

Nikolai Vladimirovich Krylov, Ithaca, New York, November 3, 1991 and April 22, 2007; Highlights

1. A little about the heritage and the admissions to MSU (Moscow State University)

E.D. Kolya, please start with your heritage.

N.K.: Unfortunately, I don't know much about it. The main lineage derives from some sort of priests of a lower rank. About my grandfather on father's side I only know that he was the head of the boiler inspection team in the Ivanovo region or in Ivanovo. And he was also somehow connected to Chapayev. He either studied under him or he taught Chapayev at some sort of Red Army courses, a though I don't know how boiler inspection has anything to do with Red Army courses. My grandfather had three sons and one daughter. My father was the eldest. One of the sons, uncle Kolya was the party first secretary of the Khabarovsk city committee. When we were there for the Soviet-Japanese Symposium, I visited him, but, unfortunately, I did not take an advantage of the occasion and did not ask him, for example, a permission to travel around the Far East.

E.D.: Did you know that there was a complaint to my authorities that I did not get the permission from the government to organize a tea party in my hotel room with the Japanese colleagues¹. You were also there. After that for some time I was even denied permission to go to some international conferences in the Soviet Union. As I understand, that was the first international conference in Khabarovsk, and the party heads simply got disoriented. I don't know what role your uncle played.

N.K.: I don't know that either. And before I met him in Khabarovsk he came to Moscow to some party courses and brought "The Golden Ring" vodka to Moscow for us. That was the first time I tried it. It was wonderful vodka! So there, in my apartment, my father and uncle met for the first time in thirty years! My father could not stand communists, but the meeting with his brother Kolya went fine.

My father's other brother, uncle Misha, was a professor of electrical engineering in Ivanovo. My father also graduated from the Institute in Ivanovo with a degree in electrical engineering and heat engineering. Then he moved to a village called Molochnoye not far from Vologda. That was about a week before the start of the war. And I was born two weeks before the war in a town named Sudogda in the Ivanovo region. That is my mother's native town. I know very little about her relatives. When I was born, my parents weren't yet married – maybe it wasn't as important at that time – so we all went to village Molochnoye. There my father taught at the Vologda Milk institute, and my mother – at the school of butter-making . The famous Vologda butter was produced there. However, there was never any butter in the village.

¹ Note from E.D. I thought that it was sufficient for me to clear this meeting (I called it "Markov Tea") with the Soviet organizing committee of the Symposium, but I was mistaken. I was audio taping the stories of the Japanese colleagues about probability theory in Japan. The recording of professor Kunita is part of the present collection.

E.D.: It was all taken to Moscow.

N.K.: Well, of course. And only for holidays it appeared in the store. I remember how for some holiday no butter was provided, so we beat the butter ourselves with mother. My mother was the technologist of the milk industry, so she brought some cream from the plant. (I guess she was given some!) Neither before that, nor after, had I eaten butter that was as good! Do you know the distinguishing characteristics of the Vologda butter? First, it has a creamy color. Secondly, it tastes like nuts! Nothing was added, no nuts, nothing. We were beating this cream in a ten liter jar, and I was shaking that jar. Then we would take it outside to put in the snow, and so on. I could eat that butter by the spoonful! But, frankly, the times were hungry.

E.D.: Nobody was worried about the size of their waist then.

N.K.: My father was very bright. He was teaching electrical engineering and heat engineering, which were part of the mandatory program at that institute. Students liked him a lot. He used to say that he brought up one third of ALL specialists in milk industry in the USSR.

Unfortunately, people drank a lot in that village. The reason is there was simply nothing to do. A lot of alcoholics, fights and arguments all the time... And when I graduated from high school, I decided that I had to escape that.

I reasoned: what is good being an alcoholic? I took a guide for applications to universities, and I liked physics the most. And since my father had some equipment, I would hear talk of how it is difficult to get anything unless you know the right people. I thought that in physics, it would be just the same, to get any equipment, one would have to know the right people. So I chose mathematics, where whatever you do, everything belongs to you! You wrote it on a piece of paper, and nothing else is necessary. It later turned out that when you work at a university, you have to buy your own paper (It is good that it was not really expensive). My father and his friend Marshak, a guy most likely exiled to Molochnoye from Leningrad (he later returned to Leningrad) were seeing me off at the railway station. They were both trying to persuade me to go to the Milk Institute! "Just submit the application!" - I was nearly an excellent student: the only C I had in my transcript was for Russian language! I wish there were some logic! Russian doesn't have logic, you have to memorize a lot, and I couldn't even remember the day when I was supposed to be accepted to Komsomol². I missed it! They were saying: "Where are you going? You are not in Komsomol, you are not from Moscow, and hence, you will need a dormitory!" I was trying to explain to them that I was trying to leave this swamp behind!

I brought my application to MSU together with my mother. We approached the University from the central entrance, and for a long time we were standing in front of the columns, hesitating to enter this pompous building. I had to live somewhere for two months before the admissions examination, so I lived at an uncle's, my mother's brother. The reason is that if you weren't requesting a dorm, there was a better chance of getting in. I think if I had a relative, coming from the province to apply to a university, he would have lived with me forever. You have to help! However, I was told by these relatives: "Move out to a dormitory!"

There were five of us in the room, and all five got admitted to MSU! It is a rare coincidence since only a small percentage of applicants were actually admitted to MSU.

E.D.: You must have had a good group of kids.

N.K.: Yes, there was a guy who was applying to MIPT (Moscow Institute of Physics and Technology). Their exams were a month earlier, but he didn't get in there! And then, already knowing a lot, he came to MSU. He used the problem book by Modenov to study, and together

² Kommunist Youth Union (see <http://en.wikipedia.org/wiki/Komsomol>).

with him we studied it inside and out. I have to say, that helped me a lot. I learned everything that I needed to know before the examination. During the entrance examination I got a B in the written exam (which was very rare) and an A in the oral examination. I did not have a medal. I remember like now that during the oral examination my examiner was Kishkina.

E.D.: Well, yes, she was a stern and strict person, but very fair.

N.K.: And friendly. I remember clearly that she asked me what the absolute value was, and I answered that it was a value without a sign. Well, we didn't have such term in my school. Then she asked me to draw the graph of the absolute value of the sine. She saw that I knew what{?} it was and was satisfied..

E.D.: Were you involved in extracurricular mathematics somehow before that?

N.K.: I knew nothing at all! Zero! I was from a village, no kruzhki³, nothing...

E.D.: Yes, and there was no Kolmogorov's boarding school.

N.K.: There was nothing at that time.

2. Mekhmat⁴ MSU

N.K.: I was lucky. I had wonderful teachers. For example, Mark Aleksandrovich Kreines taught us analysis. He was so enthusiastic about lecturing, even though, I am sure, it was his twentieth time teaching it! After his lectures I got an impression that even a monkey can learn math. Patience is all that is necessary. If you accept these axioms, which are natural, then all proofs are absolutely straightforward.

You taught algebra. During a linear algebra course you described a game like this: There are two piles that have the same number of matches. And two players. Each one can take one to three matches from either pile. The person who takes the last one loses. At first it isn't clear, what is the strategy to win. Do you test each possibility? It turns out you can use the main idea of the dynamic programming. It was very interesting.⁵ Then you proved for us the main algebraic theorem. It was wonderful! Take a polynomial and look at the the minimum points of its absolute value. And use the fact that either the polynomial or its derivative is equal to zero at that point. To make a long story short, I really liked your course.

E.D.: So you went to my seminar?

N.K.: Initially I was with Oleg Nikolaevich Golovin. The truth is, even before I got in, I decided that I will be studying probability. The word itself, PROBABILITY sounded magical to me. But since I was thinking that there was time before probability – it wasn't taught yet – I would look around. For example, I took a year long course on Riemann geometry, which I never ended up using, but it was useful. My second year I went to write the term paper for Oleg Nikolaevich Golovin, who gave me an assignment: to think of a definition for commutator. He wanted all definitions to satisfy some natural requirements, but I had a counter-example to every definition.

³ Mathematical circles [“kruzhki”] for gifted high school students, lead by university students of even professors at some institutions. This system is quite different from any form of work with motivated high school students in the USA.

⁴ Department of Mechanics and Mathematics

⁵ Note from E.D. Instead of two piles one can look at the movement of the knight on the chess board. Two players, taking turns, can move it forward or to the right any number of squares. The winner is the first to put the figure in the top right corner. The equivalency of the two games was an illustration of isomorphism in mathematics.

At the end of the second year we were taking an algebra exam. Skorniyakov was my examiner, and I got a B because I was thinking for too long (that's what he told me). I was extremely surprised by that, so the year after I went to write the term paper with Skorniyakov. I reasoned that they must think fast there, so I could learn something interesting... I didn't learn anything interesting: it concerned some sort of finite automaton. However, I did write some sort of paper about them. That was my first research paper. I attended from time to time your seminar... And then in my fourth year I went to work with you and I still am.

I got married in my fifth year. There was the question of distribution⁶, and my wife, Yulia, had another year of school left after my graduation. So I didn't feel like leaving Moscow, and I was ready to go to some sort of "PO box"⁷. But you saved me by saying: "try graduate school, and we'll see later" And it really turned out well, I have no regrets.

E.D.: I see. Well, now try to recall – it is only natural that I remember very little, but all details are interesting to me – what do you remember about those university years, what kind of seminar we had then, when was your first published work...

N.K.: My first work was published later than my second one, and the second one was.... Well, in my fourth year, when the seminar was starting up, you offered several problems. And I wrote a work on Markov's random sets.

E.D.: It was published in co-authorship with Yushkevich. By the way, that work is being cited to this day.

N.K.: Thank God that it did not disappear, so to speak. And in the process of working on it, during the year, with great difficulty, I got a definition of the Markovian set from you.

E.D.: Because I didn't know it. But I think that you invented it yourself.

N.K.: I don't know. Wentzell was my reviewer and we had quite a nice chat with him. He was talking in a friendly and sarcastic manner.

E.D.: His usual style.

N.K.: By the way, when we were taking exams, I was told not to go to Wentzell with random sets. I did go, and it was rather F-I-N-E!

E.D.: Well, he is a rather fair and intelligent person, and that he has such a sarcastic temper has its own benefits.

N.K.: Yes, yes.

E.D.: I was publicly exposed numerous times by him. I only had to make a mistake for him to immediately come up with a counterexample, and I was happy about that.

N.K.: You know, I thought about that for a long time. And I think that Wentzell is a dangerous person in some respect. I will tell you in what respect. If you have a raw idea (and that happened to me!), you express it and receive a counterexample immediately. But it doesn't mean that you should bury the idea! So I preferred to make several steps following that idea before I talked. Because if I told Wentzell the raw idea right away, he would immediately bury it. And I understand, that this and that are unreasonable. But I see that the answer I like can be obtained in an absolutely lawful way and nothing needs to be buried.

E.D.: Well, yes, the destructive side of his genius. But he is, undoubtedly, a co-creator as well.

N.K.: Yes, yes.

⁶ Each student in USSR was sent after graduation to work at some state institution, where (s)he had to stay for at least three years.

⁷ The mailbox numbers were the names for the research institutions which were working on classified projects.

E.D.: His results in large deviations and general boundary conditions will forever remain associated with his name.

N.K.: I spoke at his doctorate defense and I said that he had a fantastic mathematical power and has fantastic mathematical capabilities. An exceptional person!

E.D.: Well, yes... And then I still pushed you into controlled stochastic processes, but I don't remember when.

N.K.: Yes, that happened.

I will tell one story, which you may also remember. You were teaching a course on problems in optimal stopping. I don't remember if there was control or not. Maybe, there was some control. During a consultation before the exam, after answering all questions of students, you said: "There was a mistake in one of the theorems in this course. Figure out which one it is! Whoever gives me the correct answer will get an A right away."

E.D.: Without an exam.

N.K.: Without an exam, right away. I knew one theorem that had a mistake! But I had already passed all my exams. I was waiting while the people expressed their thoughts. It turned out that nobody knew. Then I named the theorem. You say: "Correct, bring your record book"⁸ To which I reply: "Eugenii Borisovich! I don't need to"

E.D.: Naturally, I don't remember that.

And when did you write your first paper on controlled processes? Was that in graduate school already?

N.K.: That was in my fifth year. I did my work on Markovian sets while away in Dubna after my 4th year. By fall I was already presenting it. You said that it was more than enough for a graduation thesis. Yushkevich was also presenting his work on this subject..

E.D.: You were working independently I think....

N.K.: Independently.

E.D.: But you did things which overlapped to some degree.

N.K.: Similar. Yes, yes. But I also wanted to do something with controlled chains. This work I presented at an all-Union Conference on Probability Theory in Tbilisi in 1963 (which may have been the last such a conference). And then I came to graduate school to you, and you scolded me a bit, so to speak...

E.D.: Well, I don't think you are bitter about that!

N.K.: No.

E.D.: After reading the beginning of your monograph that you gave to me, I was very pleased with the clarity and the style that you use in writing.

N.K.: Some credit also goes to you! It is certain. Really, this is your school.

E.D.: And then in graduate school you started working on controlled chains.

N.K.: Yes, yes.

E.D.: And when did the controlled diffusions appear?

N.K.: In reality they didn't appear. The thing is, in the beginning it was necessary to build the processes with bad coefficients. There was no apparatus. It had not been yet created in my Ph. D. thesis. At that time I only realized that the processes with continuous coefficients could be constructed. So I did.

E.D.: And that was the beginning of your quite fruitful work in the theory of differential equations.

N.K.: Yes-yes. I had to learn everything.

⁸ A document, containing student's academic record. Transcript.

E.D.: And even the monograph that I had just mentioned is also a result of that in some respect. The controlled diffusion processes provided the motivation. I remember how you were teaching me and other participants of the seminar in CEMI⁹ about that.

N.K.: And I remember my disappointment when nobody was interested in this area. There were strong guys there: Serezha Kuznetsov and Igor Evstigneev among others.... Well, maybe it is good that there are different areas of mathematics, different people...

E.D.: Well, of course, all of us want to recruit as many followers as possible. But, on the other hand, why should you get upset?

3. Dynkin's Seminar

E.D.: Let's once again go back to the earlier times. Do you remember anything about my seminar, in which you participated during your early university years? At one point there were two parallel seminars.

N.K.: I remember that there were two because I participated in the smaller one. Later, to my surprise, I discovered that there we learned a lot about the theory of partial differential equations. I am sure you remember.

E.D.: Some things I remember, some I don't.

N.K.: For example, the properties of harmonic functions.

E.D.: Yes, of course, that is my favorite subject.

N.K.: That was some time during my third year, and at that time we were not given yet any course in partial differential equations. Nevertheless, starting with harmonic functions, we learned about the spherical harmonics and the expansion of functions with respect to these harmonics. And there were many, exceptionally many beautiful things.

E.D.: Yes, this is a beautiful area!

N.K.: There was the maximum principle! But I don't think there were many particularly long, interconnected topics.

E.D.: Indeed, mainly fragments.

N.K.: Also, from time to time you invited graduate students or staff [as guest speakers]. Piatetski-Shapiro came to talk about automorphic functions. I remember some sort of strips. I guess something had been carried to someplace.

E.D.: Yes, in some respect, those were good times. Well, because we were all young....

N.K.: Indeed, it was easier and more interesting. I remember as Girsanov¹⁰ came to explain a problem about the optimal choice of a bride. This is how it was. We were sitting in auditorium 1403 with three rows of desks of approximately 10-12 students in each row. As a rule, the auditorium was always full. People would come to the seminar simply because they were interested.

Here is what the problem was: Girsanov was trying to guess the largest number of the cloak-room tag in each row by using the optimal strategy that he knew. (People left their coats in the cloak-room, so everybody had a numbered tag.) Girsanov was asking the next student what his number was, and he had to decide if it was the largest one or not. If he thought it was, then

⁹ Note from E.D.: Central Economic Mathematical Institute of the USSR Academy of Sciences, where I was then working.

¹⁰ Igor Vladimirovich Girsanov: http://en.wikipedia.org/wiki/Igor_Vladimirovich_Girsanov

everybody in that row had to say their numbers, and it became clear if Gersanov guessed right or not. If he thought that it wasn't the largest number, then he asked another student. At the same time he couldn't go back to the previous students. And by some means he guessed right in 2 rows out of 3, even though according to the probability theory there was only a 1/3 chance of success. It was possible not to guess at all: the sample size three is not that great.

E.D.: I see. So later you started studying these controlled processes.

4. Graduate School

N.K.: Here is the 5th year, the end of schooling. I need to find a job. And the thing is, neither my wife nor I were from Moscow, so we didn't have Moscow residency, without which we couldn't work in Moscow. My wife was graduating from the university a year after me, and then was supposed to follow me to the place of my distribution, but both she and I wanted to stay in Moscow. So I signed up for joining a top secret research institution (PO box) that would provide me with Moscow residency. And you told me: "Why not try graduate school?" I said: "Well, then there will be an unclear situation: when my wife graduates she could be sent to work at a remote location, far from Moscow, and according to the rules I would also have to go there after graduate school." You replied: "We'll see. We'll go and talk to Rector Petrovsky. Maybe we can settle this." I believed you. And indeed, it worked out this way. You went to Petrovsky (you may not remember that), Petrovsky talked to Shemyakin, and Yulya was accepted to the Shemyakin's institute as an intern. And while she worked there as an intern, I graduated from graduate school and decided to go to Novosibirsk after that. Right away we were to be given a two-room apartment on the science campus. But an interesting thing happened again. There was a big expansion of Mekhmat at that time: instead of accepting 275 students to the first year, 450 were accepted! I defended my thesis before the official deadline, before the official end of graduate school. They started looking for someone who could be left to teach. Nikolai Vladimirovich Efimov, the dean, asks me: "Would you be interested?" I say: "This is simply a wonderful offer! But we are not from Moscow, and we don't have the right to live in Moscow, we would have to stay in the dormitory and we would like to get a suite in the dormitory." To which he replied: "No problems! You will have a suite!" A suite is two rooms, seven meters each, there were three of us already, counting our daughter. We came back in September. We get one room (7 square meters) in a suite. I was disappointed. I went to Nikolai Vladimirovich and said: "Nikolai Vladimirovich, you promised to give us a suite!" He replies: "Maybe I didn't know what a suite is!" I say: "Nikolai Vladimirovich!!!!" He says: "Fine, you will have a suite."

We have already discussed today the story of how I was allowed to apply to our graduate school. However, I should repeat it so it gets recorded. The final examination (the state examination) on the Party history was the breaking moment. Once I had received failing grades in this subject during my 5 years at the university, and Novikov was my examiner. At least two examiners had to be present during the state final exam: a representative of the faculty, you, and that Novikov. I am answering the exam question, and my answer seems reasonable to me. Then all of a sudden that Novikov asks me: "Are you a Komsomolets¹¹?" I thought that was the end of me, since the question was irrelevant. I say: "No." And he: "Do you believe in God?" I say: "No as well." The examination came to its end. That's it, I am thinking, they failed me. Eugenii

¹¹ Member of Komsomol.

Borisovich comes out and says: “You got a 4.” But how? Because Novikov gave me a 3 and Eugeni Borisovich gave me a 5.

E.D.: But that didn’t always fly!

N.K.: Yes, yes! That is how I was admitted to the graduate school!

So, instead of accepting two hundred seventy five students to Mekhmat, four hundred were being accepted. Stasik Molchanov, Misha Malyutov, I and two or three more people from our year were asked to stay and teach.

E.D.: Well, if three out of five were from the same group, that is really good indeed. What year was that?

N.K.: That was 1966.

E.D.: At that time I was involved with the Second School¹², and as you have mentioned even exploited you, which I don’t remember.

N.K.: Well, that wasn’t a big exploitation. I am happy that you don’t remember because, perhaps I was a little careless.

E.D.: Stasik actually liked it a lot.

N.K.: By the way, I defended in 1966 even before the end of graduate school. And do you remember that I was a reviewer at Stas Molchanov’s defense? He was defending in 1967.

E.D.: For his dissertation? No, I don’t remember it all.

N.K.: In five minutes I earned twenty dollars! I am sorry, rubles. The situation was very simple, but how scared I was! Skorohod was supposed to be one of Stas Molchanov’s reviewers.

E.D.: He didn’t show up?

N.K.: He did show up!

E.D.: So what was the matter?

N.K.: There were two rooms, ## 1610 and 1624, and both had defenses going on. One was in mechanics, and the other one was in mathematics.

E.D.: He didn’t find it.

N.K.: He was sitting in the different one! Molchanov’s thesis defense begins...

E.D.: Now I am starting to vaguely remember.

N.K.: And the other opponent is not there! An extra opponent was necessary, there were few people, and I was feeling somehow...

E.D.: You already had your degree, right?

N.K.: Yes, but I regretted being there! I had not read anything, the first time presenting, and all these smart people around! What should I say? Well, I repeated something that people said before me... Then Skorohod came in – he realized that he was sitting in a wrong place only when the next dissertation was announced. He went for a walk and found the right room only by the end of the defense, but he was still given a word!

E.D.: Very curious! No, of course, I absolutely don’t remember. It is amazing how one forgets things.

N.K.: And then I worked in the analysis department for four years, and one of those years I spent on a business trip in Algeria.

E.D.: You returned from there with very interesting results.

¹² In the 1960s Moscow Second School had a special mathematical program initiated by I. M. Gelfand and run by Professors of Moscow State University with collaboration of their students. E. B. Dynkin ran this program during the 1964-65 and 1965-66 academic years. The present name of the school is “The Second School Lyceum”.

N.K.: Indeed, I wasn't losing my time there. And that was 1967-1968 academic year when I successfully avoided the signers up.¹³ Had I been in Moscow, I would have probably signed the petition with all the consequences! And I physically was not there. By the way, during the time I was working in Algeria we received a permission to live in Moscow.

E.D.: Well, of course, you could have solved the problem easily by marrying a woman from Moscow, but you chose the harder route. Were you also a Kuznetsov's Doctoral thesis reviewer?

N.K.: No. Sergei Kuznetsov was the editor of my second book. I talked a lot to him. And overall we have a very good relationship.

E.D.: Did I tell you that I invited him here?

N.K.: I wasn't his reviewer, but I spoke during the discussion of his dissertation and said how good the results are, how good it is that the country has an abstractionist who works on such difficult and boring problems which nevertheless deserve a solution.

5. The Trips Abroad

E.D.: Please tell me, Kolya, about your experience of going abroad. When was the first time you went, and under which circumstances? And when and how did you NOT go and under which circumstances?

N.K.: I have a big experience.

E.D.: A quite extensive one of NOT going.

N.K.: Who knows! After some time I even stopped trying. In particular, Ito was 60, and he was organizing a conference in Japan. He invited me and my wife. The invitation actually said that he would pay all expenses in Japan himself! I didn't even show that invitation to the administration! Why should I show it? They would take it away from me. This way at least I have an original autograph by Ito.

E.D.: You should have taken a photocopy.

N.K.: What photocopiers are you talking about in those times? So, the first time I went abroad was in 1967 to Algeria. They paid well and I wanted to gain a firm financial standing. My intention was to live, before getting a permission for residence in Moscow, in better conditions (instead of the dormitory) and to earn money for buying a car (and we did buy it!) But I only lived in Algeria for one academic year, although we were sent there for two-three years, and I got out of there with a scandal.

E.D.: Why did you decide to get out of there?

N.K.: Because I had already received the residency permission and I had already earned money for the car... and I was afraid to lose the connection with the mathematical world.

E.D.: I see.

N.K.: When we had to go to Algeria for the second year, our daughter had already turned three, and it turned out that for that age there is a rule that states that mother's passport has to have a photo with a child in it, and we only had separate ones.

¹³ 99 Soviet mathematicians signed a letter in defense of a mathematician-dissident Esenin-Volpin (see http://en.wikipedia.org/wiki/Alexander_Esenin-Volpin). Many of them were later subject to persecution by the government.

E.D.: Couldn't you take a picture?

N.K.: We could, but at that time it took months... getting the new passport and all that. I already knew about the problem when we came for the vacation, but I didn't tell the inspector until it was the time to go back. Only then it came out that my documents weren't ready. It was inspector's job to check that all my documents were in order, and I could have not known anything at all. It was a huge scandal, but I couldn't go nevertheless.

After that I went abroad only in 1976 to go to Poland. That was a real battle. Banach¹⁴ center that was organized upon an agreement between the Soviet Union and Polish Academies of Sciences sent me an invitation. When I brought it to MSU I was told: "Go away, nobody will work on your case." What an answer! I came to terms, but I was upset. By that time I was 35 years old, I had a Doctor of Sciences degree, I was innocent in the face of the Soviet Government, I went to Algeria and did not run away. I wanted to start going abroad at least somewhere. Shiryaev organized this trip; everything had to go through him. I even received the invitation essentially through him. He went to the member of the Academy of Sciences Bogolubov, and Bogolubov wrote a letter that Krylov, this and that, is INVITED to the Banach center. I brought that letter to the international department, and immediately they started working on my case. But there wasn't anything that really changed! They had seen that invitation in my hands before! They started working with me, but very slowly. I was supposed to leave in January, but in the end I left in May. I got the documents together and they were supposed to be sent from the international department of MSU to the Ministry. But they were NOT leaving the international department! Just not leaving, and that's it! Then the member of the Academy of Sciences Bogolubov wrote another letter which said the same thing: Krylov, this and that, is invited." After that letter the documents were immediately sent to the Ministry, and they had some organized process there, and everything was done automatically. So I went to Poland.

E.D.: They must have some sort of code.

N.K.: Maybe there is a code... They just understood that there was nothing wrong with this person. And another interesting fact: I was getting the documents together for the trip to Poland from the Interfaculty laboratory, which still existed at that time, but when I left, it was dissolved. Not a single one of my documents, which were later in the Ministry were actually true! Not one! It was all lies. And it wasn't my fault! When they were being collected, everything was right, but by the time I left, everything was just nonsense.

E.D.: Well, that's good.

N.K.: My business trip to Poland lasted for a month, and when I was coming back to Moscow by train, we crossed the border late at night – maybe it is easier to catch criminals at night? – I was awoken to have my passport checked. I don't know what I looked like, but the young border patrol agent looked in the passport and said: "This is not you!" I replied: "You can do whatever you want, but I can't change. I only have this passport. Maybe it's not mine?" Well, he let me through.

E.D.: Maybe he was just being witty?

N.K.: No, he wasn't being witty.

Yulia: He really doesn't look anything like the photographs from those times.

¹⁴ Stefan Banach. See http://en.wikipedia.org/wiki/Stefan_Banach

N.K.: Then 1978 came. I was invited to the International Congress of Mathematicians in Helsinki. It is also an interesting story. Kostrikin was our dean, and Nikishin was the vice-dean. They were the ones who went, even though they didn't have any invitations!

This is how it happened. The invitation arrived. The international department tells me: "Get your documents together." I decided that I wasn't going to do anything! It is their business after all. What is it: I should write my own recommendation myself, go to various people and confirm it. I mean, I wouldn't write something bad about myself, like I am a criminal or something... I would give myself a great review! They had to give me a review! This was my train of thought because I reasoned that I would not be allowed to go on a trip to a capitalistic country. There was a law in USSR that was well paraphrased by Shiryayev: anyone who wants to go to a capitalistic country should not be allowed out the FIRST time.

E.D.: It is OK the second time, though.

N.K.: It is allowed the second time, but not the first time. So I didn't do anything. But it turned out that my documents were put together and processed! It was an international thing after all, so they were a little afraid. This is how my documents got to the international department. The congress in Helsinki was supposed to take place in the summer, and I wanted to go to a vacation on the Seliger Lake. I decided to find out from Nikishin and Kostrikin if I should wait for my case to resolve or if I could just go since my case is hopeless and I wouldn't lose anything. I approach them – Nikishin and Kostrikin – they were standing on the 15th floor. I can see the place where they were standing like now and ask. Kostrikin replies that it is worth waiting. So I told myself: "Just go to Seliger with a peaceful mind." And I left! And Wentzell stayed in Moscow and waited... And nothing happened. I saw it written on their faces that these two "chess players" had already check-mated me.

E.D.: Perhaps they remembered that you were my graduate student.

N.K.: Yes. Here is the moment when Kudryavtsev asked me about that. He was in charge of the international department of Mekhmat. The rumor goes that he was the Major in KGB. He was a first-grade scoundrel! So he asked me: "Were you Dynkin's student?"

N.K.: Yes, I was. So what?! Maybe he expected that I would repent. Yes, once upon a time I was a graduate student under Dynkin. Evgenii Borisovitch has left. Kudryavtsev asked if we were in touch, and I honestly replied that we were not.

E.D.: I don't keep in touch. How about your subsequent trips?

N.K.: An interesting story happened with a personal invitation to Hungary in 1981. Here is how it was happening. I received a personal invitation, and I was going to leave on vacation at my own expense – I should not be describing this to you. I was innocent in the eyes of the USSR – I have been both to Algeria and Poland, and I didn't run away. I wasn't allowed to go to Helsinki, and now I want to go to Hungary. With my invitation I came to OVIR¹⁵ for the paperwork. But I couldn't receive the paperwork! For good 15 minutes a woman was trying to persuade me to go on a vacation somewhere in the Soviet Union, and not to Hungary. I ask her: "Do I have a right to go to Hungary?" She: "You do, but... How long has it been since you visited your parents?" Me: "A while." Her: "Well, then..." In the end I told her: "I will be complaining about you!" That was the only thing that stopped her. Then I had to redo the paperwork ten times. I would type something incorrectly (There weren't any computers like here!), and she would point out that it was incorrect, and I would retype it again. The last stage was as follows. The *kharakteristika* (recommendation letter) was written with all due signatures.

¹⁵ For a trip abroad, Soviet citizens needed to get an exit visa from OVIR (Office of Visas and Registration).

However, the last words “ Approved at the meeting of the MSU partcom (party committee),” the date and the signatory names were typed on the partcom’s typewriter, and, as the result, in a different font. And when I brought the *kharakteristika* to the OVIR inspector, she refused to accept it saying: “It is no good since the names are typed in a different font.” I say: “Look at the big name people who had signed it: the secretary of the partcom of the MSU, for example.” She: “I don’t know anything. Do whatever you want!”

E.D.: What a mockery!

N.K.: She continues: “Have one of the people who had signed it certify it!” Who is going to certify it? Would it be Tropin, the pro-rector, or the secretary of the partcom of the MSU, or the secretary of the profcom (trade union committee) of the MSU? I went to the chair of the MSU profcom and tried to meet him for a week. He was twisting for a long time and in the end found an excuse: “The stamp here belongs to the party! I cannot sign it. Have partcom sign it!” We went to the partcom. And there, you know, the secretary of the MSU partcom had shot himself just the day before! Somebody in the corridor understood from my lost and wild appearances that I was having a personal tragedy. He asked me, what had happened. Then he entered a room, took a stamp, stamped the document and wrote: “Alteration approved,” dated it and left. And I went to Hungary! But how much stress the process caused me! Awful!

E.D.: I can imagine!

N.K.: Later, thanks to Robert Liptser, I got to go to Italy, to a capitalistic country! That was a clever combination. A conference was organized there, a clever conference. Gvishiani, the head of the Systems Research Institute came up with some system. The Systems Research Institute (as if other Institutes conduct system-less research!) was simply a cover-up for the children of various heads who needed to report about their work. Organizing conferences was one of the points in their reports. This institute, in cooperation with an Italian institute organized a conference in Padova with a minimum number of participants. The goal of the conference was to drag out me, Liptser (Liptser had already visited a capitalistic country before that) and Sasha Vetrechnikov, one of my students, abroad. That was the goal of the conference! The conference was scheduled on some dates. Getting the paperwork together took up exactly all the time up to the beginning of the conference. And, unfortunately, that year I stupidly left on vacation to Czechoslovakia to go downhill skiing.

E.D.: On vacation?

N.K.: Yes, on vacation. And by the way, it was only permitted to go abroad once every three years. Those were the rules.

E.D.: Naturally not for everyone.

N.K.: Yes, not for everyone. But that played a role. I came to Kudryavtsev with that invitation, and he is saying: “You have already been abroad this year!” and right then calls the head of the MSU international department to ask whether a professor can go to a conference in Italy, if he had already been on vacation abroad this year, downhill skiing. And that one replied very loudly, and I could hear him: “It depends on the professor!” Kudryavtsev put down the phone and nevertheless told me: “No, we cannot allow because you have already been abroad.” I say: “You know, if I go to Gvishiani¹⁶ (Gvishiani was a member of the Academy of Sciences and Kosygin’s son-in-law¹⁷)... If I come to Gvishiani to the Systems Research Institute and just tell

¹⁶ See <http://www.gcras.ru/gvi/CVGvish2007eng.pdf>

¹⁷ See <http://www.britannica.com/EBchecked/topic/322804/Aleksey-Nikolayevich-Kosygin>

him everything as it is, I will be laughed at there, simply laughed at. That is not an argument.” He twisted and turned, and the paperwork started going through. But it was going through all the way up to the beginning of the conference. That means I was not able to receive the documents for its beginning. These documents only left MSU at the beginning of the conference, and there was still the Ministry! But it was our conference! It was immediately moved to a month later and I left.

E.D.: You had your own tactics.

N.K.: Yes, we had our own tactics; we moved the dates of the conference. We all presented there talks. There were quite a few people, including the managing editor of Stochastics Mark Davis.

So, as Rozanov said, thanks to the fact that I had been to Italy and went to the kolkhoz¹⁸ with students for a month to harvest potatoes, I got an opportunity to go to the congress in Berkley in 1986.

E.D.: And that was your first, so to speak, trip through the University.

N.K.: No, The delegation was formed by the Academy of Sciences.

E.D.: But did you go as a delegate or as a tourist?

N.K.: As a delegate.

E.D.: Well, that was already Perestroika! We may have not understood that, but they did!

N.K.: Perhaps. Well, I would have gone to Helsinki as a delegate, but at that point anyone could have given me a check-mate in two turns.

E.D.: They were very sensitive to the situation. They knew how to trim their sails to the wind. They felt that there were already changes up there.

N.K.: When Kudryavtsev was still in charge of Mekhmat’s foreign relations we finalized the documents and went to Madagascar at the beginning of 1988. Shortly after that Kudryavtsev left that position or something like that.

E.D.: What else does he do?

N.K.: I think he is the head of the department. Or a head of a laboratory of some sciences.

E.D.: Is he considered a mathematician?

N.K.: Yes, I think so. I think he works on cybernetics or something of that kind. There is such science. It may even be important and useful.

E.D.: America doesn’t have it.

N.K.: And has never had!

E.D.: There was only the book by Wiener.

N.K.: Yes, Wiener. Well, so what? Science should have at least common methods, common goals, and common means. If none of this exists, then each problem is on its own...

E.D.: Yes. Maybe you tell how you accepted the invitation from the University of Minnesota? It wasn’t all that easy either? And who played what role in it? Positive, negative?

N.K.: Thank God, nobody played a negative role. The only thing, our post office really tried...

E.D.: Well, that you got fired from MSU is still...

N.K.: I didn’t expect anything else, frankly speaking.

¹⁸ A collective farm

E.D.: Well, but not everyone got fired.

N.K.: Not everyone. But I was fired within the month after I left on a month-long vacation. Because I left a letter to Rozanov with a request that if there is no way to consider that I am abroad without pay, while keeping my position, I would like to consider myself leaving my job on my own request. I didn't want them to put any criminal article in my work record, like left the work front line, what a Fabes!

E.D.: Now you couldn't care less what they would write there. Maybe, during the changes in the government that would have even been...

N.K.: A plus. Perhaps. Yes, when after our first vacation we were planning to go to Madagascar, my daughter and son-in-law were persuading us not to leave, to make up some excuse, and instead look for a way to go abroad. But I refused, saying: "No, kids. That is a serious deal and takes careful planning." And we went to resume our business trip to Madagascar. From there I sent letters to Varadhan, Nirenberg, Fleming, Friedman. For a long time there was no reply, so I was nearly getting disappointed. But then I received an invitation from Chicago. It was very friendly, the city was described, but I didn't want to go there.

E.D.: Gangsters after all!..

N.K.: It said there that Chicago's gangster reputation comes from 1920s, and now it is a completely different city. For some reason I wanted to go to Minneapolis.

E.D.: And who invited you to Chicago?

N.K.: Peter May, the chief of the department.

E.D.: That is a very good university. Do you know that?

N.K.: I know that it is good. It is private.

E.D.: It is probably more famous than the University of Minnesota.

N.K.: Yes, yes, yes. They sent a list of professors, and there were few people, and nobody in my specialty. I soon also received an offer from Minneapolis, and I liked it a lot more: a large faculty, I could attend lectures there. They knew me there just through my works! I couldn't describe to algebraists how important I am.

Borya Rozovskiyy taught me that I need the H1 visa, and not the J1 visa. While being on Madagascar although I received little information, it was very important! I started getting some feeling for it! We had a wild number of questions! We were going to go as the entire family, all six of us. I was only asking for 5 years so my kids could get an education somewhere at least. Additionally, I thought that if I was asking for longer, they might not take me! Maybe I couldn't come for the rest of my life, but it is inconvenient to offer me a shorter contract.

E.D.: What is your situation now? Did you already receive tenure?

N.K.: I asked Fabes about tenure, and he said: "You are in tenure!" Well, although it is wrong and illegal, since I still didn't have a Green card.

E.D.: That is absolutely irrelevant! As you know, I came under H1 because we stopped by Israel to see my daughter, and I was offered a permanent position from the very beginning by a telegram sent to Moscow. But I received the official paper with the approval from the Board of Trustees only half a year later. And I received the Green card later.

N.K.: Well, then it means that I have tenure, although I haven't seen the official paper.

E.D.: The word here is the same as a document. And you get paid well. It already means that they are interested in you.

N.K.: I have a very good, friendly relationship with all of them, and we tease each other, so to speak. I am not very good at it, but the relationship is nevertheless good.