



**Interview with Mario Pinto, February 19, 2015**  
**by Barbara Frisken, CAP Director of Academic Affairs**

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**Preamble:**

Dr. B. Mario Pinto has recently been appointed President of the Natural Sciences and Engineering Research Council of Canada. Previously, Dr. Pinto served two terms as Vice-President, Research at Simon Fraser University. He is a pioneer in the field of chemical biology, and an active researcher in the areas of drug and vaccine design. He is a Fellow of the Chemical Institute of Canada and the Academy of Sciences of the Royal Society of Canada. He recently presented NSERC's Draft Strategic Plan for 2015-2020 for advice and comment. You can read about the plan on the NSERC website: [http://www.nserc-crsng.gc.ca/NSERC-CRSNG/NSERC2020-CRSNG2020/index\\_eng.asp](http://www.nserc-crsng.gc.ca/NSERC-CRSNG/NSERC2020-CRSNG2020/index_eng.asp).

Comments on the NSERC Strategic Plan for 2015-2010 will be accepted until May 8, 2015. A link to the online comment submission form can be found on the webpage noted above.

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**Barbara: First I'd like to congratulate you on your appointment and thank you for participating in this interview.**

Mario: Thank you very much, Barbara. It is a pleasure to speak with you today.

**Barbara: One of the first strategic goals articulated in the plan is to foster a science culture in Canada. What do you think that physicists can do to help build a culture of science in Canada?**

Mario: First, I think they can join other natural scientists and engineers in promoting the message that science is essential and all around us, and I really do believe that until we foster a science culture with the general public that we are not going to make the strides that we want in terms of investment in science and engineering. So whatever you can do to work with the general public from K to 12 all the way up to your Members of Parliament to educate them about what is being done in the universities.

Now, you are already doing a lot in terms of outreach activities and I think that is very good because through the students you will educate the parents. I think that is the critical part of the exercise.

**Barbara: What can we do to increase understanding of the importance of research in areas of foundational knowledge?**

Mario: This is a good question. Let me tell you what I have learned since I took over as President and this is what I have been communicating to different groups in my trips across the country. In March and April I'll cross the country yet again to talk about the NSERC 2020 plan and to get feedback on the plan, but also to take the occasion to share these insights.

In my encounters with the different sectors: academic, business, and government, the importance of discovery research is appreciated and there is a growing understanding of investment in research where results may be unanticipated. Two nights ago, we celebrated the top NSERC research awards at Rideau Hall, the Governor General's residence. At the event, Minister of State for Science and Technology, Minister Holder, spoke about the importance of discovery-driven research and the value of scientific inquiry.

Everybody must realize that we shouldn't create an artificial distinction between pure and applied research. Let's focus instead on doing excellent research. But this is not to say that we should not keep up the pressure to spread that culture among the general public, the business community, and parliamentarians, and that's what I am in the process of doing.

As far as Discovery Grants go, I'd like to emphasize that investments have increased (15%) over the last decade and funding has steadily gone up every year. If I look at the overall NSERC budget, 66% of the funding pie is dedicated to discovery-driven research, while the rest supports strategic partnerships and innovation. Of that 66%, 13% is in Scholarships and Fellowships, and 13.5% is in CRCs (Canada Research Chairs) and CERCs (Canada Excellence Research Chairs), also doing foundational research. So the bulk of our money goes into discovery research.

The importance of foundational research is well recognized and we have to accept that it is part of our fabric, part of our foundation. We need to celebrate it more and this is what you will see in the new plan, but with the understanding that, when inventions do arise, we have the responsibility to provide the tools to develop these inventions to create innovation for societal and economic impact.

What NSERC does through the partnership programs, is to add value and de-risk the scientific invention for further investment. This investment takes different forms, some of which are supported by other funding organizations. But what we are doing at NSERC is discovery research, adding value, and de-risking. That's it. Commercialization requires the involvement of many more players in the innovation ecosystem. This is our space. What I am doing is defining our role for the academy, for the business community and for parliamentarians.

**Barbara: One of the things people are wondering about is the continuum between university research, NRC, and industry.**

Mario: You bring up a very interesting point. There are many, many players in the space of research and innovation. We have to look at the other partners.

NSERC is trying to provide some coordination and collaboration between the different organizations to leverage respective strengths, working with NRC IRAP, MITACS, etc. to try and reduce the administrative burden and provide one access point. Discovery is our cornerstone and our foundation, but when invention needs to be developed further, we will partner with industries and other agencies to take those inventions forward and build them into true innovation.

It takes a whole ecosystem. The important thing is to do it well, whether one is doing discovery-type research or partnership-type research with industries, to do it rigorously with a high caliber of excellence in both those endeavors.

What I maintain is that the distinction between discovery and partnership research and what we call innovation is really moot, because it depends very much where I draw my boundary conditions what makes research of a discovery nature or an innovation nature. But one thing is clear, the entire system profits from the dynamic interaction between the two.

**Barbara: There is a practical distinction – if you are moving towards the partnership area you need a partner.**

Mario: There is, and then you have to ask very different questions. You have to look at the measures of rigour appropriate to that partnership. You can't use the measures of rigour you would use in a pure scholarly inquiry in the partnership precinct. If you are going to encompass partnerships, you have to use other measures as well, appropriate to industry standards, for example.

We should not be preoccupied with this distinction and just do excellent research and innovation, and that will be key.

**Barbara: One of the things physicists have found challenging about the strategic areas is that they have become very defined. People don't feel they fit.**

Mario: There are broad research priorities and sub-priorities in the Science Technology and Innovation Strategy and really they provide enough latitude to encompass most initiatives. I recently presented this to the Evaluation Groups as part of the discovery merit-review process. Allow me to outline the research priority areas and sub-priority areas because it may be instructive to your community:

- **Environment and agriculture** – water, health, energy, security, biotechnology, aquaculture, sustainable methods of accessing energy and mineral resources from unconventional sources, food and food systems, climate change and technology, disaster mitigation
- **Health and life sciences** – neurosciences, mental health, regenerative medicine, health in an aging population, biomedical engineering, medical technologies
- **Natural resources and energy** – arctic, responsible development and monitoring, bioenergy, fuel cells, nuclear energy, pipeline safety
- **Information and communications technologies** – new media animation and games, communications networks and services, cyber security, advanced data management and analysis, machine to machine systems, quantum computing

- **Advanced manufacturing** – automation, including robotics, lightweight materials and technologies, additive materials, quantum materials, aerospace and automotive

These areas are broad and offer many opportunities to the physics community. Here are a couple of examples that I can speak to: Jeff Dahn at Dalhousie University has been well supported and is very successful. He taps into a lot of partnership programs in the area of battery technology. Karen Kavanagh at Simon Fraser University has just received an Engage Grant to work with Parkside Optical Inc. That's just the beginning of the relationship. There are many other examples of physicists working in Strategic Partnerships, Collaborative Research Development programs, and Industrial Research Chair programs.

**Barbara: The CAP-NSERC Liaison Committee has found that physicists' participation in partnership programs is low as compared to some other disciplines. There will be a session about this at the CAP Congress in June.**

Mario: Physicists are at the core of many of the strategic areas. I don't see many restrictions because of the chosen strategic areas. You can work on sensor technologies, nanotechnologies, wireless communications, quantum materials, optical spectroscopy, and the list goes on. Physicists are well positioned.

Start with an Engage Grant, it's the "first date", the first exposure of a researcher to a company and possibly first exposure of a company to the brain trust. This will set up the network for further development.

In the past five years, one in five Engage Grant partnerships have gone on to more mature relationships like Collaborative Research Development grants, and Industrial Research Chairs. And one in six of students involved have gone on to be employees of the companies. There are lots of opportunities, not just for physicists, but you have a privileged position as you are at the core of many of these activities, as I see it.

What we can do better, which is part of the NSERC 2020 strategic plan, is to be the matchmaker and provide access to these companies for the academics, and vice versa. We can develop an asset map of the different strengths of academics to offer to potential industrial partners.

**Barbara: I think that would be helpful. Is there a particular type of industry that is more likely to become involved in partnership programs?**

Mario: NSERC funded researchers are working with 3,000 companies through partnerships. We are primarily a land of small and medium enterprises and we might as well embrace this ideology and ethos and run with it. And many people are: 3,000 companies is quite significant. There are some large companies: we have for example IBM and 3M working with us. Overall, there is a significant Canadian industry presence and we work with them.

The testimonials I have heard from these business partners are just outstanding. They value the brain trust so much that it is overwhelming. Scientists and engineers shouldn't underestimate their contributions.

Generally, the Engage Grants are taken advantage of by small companies, the Collaborative Research Development grants are more mature relationships taken advantage of by medium

companies. Industrial Research Chairs are exploited by large companies. We can see the progression and their maturing as a function of company size.

**Barbara: IRCs is another area where I have noticed that physicists are under-represented.**

Mario: I think this is very much dependent on the institution. I will say that Industrial Research Chairs are a great way to bring in new talent. I'd like to see all institutions occupy this space because it is a great way to add new faculty without bearing the cost, at least for five years.

There are a total of 180 Chairs across the country, and they are particularly well represented in Alberta, Ontario, and Quebec. Of these, 11 are held by physicists.

**Barbara: We only have a few more minutes, I wondered if you could comment on how we can build on the potential of academic institutions of all sizes?**

Mario: Absolutely. The second goal of NSERC 2020 is to take advantage of the diversified, competitive research base in Canada. We have to admit that we have great diversity in research and innovation, ranging from the colleges and polytechnics, to the universities, small, medium and large, each with a different mandate and a different clientele. We have to embrace that diversity.

That means we may have to be flexible. By that I mean, when judging the productivity of a researcher from a primarily undergraduate university, we should admit that they are working with undergraduates and so the productivity and the type of research project is going to be geared to this base. So perhaps we should be flexible in evaluating their contributions in the training of undergraduates.

Similarly, the colleges, polytechnics, and institutes have their place, mostly on the innovation side. NSERC's plan is to embrace this diversity. This diversity extends to populations as well. We need more women in science and engineering, and we need more aboriginals in science and engineering. We have to recognize that we have a diverse culture, embrace it and figure out how we can leverage these various strengths to generate a robust research and innovation ecosystem. Through diversity we can generate strength. But, research excellence has to be the overriding criterion with the assessment of university contributions. This is what we propose in our new strategy, to embrace the contributions of the different types of institutions so that we are inclusive to all parts of the population.

**Barbara: Have you looked at having different programs for primarily undergraduate universities as they do in the US?**

Mario: In my first round of consultations with the community, I asked this question of researchers at small universities, and was surprised that a strong majority of them wanted to be evaluated in the same competition. They did not want a separate allocation; rather they wanted to be evaluated with their peers. But they wanted some consideration for the training environment. We offer similar flexibility with early career researchers.

**Barbara: How can people provide input on the draft NSERC 2020 Strategic Plan?**

Mario: There is a free-format survey on our website: [http://www.nserc-crsng.gc.ca/NSERC-CRSNG/NSERC2020-CRSNG2020/index\\_eng.asp](http://www.nserc-crsng.gc.ca/NSERC-CRSNG/NSERC2020-CRSNG2020/index_eng.asp). We have asked two specific questions and comments are welcome. I will look forward to meeting with researchers across Canada this spring where I will hold in-person sessions looking for input. I look forward to the feedback and interacting with the community. This is a cogent strategy but we want to make sure that the community has an opportunity to fine tune it and that you will help us realize this strategy because it has to be a team effort.

**Barbara: The plan presents a more optimistic view than I have heard for a while, and it is quite refreshing.**

Mario: Thank you Barbara. If you can't be optimistic it is not going to happen. We, as a community, have to believe in the plan. We have to stop dividing the pie and instead grow the pie. The other objective is to present a coherent front. We need to move forward together to harness the potential of scientific discovery and innovation.