

ИНТЕРВЬЮ¹

В августе 2016 года Министерство образования и науки подвело итоги первого этапа конкурса на получение грантов Правительства РФ. Пятая волна «мегагрантов» стала продолжением политики привлечения ведущих ученых со всего мира для создания научных центров международного уровня. С 2010 года по постановлению № 220 открыто 160 лабораторий в разных городах России, и самые успешные из них получают дополнительное финансирование после окончания основного срока реализации программы, рассчитанного на три года. За это время ведущий ученый совместно с заведующим лабораторией формируют исследовательскую команду, большую часть которой составляют молодые сотрудники. Благодаря международному опыту и значимой финансовой поддержке в подобных лабораториях складываются свои особенности организации науки, которые способствуют профессиональному росту молодых ученых. Одна из задач нашего исследования состоит в том, чтобы определить эти особенности, и для ее решения мы используем метод полужформализованных интервью с представителями лабораторий.

Международный исследовательский центр «Интеллектуальные материалы» в Южном федеральном университете (г. Ростов-на-Дону) представляет собой случай успешной коллаборации ученых, команд и институтов. Развитие Центра активно поддерживает ЮФУ, а также зарубежные партнерские университеты в Турине, Тель-Авиве, Гренобле. Ведущий ученый — профессор Университета Турина **Карло Ламберти** (Carlo Lamberti) активно участвует в деятельности Центра и способствует развитию международного сотрудничества молодых ученых, обеспечивая доступ к экспериментальному оборудованию партнерских центров. Директор Центра — доктор физ. — мат. наук, профессор **Александр Владимирович Солдатов** — уделяет особое внимание развитию технической оснащенности лаборатории полного цикла. Старший научный сотрудник, кандидат физ. — мат. наук **Андрей Петрович Будник** подчеркивает важность зарубежной практики и коммуникации для профессиональной социализации молодых ученых.

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CARLO LAMBERTI

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**“You need a good army, you cannot have just a general”**

Please tell us about your academic path — how did you become a part of science, and this particular science?

Carlo Lamberti: Well, it's started quite a long time ago when I was in a high school. I think I had an exceptional teacher of chemistry, mathematics and physics. I was quite excited about that and I wanted to become also physicist — to study the stars and the universe. Astrophysics was my dream. I was in Belgium that time. The fact that I decided to come back to Torino because there was a good astrophysics school in Torino. My family comes from Torino, I was in Belgium because of the job of my father. So I started to do physics there with an idea to become astrophysicist. Meanwhile, I was quite excited by the mathematics class and I decided to change my mind and I went to become a theoretical physicist. I made a master thesis in theoretical physics, and then I tried to get a PhD in that field, which was not that easy. Because everybody wanted to do theoretical physics in Torino. I got the opportunity to make a PhD in solid state physics institution — not directly the university, but the research center of telecommunication. It was the research center of the Italian telecommunication company. We worked in the field of optical fiber communication. After these three years of PhD, I got a permanent position as a teacher in a high school. I was teaching physics and mathematics to the students of the last three years of high school for about four years. I still continued science because in Italy teaching in a high school means that you have to teach eighteen hours per week and only the morning. So in the afternoon I was in the department, on Saturdays as well. At that moment I moved from physics to physical chemistry, but I was working for free there. I got the lunch ticket of my professor, so I was paid one pizza a day. My salary was one pizza every day, and one pizza was very good at that time. The boss told me that there was no chance to have a position at the chemistry department because I was a physicist. But, okay, I had a job so I could do this for fun, that was okay. And then it happened that I had the opportunity to make four years postdoc back in Belgium, in Antwerp, in the Flemish part of the country. As I went to my boss and said: “I stop working here because I have a postdoc position starting from September in Belgium”, but he said: “okay, but now wait, I will try to find a postdoc position here for you”. That's very funny because probably if I would not have at this opportunity in Belgium I would work for free at the university being teacher at the high school. So, I had a postdoc position in Torino and I did a lot of job during these years, so basically after this postdoc. That's funny because I made my first postdoc in four years after I have defended my PhD thesis. Then I got the permanent position as a researcher at the end of the postdoc. After that, I became an associate professor some years later. Now I'm still associate professor and this is my scientific career. Why am I here in Rostov-on-Don? Well, that's because together with a French professor we built up a European Master programme in Material science

called MaMaSELF, and which is on since 2007 and brought together a lot of students from all over the world with European funding, Erasmus Mundus. I am at some very superficial contact with the professor here in Rostov-na-Donu.

How did you get in contact with Prof. Soldatov?

Carlo Lamberti: He sent me an email telling: “I will be in Milano during these weeks, so it would be quite easy for me to come visit your lab”. The group of Soldatov was also very-very strong in the theory, in the calculation of X-ray absorption spectra. While our group in Torino was always very strong in making experiments. So Prof. Soldatov said: “Okay, you are good in making experiment, if you provide me some of your experimental data, we can make the simulation and we can understand by that what happens”. “Okay, no problem, I mean, I can give you all the data I have. But then the problem is that, in order to make things working, you need basically a good student that works on it”. And so I was telling him: “Listen, we have this opportunity because we are running this huge project in frame of Erasmus Mundus. If you have good students you can send them to us, we can give them a good grant and we can start a collaboration like this”. I didn’t hear about him for a while then, and I don’t remember if it was by email or SMS or phone he was telling me: “I have a good student”. I said: “Okay, then it is time to show up because I am in München in Germany, exactly for making the selection of the students. If you send very rapidly me a CV, we can evaluate him and give him a grant”. So the application was really made at the very last second. He was a very good student, with an outstanding CV, so he was selected. This student is Kirill Lomachenko: he made the first year in TUM München and then he came for the second year for the master program in Torino. We made very good research together that was published in a very good journal. Than Soldatov told me: “Listen, it is very important for our university that we get some international recognition”, and I said: “Okay, no problem, because within the frame of the Erasmus Mundus we can have extra European partner”. Consequently, the Southern Federal University became a partner, an external partner of the MaMaSELF program. Kirill was very good and we agreed together with Soldatov that I give him a PhD grant to continue PhD in Torino. Because that was the aim — we needed to be in Western Europe to make the experiments and in Russia to make the calculation, so it was really needed for the project to be in that parts of Europe. The South Federal University was a partner; we decided to invite Soldatov for the summer school. We have every year in Montpellier, South of France, we have two weeks of school where all the students follow together classes given by top-professor in the field of the master program, before being split to the different partner universities (Torino, Montpellier, Rennes, LMU and TUM) for the remaining part of the year. In that occasion, we invited him to give a lesson and to present the master thesis available at the South Federal University for the second year MaMaSELF students (MaMaSELF associate partners are allowed to host MaMaSELF students for their master thesis in the last semester of the second year) It was the beginning of September 2013. Soldatov said to me: “Listen, I have something to propose you. Let’s make a walk”. Okay, we made a walk in Montpellier city, Montpellier is not very big, but I mean, we walked across almost two or three time to look at the interesting part of the city. We spoke about a lot of things without entering into the point. Then, at the end, I said: “Listen, Alexandr Vladimirovich, we have to sit down and you have to tell me what you have to tell me about”. He said: “Okay: there is something that you will never accept but anyhow, it is that possible to make an application in order to receive a very huge megagrant from the Russian Ministry of education! “The funding is something in the order of one million euros per year for three years. Basically, to be eligible, we have three constraints. The first one is that the project

must be led by an international scientist or by a scientist who would not work in Russian Federation since... I don't know how many years, but I never put my feet in Russia so it was okay. The second condition is that the state university must show the interest in this project by co-funding twenty five percent". And I say: "This I can manage because there is interest from us", and then the third point, and he was sure that I will never accept the third point, is that I have to spend four month per year in Russia. At that moment, I said: "Okay, listen, but why not? I accepted immediately for several reasons. First, because for a scientist every possibility to have a funding of three millions euro for three years allows you really to make a big project and significant to improve the level of science that you are doing. Many project are for shorter period and this is eventually two more years. I mean, you can really look far away in your projects. This is the first point. The second point was that I realized that the quality of the Russian student was amazingly good, and in order to make high-level science you need high-level students. You need a good army, you cannot have just a general. I was already working for more than one year with Kirill Lomachenko and I was really, really more than happy about this collaboration. I also realized that together with Kirill there are a lot of other people, the group that very, very, very high-level. And so I said: "Okay, with a team like this we really can go very far away". So, I was really very-very convinced to try to get this chance.

What part did you take in preparing the application?

Carlo Lamberti: I decided on scientific topics, because I needed to choose those where I feel myself strong. They would be evaluated by international referees, they immediately see whether the principal investigator is strong or not. We had to work, but Soldatov was very-very open on this, we had to do something where we can be good, that's all. So, we decided topics where I was already recognized on international level. Basically they were translating from Russian into English some part, they sent me this part and I was putting, writing my idea and then I sent back, then we were correcting a little bit. A huge part of the work was done by the young students who were translating from English to Russian. We managed to submit that, but we started working on this at the beginning of September and the submission was in the end of September, the deadline. We worked quite hard in this period and we managed to submit. Then I remember, it was the first days of January and I was with my family in a house in the Alps mountains, and the phone called... no, it was not a phone call, it was SMS from Soldatov and we got a megagrant. When we made this application, we were doing our best, but this is a very, very, very selective competition, only less than ten percent are granted. We made some changes because when you start working, you realize that maybe something can be done in a better way with some modification, that basically the main direction was still there.

How did you gather the team?

Carlo Lamberti: With such a budget you can gather quite a large number of people. We had a very good physicists from the group, so it was not difficult to pick up physicist, and for the synthesis we needed some chemists. We also decided to invite some chemists. It was kind of competition. Our aim has to be able to close, to loop the cycle in such a way to synthesize the material, to characterize them with totally scientific instrumentation and to make the simulation in order to understand the result. Why it works and how it can be improved if it doesn't work or if it works.

When you came to the laboratory, how did you find the equipment?

Carlo Lamberti: The starting equipment was already amazing for the average Russian level of labs. Then of course with megagrant we had the possibility to add new equipment, as

all we have significantly strengthen our equipment, instrumental equipment, characterization equipment, and also our computational equipment. We have bought several computers for parallel calculations, that very useful. But we already started from a very high level in international environment, as Soldatov's lab even before the mega-grant was at the average level in the European standard.

Was there an intention to gather the team of young scientists?

Carlo Lamberti: Well, I think that this is the best investment for the future. I'm here for three year, and my dream is to leave here trees that will grow and become a forest. Investing in the youth is the best way of doing this, particularly when they are so good. They are highly motivated. I mean, here we find quite a lot of people from Rostov. In the past, people that wanted to become someone in science, had to leave. Now they realize that with this mega-grant they have the possibility to become known scientists and to do their job in their own town. They realize this and they are very proud of this and they work very, very hard for this. On the other hand, we also hired scientists from abroad, to increase the international level of the lab. This is the case of Dr. Andriy Budnyk, who arrived in Rostov-on-Don in September 2015. Here he is fully integrated. Let's say, Andriy speaks perfectly Russian and he comes with huge experience in my lab in Torino, where he made PhD and something like four year of postdoc. So he come here with something like seven years of international experience and on top of this with a 100 % integrability in the Russian system, this was also important. The group of Soldatov had already a quite relevant international experience because, Alexandr Vladimirovich was always about to send his students abroad to learn how people make science in other labs, to learn English. If you come in our lab, you find everybody speaking English, which is again something quite unusual in the average Russia. I remember the places I have to go to make a conference and then I need a translator, which is not the case in this group. But if you move in the same building, then you may feel in some cases this problem.

Do you somehow help them to win other grants?

Carlo Lamberti: I think that the fact that my name was there with all publications, it helps probably. It works for the evaluation committee that we have a strong group, the possibility to do a lot of things, we have already done and we continue doing a good job. I think that people that are in the committee did make evaluation, they took into account several points. The idea itself of the project, our new activities, but then other things, which arose important. The degree of risk is how strong is the group, and what is the chance that they really obtain what they are claiming for. I think that in this part of the evaluation probably having huge name behind helps in giving some grant. I can help in giving idea, but once the project is written, it is written.

How do you organize your work with those students or young scientists?

Carlo Lamberti: We have quite regularly meeting, informal meeting, we have a formal meeting every Monday, where one or two-three person depending on how long is the speech present to the whole group the last results from heir research work something. This is a very important thing, because there are maybe some idea that can come through the team and help the presenter to find alternative solutions. This was what we found quite useful and important. Coming to the core business of our research, basically, we make our research as strongly based on the use of large scale facilities, which are very expensive instrumentation that are not easily accessed, so you have to write the proposal in advance. The programming of the work starts really from far away, because we have to say okay, which are the hot topics that we have in our hands. We have to make a proposal here and there. We work a lot in Grenoble (ESRF and ILL), in Switzerland at the Paul Scherrer Institute (SLS), in Sweden,

in Lund at MAX-lab. Now MAX IV, and we will work in the future in Hamburg in the big three facilities. Basically, everything is planned in advance. When we have the results, we meet in order to write a papers, because our output is another publications in high-level journals. I just make little statistics because I had to give a speech two days ago for the jubilee of university. There was a big fest with rector inviting a lot of other rectors and ambassadors, it was very formal meeting. I had to make a very brief report. In the first year of mega-grant we published ten papers. In the second year we counted fifteen published now, and some are submitted. These papers received so far thirty citations. That in twenty months is quite something. We are quite proud and want to continue in this direction.

How do you work on papers?

Carlo Lamberti: We look to the data, with kind of story we can tell, In the most of the cases we have a huge amount of data because when we go and collect data for seven days, multiply twenty four hours. Often we may have material for more than one paper, so we decide with all this material out to combine in other cases. We put together in this paper new findings. I try to let the students write first. Because that's a way to grow up the young students. When the paper is written, I go through it again to correct and to improve. Maybe, it will go faster if I write the paper myself, but that doesn't work for trees. The average way of writing in the team is very good, it is not worse than mine. It was already used because if you need to make a project proposal for synchrotron you need to write down in English. The language barrier is not a problem in this team. When we make the experiment I'm there, at the synchrotron together with them. Most of the students and young researchers of the team visited Torino laboratories. Andriy, Sasha, Kirill. Now come to Rostov-on-Don several times per year for one month or something. Before, when I was in Torino, I stayed full-time. Now I'm staying here, but for some experiments I go to Torino. Now we have three joined PhD students from Italy and Russia. Kirill Lomachenko will finish soon, then we have two, that's a new one just almost finished a first year, Luca Braglia and Aram Bugaev. So, we really make an interconnected team. Luca now is here and Aram is in Switzerland.

So far, what barriers can you mention in a project of this kind?

Carlo Lamberti: For sure, the mega-grant requires a huge bureaucratic effort. You have to fill in forms and forms and forms... But this job is done my colleagues. I'm lucky not to do this, but this indeed is quite time consuming. Maybe if the bureaucracy should have less, every people should use better their time in order to make more science and not just filling paper. At the end of the year I have to sign something like thirty centimeters of report. I wonder who is reading this! The system spend money because people are paid to do this. The system also spend money because other people are paid to check this. So you spend twice this money. If it is possible to find a more efficient way to check whether one is booking, whether not, the whole system will have a great benefit I think. We are asked to run a mega-grant, and we need at least seven publication per year. This is not a problem for us, because we are by far from this limit. But still, we've got a competitive team, so it doesn't matter if we are ten. We are not relaxing because we are ten, we still want to have more. I think this is probably in our mentalities. This year we have fifteen so far, but we are still writing, even we have more than two times what is needed to have the megagrant approved for the next year. I don't know if it is in our gene, or if someone is a sportsman, he has the world record in hundred meters, he still was to go some hundred seconds faster in the next run, that's a little bit in our mentality — the mentality of people that make science, that are in the field of science. Science in the end is a very competitive work.

What is your opinion about the new public management in the university and its neo-liberal model?

Carlo Lamberti: Well, I think, it is important to have an evaluation method because at the end professors are public employees. In most of the countries if you are a public employee, you get your salary at the end of the month independently of if you worked or not. There are exceptions and there are countries where it is not like this, but in general, for sure in Russia and in Italy it is like this. So, it is important, if a country wants to become leader in the field of science, it has to find a right way to promote the good groups. Because you cannot promote everybody, this is impossible. The amount of money that the country can give to the research is limited. It is very important to decide where, in which group to put this money. Then one has to take care because in absolute you just look into the number, in some cases you can be mistaken. For instance, I am a well-known in some fields, so I'm pretty sure that in these fields where I am well-known, well-established, it will be very easy for me to make several publications. These will not be very innovative publications, but they will be very easily accepted by the scientific community. So, when you send this to referees, they say: "Okay, okay". This is because I am well-known in this field. The results would have been quite, let's say, easy from someone which is good in this field to imagine what would have been the result of this research. Because very similar one have already been done, though one can guess that if you do the same thing on this slightly different system you will get this slightly different result. The referee will find this very logic, well done, and it will be easy to publish there. But you had not contributed to big advance in science. Conversely, when you are making something really new that's the case you get the most difficulties in publishing. Because people are not expecting this. If someone is really very innovative at the beginning, there is must more difficulty in getting papers. Basically as I have to act somehow as a manager of big team, my personal strategy is to make a diversification. We must go on very challenging direction because we are proud and we want to have very-very exceptional results. I know that it is risky to make because when you go this direction it is easy to fail. Because maybe that experiment is too difficult to perform, because maybe you're starting, and even if you are good, experiment is okay, then you will get in trouble to get published. That will take a long way. So, we have to do both basically. Because we have also to guarantee to the young people, to give them a number for publication because they need this for the CV, because when they finished their PhD, they need to apply for a postdoc. I want my students to make a good career. They work for me very hard also because they know that I do all my best to allow them to find a way in science. We tried to have a good balance between, let's say, standard research which is easier to be done, this is more productive in terms of number of main work.

You encourage them to experiment in some challenging directions, don't you?

Carlo Lamberti: Yes, I do. Let's say, standard research is only for few years. Then you are dead. You need always to go to have a fraction of your standard, to computing of new things, even if you know that this is a challenge, that you can lose your time, that you can make wrong experiments, and even if everything is good and you will get published. Then you can, and this field may be a top for two-three years and then becomes standard. There are first two-three years to make fantastic things, pretty innovative, then for the next five years that become the standard one and a new branch has to come out. This is the way. Then some of your the branches you decide to cut because they are no longer productive or if you work there you just get a lower impact papers and, it is no worth any longer to work there and that's quite a dynamic way of working. That's my role, because I don't forget that I'm

a teacher. As scientist you can be proud of the research that you have done, but as teacher you can be proud of all the research that your student can do in future which is much more. So, I always hope to get student that sooner or later become better than me. I have this in my book: “*To the older trees, because that’s from them that we came from but most importantly, to the young trees, because to them belongs the future. In my naïve mind I like to think of knowledge dissemination as an old tree, with its roots strongly and deeply set in the ground, and with its seeds gently taken by a lovely wind that spreads them all around. Let the ground stick close to the old tree’s roots and let the wind caress its branches, as long as possible. . . till new young trees grow up from the ground and become stronger and stronger and can finally replace the old one*”. This text stands at the beginning of the book², if you want to know it.

Could you please share some thoughts about the features of Russian students in comparison with others?

Carlo Lamberti: In Italy, we had Chinese PhD and postdocs. Chinese are the one billion people and I have just known few of them. I will not generalize too much, but my feeling is that they work hard, they are executors. If you give them a protocol they will follow this very-very precisely. But don’t ask them to put a single part out of this protocol. Of course, for some kind of research you need some just men power and so they can be useful. But if you want to have something innovative that’s not the way. Well, in general I think that if a young scientist is motivated in his job, there is not much difference to different countries. They will work hard, also the day and the night and we can see that they are feeling something interesting in their hands. I don’t think so that the difference comes from the starting point, because the average level of education is different in different countries. Independently of the fact that one can be good or better or medium in science, they start from a different level. But the good one will still manage to recover the distance. What I found is that there are some difficulties for students coming from the Arabic countries. They have difficulties in working with team having a lady as leader. If the team is leaded by a lady then we had often quite several troubles with people coming from Iraq, Iran, etc. because they don’t accept that women can tell them what to do. This obviously creates problems. In two cases it was quite a case. I had to impose myself, as very good colleagues are women. Sometimes I say: “Okay, you lead this research”, and then in those cases I have to take it over. That was not good. For the moment, I’m still not very excited by Chinese students. They start to be very important in science, but because they are so many. The productivity of China with the number of active scientists that they have, I don’t think it is very high. I never make this kind of statistics, but the people I directed were good executors, but sometimes they didn’t feel to be part of a team which is very important. If someone works in my group I would like that you feel part of a team. You have to do something for the team, because in the return the team will make something for you. And at the end everybody will gain a lot, if everybody in the group are working as a team and not as a lot of different individualities. Some people coming from China and even from India give another feeling. They say: “Okay, supervisor asked me to do this, but is this important for my thesis or not?”, and they are not able to look after this. You use a reagents — it is empty. You have done your experiment, that’s okay, you don’t care. But the next student that comes to make an experiment, doesn’t find the reagents and will lose two weeks. It is so difficult when you are using a chemical tools and

² *Characterization of Semiconductor Heterostructures and Nanostructures Second Edition*, (C. Lamberti, G. Agostini eds.) Elsevier, Amsterdam (NL), 2013. P. 1–813. ISBN: 978-0-444-59551-5. <http://www.sciencedirect.com/science/book/9780444595515>.

it's close to an end, you have to write somewhere and to make an order. Now you are putting in trouble someone else, but if everybody do like this then you may be in trouble next time. This kind of little things let's say, contribute quite significantly to the overall productivity of the lab.

What kind of additional support does your research team have?

Carlo Lamberti: Within the group we have second important funding which is not as huge as the megagrant, but still quite big – Russian scientific fund on the topic of nanoparticle for medicine. It is an interdisciplinary project between material science, physics, chemistry and medicine departments. And there are a lot of small ones, for instance, our students get quite often this funding from the Russian president. This kind of their small things, but all together help, of cause in running group.

Thank you!

АЛЕКСАНДР ВЛАДИМИРОВИЧ СОЛДАТОВ

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“Чего молодежи из нашей лаборатории искать? За рубежом лучше не будет”

Александр Владимирович, расскажите, пожалуйста, о Вашей лаборатории, о секрете ее успеха.

Солдатов А. В.: Определенный успех у нас есть. И мы не боимся окончания гранта по 220-му постановлению, потому что грант дает треть всего бюджета. В принципе, в нормальной организации потеря трети финансирования не сильно сказывается. Тем более что мы больше трети, ближе к половине, тратим на оборудование. Но оборудование можно покупать бесконечно, а можно перестать его покупать, и ничего не произойдет. В России можно найти нужное оборудование, которого нет здесь у нас, и мы активно используем международный центр. Допустим, в понедельник мы проводим конференцию для молодых ученых юга России по использованию установок «мегасайнс», так называемых, — это синхротронные центры. Два зарубежных — это европейский синхротронный центр ESRF в Гренобле и DESY в Гамбурге, в Германии Европейский центр. А третий участник — это наш Курчатовский институт из Москвы, третий синхротронный центр. Поэтому мы тут свою нишу нашли.

Мы подали проект на проект «5–100», и я был в группе подготовки. В кризисе надо как-то перестраиваться, но надо не уменьшать финансирование, а оно уменьшается в этом году 10–18% по Министерству в среднем. Но это не значит, что надо просто всех взять и сократить на 18%. Я показал анализ эффективности подразде-