine academics, all of whom came from the Independent University. The people who joined later were invited based on the results of open, both national and international competition. Cooperation with the Independent University remains very tight – many of our instructors read lectures at both institutions and together we coordinate “Maths in Moscow”, a study programme that allows North American students to study maths in Moscow for a semester.

Today the Faculty of Mathematics has about 70 professors and 20 researchers who work in two labs. One is the Laboratory for Algebraic Geometry and its Applications headed by Fyodor Bogomolov (Professor at the Courant Institute, NYU) and the other is the International Laboratory of Representation Theory and Mathematical Physics headed by Roman Bezrukavnikov (also a Professor at MIT) and a prestigious Fields medal winner Andrey Okunkov (Professor of Columbia University, New York). About 50 master's students are enrolled in two study programmes in Mathematics (taught in English) and Mathematical Physics and there are about 25 graduate students. There are also more than 200 undergraduate students.

Last but not least, our small administrative department includes the editorial team of the *Moscow Mathematical Journal*. We started the journal in 2001 and soon afterwards it began to be indexed by international citation databases. According to a survey conducted by the Australian Mathematical Society in 2009, MMJ was the only Russian journal listed under category A (with only A+ being higher; no Russian journals were listed there).

Of course, our results should be assessed by experts from the outside, not by me. But if you did ask me, I would name the following as our most significant achievements.

- An established team of professors and researchers that bring together outstanding and mature scholars; their younger colleagues, mathematicians who already have displayed excellent results in international science; as well as promising younger colleagues and students.
- Our ability to consistently attract strong students to our bachelor programmes. We attract those who strive to learn and make tremendous efforts to achieve that. The percentage of students who enroll and were not able to keep up is relatively small.
- Active academic cooperation with the leading institutes of the Russian Academy of Sciences, such as the Steklov Mathematical Institute, the Kharkevich Institute for Information Transmission Problems and the Lebedev Institute of Physics.
- The fact that our faculty is integrated into the global mathematical science world. Our professors come from Japan, Great Britain, Canada, France and many Russian colleagues hold PhDs from leading western universities like Harvard. Visiting colleagues from European, North American and Japanese Universities read lectures and hold seminars on our grounds almost every week. Our outgoing mobility is also quite well-developed. We take part in organizing international conferences and our academics give yearly hundreds of talks at a variety of conferences. Three of our scholars were invited to give a talk at the International Congress of Mathematicians in 2014, the highest level mathematical conference, held every four years.
- We have an International Advisory Board that provides us with top quality academic expertise and evaluation of our work. Among the experts there are three holders of the Fields medal, including Pierre Deligne, a laureate of the Abel prize.
- And, of course, the unique atmosphere of interaction between undergraduate and graduate students and their professors in a world saturated by mathematics.

What we still want to achieve is to bring our masters programmes to the level that has been achieved by our international bachelor programme and bring more international students in.

### Research and Teaching

Our research is inseparable from the everyday educational process. There are regular research seminars functioning at the faculty all the time – it's at these seminars where ideas are coined and discussed. These discussions and seminar work then lead to new results. Thus students inevitably get involved in research from their very first days at the university. Scientific discussions go far beyond curriculum activities and the hours scheduled for classes. Such fields as algebraic geometry, topology, mathematical physics, representation theory, complex geometry, dynamic systems theory and mathematical logics are all well represented at the faculty.

As for the education we offer, we are extremely competitive in teaching mathematics to Russian students – the level of the knowledge they acquire at our bachelor's programme yields to none other university in the world. Our graduates are in demand by the best graduate schools all over the world, and oftentimes they prefer our graduate school over other tempting options. At the same time, being competitive internationally means that strong students from around the globe want to work with our faculty and are ready to pay for the education we offer. We are not quite there yet, but this is one of our objectives.

### Structural Reform

The structural reform started by the HSE administration in 2014 has not influenced us significantly. Our faculty is comparatively young; when it was being founded the goals and the parameters of the future structural reform were already being taken into consideration and laid in the original model of the new faculty. So we have never

had *kafedras*, thematic departments typical for Russian academic institutions, we only had several basic academic units. In our structure we have two research labs, established for a fixed period of time determined by their budgets. These research units are quite autonomous in choosing directions for their research and spending their funds. And there are study programmes, each having its own council that determine their goals and ways to reach them.

### Atmosphere

We try to maintain the atmosphere of mutual learning, informal interaction among everybody at the faculty - from professors to freshmen - with the primary aim of enhancing the quality of our knowledge. Yes, I mean that professors can learn things from freshmen; this is not a slip of the tongue! We also have our traditions. One such tradition is of professors and first year students getting together to drink tea. The goal is to identify where the adaptation process doesn't run so smoothly and how it can be improved in the internal faculty life. Then we try to make things work better for the students; usually we succeed, sometimes we don't. I would say that extra-curriculum activities also are a weak aspect of our faculty.

## Welcome Aboard

**In September 2014, new international professors and postdocs joined the Faculty of Mathematics. We are pleased to welcome aboard Assistant Professor Satoshi Kondo and Postdoctoral Fellow Alexandra Skripchenko.**

**Satoshi Kondo** received a PhD in Mathematical Sciences at the University of Tokyo in 2003. Upon graduation he worked as a research fellow at Kyoto University (2003 - 2008) and after that held a position of an Assistant Professor at Kavli Institute for the Physics and Mathematics of the Universe at the University of Tokyo (2008 - 2014). Since September 2014 Kondo has been working as an Assistant Professor at the HSE Faculty of Mathematics.

### What are your interests in mathematics?

The mathematics I am interested in is called arithmetic geometry; it is a part of number theory. I use the tools of algebraic geometry to think about problems in arithmetic.

### Have you taught any courses yet? How do you like the students?

I haven't taught any courses yet, but I am conducting seminars with another colleague where students take turns giving lectures on various aspects of one fixed topic. It is amazing how enthusiastic and serious about mathematics the students are. It is also good to know that they can do things on their own. I do help them at times and show them the general picture of the topic, but they can find the rest of the way themselves.

### What are you currently working on and what are your long-term plans?

In the short term I plan to finish a paper that I have been working on for many years. Now that I am in Moscow and not in Japan, I hope to attend conferences in Europe more often. This type of experience would not have been possible if I had stayed in Japan.

### Has it been easy for you to connect with your new colleagues? Is it true that mathematicians are very introverted people?

I thought that mathematicians were introverted because I am one. But I now work with two collaborators who are not introverted at all. And I hope I will learn to do maths and not be introverted at the same time. It has been already four months since I came to Moscow, but I am still trying to fully settle. The mathematicians speak English so I have no problem communicating with my colleagues one-on-one. But still I feel that I need to be able to understand the Russian language and culture to fully connect with them. It was good that one of my colleagues invited me to give a talk at a conference in Moscow in early December. I got a chance to meet more local people and that helped a lot.

**Alexandra Skripchenko** was born in Moscow and received the degree of the Candidate of Science from Moscow State University in 2012. Upon graduation she spent a couple of years in France as a research fellow at the Institut Mathematiques de Jussieu in Paris. In addition to work she enjoys reading, going to the movies, and sports – both playing and watching. Another interest is corporate finance, an area that Skripchenko used to specialize in. In September 2014 she started her postdoctoral fellowship at the Faculty of Mathematics at HSE.

### What do you do in mathematics?

I work at the intersection of several different subjects: dynamic systems, low-dimensional topology, and geometric group theory. My main point of interest is related to the description of dynamics – evolution of complex systems in time. The origin of the problem is connected with theoretical physics. However, the tools that are used are much more diversified and include some achievements from other branches of maths.

### How can mathematical discoveries influence our everyday life?

First of all, maths is the basis and common language of physics, and in my world most problems that we consider have purely physical origin. Also, some branches of mathematics have direct applications in finance and in economics in general. In this sense every day in Russia when we check the oil price forecast, we use mathematical products. Also computer science, data mining and other fields require a strong mathematical background from people who work with it. Mathematicians (mainly probabilists) also work on models for chemistry and biology. On the other hand I have to admit that often mathematicians approach some very abstract problems, and possible applications of their theories arrive much later, in 40 or 50 years, when this subject has become less scientifically interesting and attractive.

### Do you think mathematicians have a somewhat different perspective on things than other people?

Of course, in Russia we have jokes such as “Mathematics is not a profession but a diagnosis.” According to stereotypes we are supposed to be extremely logical, very boring and very distant from the real world. I think the first part of the stereotype is true and the rest depends on each concrete person. I don't think that as a science mathematics is so very different from other sciences. But as a lifestyle it is quite different from other regular work with plenty of duties and no pure research. In mathematics you are much freer and your evaluation is more objective than in business, you either get some result or you don't and there is nothing in between.

### How do you feel working at a new place with new colleagues?

I am a Muscovite from birth. I was an undergraduate and graduate student at MSU, so I knew several people before I came here. People have been very welcoming and it has been easy to incorporate myself into the faculty structure. Also, we have very brilliant team in several different branches of maths, and I try to use this opportunities to learn things like geometry from these people.

### What are your work plans?

I want to continue to do what I am doing now – proving new theorems, discussing them with my colleagues and learning new things every year. I hope to have the opportunity to collaborate with people from different countries because it means getting in touch with different mathematical cultures. I would like to share some of my experience and to involve students in my research. As for my geographic location, it is not important since mathematicians travel so much.

## HSE Website: What's New?

The HSE website hosts a tremendous amount of information, which is typical for a big institution like ours. The need to organize info in an easily-navigable way and update the look of the website has led to changes in the website structure and design. About a year ago the website began updating its look for the users. We wrote about this in our September 2014 issue, and since then more pages have been updated.

First, a new page aimed at the international faculty <http://ifaculty.hse.ru/> has been available for several months now. The page features practical information for those internationals who are going to move to Russia to work at HSE and for those who are already here and are figuring out how the working and administrative processes function at the University. Here you will find all issues of The HSE Look, as well as announcements, events, news articles and interviews with HSE faculty. The page is maintained by the International Faculty Support Unit, so feel free to contact us at [ifaculty.support@hse.ru](mailto:ifaculty.support@hse.ru) to give us feedback and let us know if anything is missing.

Second, employee profile pages have been transferred to new design patterns. These profiles have proved to be an invaluable tool to support communication between professors and researchers working in HSE departments spread out across different buildings all over Moscow. For students, the faculty profile pages are the easiest way to learn more about their instructors when choosing courses.

**Valentina Kuskova**, Assistant Professor at the Faculty of Management, Director of the International Laboratory for Applied Network Research and a newly appointed Deputy of the First Vice Rector on issues of international faculty recruitment spoke to us about the benefits of having an attractive profile page. “Why just not post a CV, why fill out a personal profile? It’s a good question”, says Kuskova. “After a few years, academics have CVs stretching to many pages. Who has time to read those? But when you need to find out what a professor is about, where do you look? A faculty profile serves as a quick “at-a-glance” view of what the person is about, and quite often, it has more information than just a dry CV. If you study marketing, you will quickly associate this profile page with the colorful packaging on the outside of a box of medicine, and a CV –

with the long, dry, detailed and overly technical medical booklet inside. What is the practical side of it for the faculty? Visibility, of course. In this case, it’s a double-edged sword. If the profile is complete and interesting, the person is perceived as such. Leave it blank for the opposite. When I receive, for example, a collaboration request from someone who I don’t know, I use their profile page to assess who I am about to talk to. I glance over the education, list of publications, awards (often subjective, but still a good measure of professional contributions), sometimes – if available – personal information, out of curiosity. The more complete the profile, the more at ease I feel with a colleague – I can use objective data to confirm that we do have something to discuss.”

Maintenance and timely updates of profiles are important believes Associate Professor at the Faculty of Law, **Antonios Platsas**: “Aside from the fact that this is good practice, this is something that can make our operations and achievements more transparent and visible. There are obvious advantages to keeping your page informative and updated for the institution, academic staff and those outside of the institution too, including prospective students and academic colleagues from around the world”, says Platsas. “I personally use these profile pages to communicate with colleagues with similar research interests or for practical matters. Profiles as a whole are operating at a good level now. Of course, there is room for improvement, as we are not in the sphere of the ideal yet. For instance, I was perturbed to notice certain external interference on my profile previously. Good practice would tell us that academic staff should be consulted prior to any changes to their profiles and their consent must be sought and granted. I hope that things are moving in the right direction now.”

One of the most useful options for faculty is the opportunity to edit lists of publications and attach research papers and abstracts. Publications in the media can also be shown on a separate tab. In addition to standard sections such as education, work experience, publications, and contacts there is an opportunity to add sections of your choice. The interface for editing a profile page has become much more straightforward and easier to use. For more details, please visit the website of the Office of Online Media <http://portal.hse.ru/en/>.