

Professor of the University of Aalto Pedro Vilaca: “Be open to create, be free to create!”

There is a world of difference between understanding of what is welding by an ordinary person and a scholar. Doctor of sciences, Professor of the University of Aalto (Finland) Pedro VILACA made us believe in that: he is sure that welding technologies have a great future. Professor VILACA came to SPbPU to take part in an experiment housed by the Institute of Metallurgy, Machine Building, and Transport (IMMBT) together with a research group of the Laboratory of Light Materials and Constructions (LLMC) under direction of Associate Professor O.V. PANCHENKO and also to teach a lecture and hold a seminar for the Polytechnic University students. In his interview, professor told about the details of the laboratory experiment, innovation achievements in the area of welding, and also gave Russian students good practical advice. Our interview speaks about this and some other thing.



- Professor Vilaca, could you please tell what similarities and distinctions did you notice between the two our universities? What impressions did Polytechnic University produce on you?

- Our universities have quite a lot in common: both have rich, more than century-long histories. From the technical and scientific points of view, I think, we are running in parallel courses sharing the capacities we have, and reinforcing the impact of our research groups, as our universities and institutions are progressing.

Coming back to the history, SPbPU has beautiful buildings that were an outcome of a golden period of the Russian history. The University of Aalto has a more modern structure, and it also is echoing a younger society that came from a completely different historical background. In fact, it is very beautiful here: you have a mixture of really old and extremely beautiful buildings with modern ones. It is a pleasure to walk around the campus and be able to visit all those places.

- When had cooperation between the University of Aalto and SPbPU started?

- In 2014, the University of Aalto and SPbPU' signed a memorandum of understanding and cooperation; it was signed by SPbPU Rector RAS Academician A.I. RUDSKOY and Vice President of the University of Aalto Professor Hannu SERISTO. In accordance with the memorandum, we are trying to actively develop our joint research projects, exchange experience, and invite visiting professors, teachers, and students to our universities. Within the frame of our cooperation, I am visiting St. Petersburg for the second time.

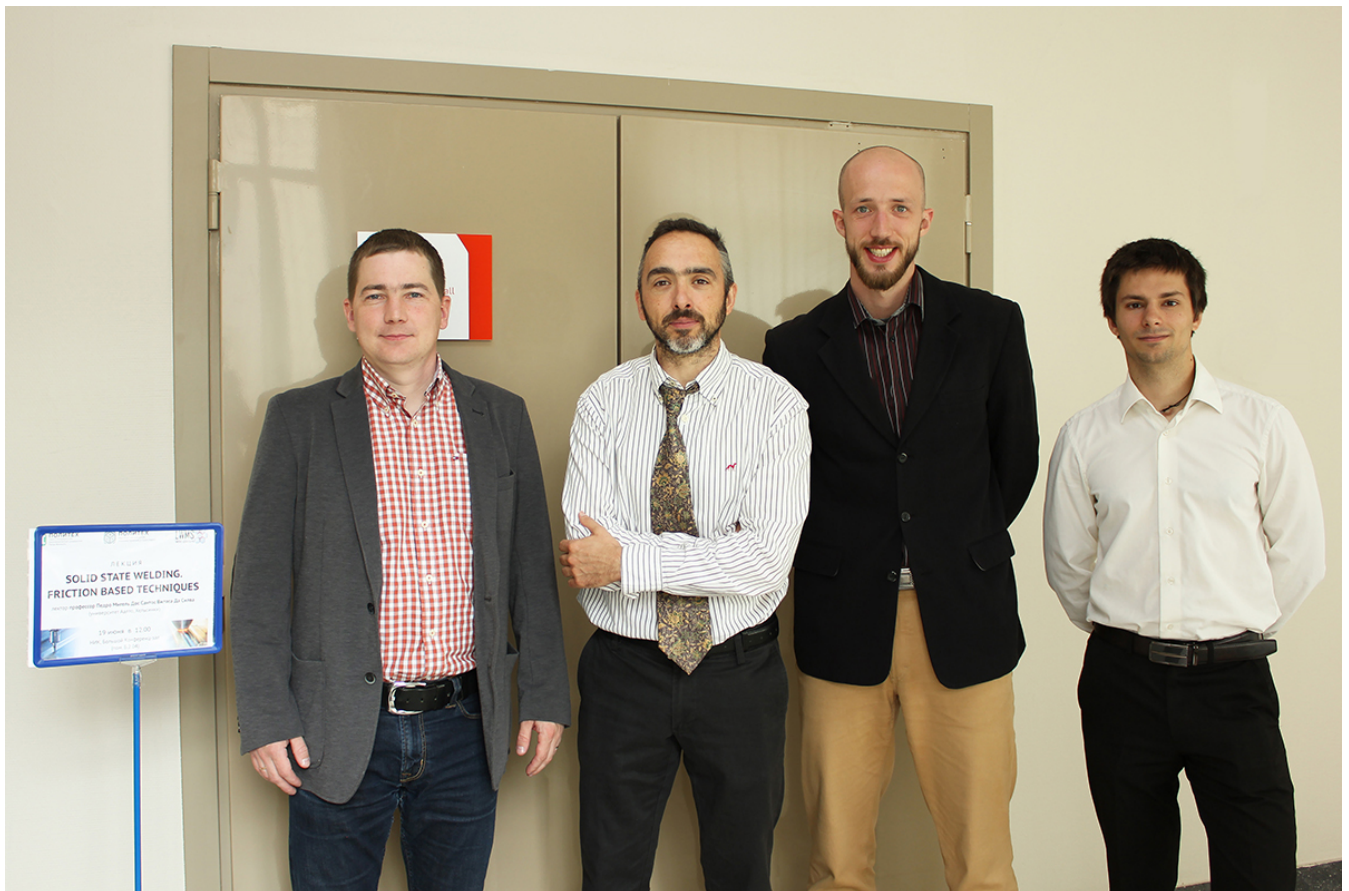


I would single out three major areas of cooperation: we hold direct joint researches (for example, the laboratory experiment which I will tell about later); we share our ideas and stay in direct contact with research groups, and we also participate in the educational process. Our scholars and teachers, me included, teach lectures and hold seminars for young people who still are in search of their future specialization. And, of course, we are interested in student exchanges, which allow us to engage in research work young people from both universities using available technical equipment. Besides this, the equipment that belongs to SPbPU and the University of Aalto are quite complimentary and advantageously add to each other; this is another benefit of our cooperation.

- Could you please tell us more about your professional activities?

- For more than 20 years my life has been connected with studying various technological processes; the major part of those are processing hard-state materials including solid-phase welding and other relative technologies.

15 years ago I started working as a professor at the Higher Technical Institute in Lisbon (Portugal) and later continued my studies at the University of Aalto. Then it was called Helsinki Polytechnic University. It got its new name of the University of Aalto in 2010 when it was named after an outstanding Finnish architect and designer Alvar AALTO who had once studied there himself. In my opinion, this is quite symbolic: in addition to technical sciences, our students study diverse spheres of arts and business.



I have always been in contact with the international community. In due time, I had studied and worked in England, Portugal, and Germany. It was exactly in Germany when as a postgraduate student I had discovered for myself the specifics of solid-phase welding. At that time, this technology had a very limited sphere of application, and I was lucky to get to it at the stage of its establishment and progress. I fell in love with this technology right away and made a great effort to learn it, develop, and search of sponsors. Solid-phase welding has got a broad sphere of application in the industry and allowed us to find truly innovative solutions in the sphere of processing of various materials.

- Here, at SPbPU, you took part in an experiment together with a group of Russian scholars. Could you tell us what it was about?

- In the course of our study we are trying to increase the strength of a heterogeneous copper and aluminum connection by introducing carbon nanotubes into the welded seam. Copper and aluminum have quite specific properties: very high coefficients heat and electrical conductivity, but at the same time, very different coefficients of thermal expansion and density. Aluminum is a light metal, while copper belongs to the group of heavy metals. This sort of two different metals connecting has application in the spheres related to heat and electrical energy. The results of our joint work are quite interesting; already the very first end-to-end connections between sheets of copper and aluminum came out quite successful.

- There is no doubt that the science is moving forward. What innovations in the sphere of welding you consider as the most promising ones?

- The current level of solid-phase welding is, no doubt, quite impressive. Such materials as aluminum, copper, or titan, cannot at all or can but with many difficulties be connected using traditional methods of welding. Despite specific physical and chemical properties of such materials, connections of those could be achieved using the solid-phase welding. Alternative ways of joining, for example, the use of rivets or bolts, have a lot of disadvantages compared to our method.

In addition, scientists at the University of Aalto have learned how to produce bimetallic compounds of metals with simultaneous creation of channels inside them. These channels are used during exploitation as cooling systems. This allows us to offer new solutions for such a sphere as high-voltage electrical engineering.



- Within the frame of your visit, you held a seminar for Polytechnic University students. Could you please tell us about your impressions of our students?

- I could see that since the time of my first visit to Polytechnic University in 2015, the number of international students has significantly increased, and a lot more students speak English. However, understanding and command of foreign language still presents certain difficulties. In the world of science, we normally communicate in the common language, namely, the English language. And communication is the basis of the knowledge, so we have to be able to interact, to create, to understand what the others are doing, we have to communicate. There are many ways to communicate, but definitely speaking and reading in common language makes it much more efficient. I already see a significant difference in the international attitude of your students, and the amount of faces of international students is impressive. I see that in the campus. I am staying at the International Campus of SPbPU; it has an international reception service for foreigners and, obviously, we feel that everything is running in the right direction there. The next step is really to open this capacity to speak the international language, to make it easier to go abroad, to host others in an easier way, because the culture is something much bigger than just the language; there are many things you can learn having a common language.

- And, finally, our last question: what three qualities are the most

important for students for the successful educational activities?

- I would say: trust the system that consists of the staff, facility, professors. Trust is very important. People around us need to trust each other. No one is going to do anything wrong, everyone is striving for better conditions and also for higher level of learning. The students should be patient and with this trust attitude, the things will happen in the right way. They should not start judging. They should trust. Trust is extremely important. The other issue is spirit of the mission. We should do this not because it is nice; even if it is not nice, it is our mission to do something that we have chosen to do. When we choose an engineering course, or a journalist one, or whatever, we should take it and be the best ones we can, and a little bit more, if possible, in that activity. It's a mission. Everything is beautiful, everything is great. However, nothing can be absolutely amazing and exciting all the time, so we have to have the mission spirit. And finally, it is about our personal contribution. So, be creative, be open to create, be free to create. Those are the three issues that, I suppose, students should encompass in them.

- Professor Vilaca, thank you very much for your interview! We wish you success and discoveries in your academic and research activities!

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