

Speaking notes for
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at the
“Cultural Knowledge and the Healthy Society: A Research and
Innovation Summit”

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- Thanks very much, Sara [Sara Diamond, President of OCAD], for your introduction.
- I'm very pleased to be here today on behalf of NSERC.
- I would like to start by applauding the Ontario College of Art and Design for organizing this event and to all of you for being here. Your presence and your interest in integrating design with scientific research reflects your commitment to making the world a better place.
- I don't need to convince you about the benefits of good design. We all know that it makes us more comfortable with our surroundings, increases our security, improves appearance, increases efficiency, effectiveness and productivity, ... and the list goes on.
- I'm here to talk to you about NSERC's role in the research and innovation cycle, especially health-related research. I will also touch on how our programs, and the work being done by our researchers, fit with the concepts of design thinking.
- But let's take a look for a moment at the bigger picture of our international environment. In the world-wide economic race, I think it's fair to say that all countries fell down in the past year. But we in Canada now have an opportunity to reposition ourselves as we get up. It is my belief that those countries that will emerge in a better position in the race will be those that have invested in advanced innovation, research and development.
- We know that scientists and engineers are driven by curiosity – they want to get a better understanding of what they see around them, and then use their knowledge and talents to improve the world.
- Researchers are also, at heart, creative people. For many of them, their creativity shows itself in their ability to think outside the box in order to come up with new ideas to solve problems.

But it's also very common to find them expressing their creativity in artistic ways as well.

- Leonardo Da Vinci is probably the most famous example of a prolific scientist and inventor who was also a superb artist.
- Sir Frederick Banting, the man who discovered insulin, was also a talented painter.
- Canadian astronaut Julie Payette is an accomplished pianist and singer.
- And there are many others, of course. The point is, scientists and engineers have more in common with designers and artists than you might think.
- But let me get back to where NSERC fits into the picture. For those of you who don't know us, we are a federal granting agency that supports academic research in the natural sciences and engineering. We distribute \$1 billion per year that funds research programs, trains students and helps commercialize innovative discoveries developed in universities and colleges.
- We are NOT, however, a bastion of so-called "silo thinking" – the idea that effective research can be confined to individual scientific disciplines.
- In fact we fully recognize the value of bringing together not just other "hard" science disciplines, but also the social sciences, health research, the arts and design.
- That's a far cry from the notion that a casual conversation between a biologist and a chemist constitutes interdisciplinary collaboration.
- My colleagues from the Social Sciences and Humanities Research Council and the Canadian Institutes of Health Research would agree that some of those old ways of thinking no longer work.
- These days our three councils are doing more collaboration than ever before. I'm in contact every day with my colleagues in the

other funding agencies, including the Canada Foundation for Innovation. We have regular joint meetings, we're harmonizing our programs, policies and practices, and we will soon have common web pages on our websites. Two weeks ago, we even made a joint submission to the Parliamentary Committee on Finance laying out our agreed three top priorities for the next federal Budget.

- Quite simply, we want to work closely together – shoulder to shoulder, as Chad Gaffield likes to say -- because every day we see the merit in it. Knowledge today is multi-disciplinary and interwoven. In most fields, you cannot be a productive researcher without complementing your expertise with knowledge from other disciplines. Because of that, we at NSERC have tried to be leaders in promoting the value of interdisciplinary and collaborative research.
- A number of our programs reflect that commitment, and I will share with you just a couple of examples.
- First, our Collaborative Health Research Projects program is run in partnership with the Canadian Institutes of Health Research in support of research that bridges the natural sciences and the health sciences. In the program criteria, we also strongly encourage the research team to include expertise in the social sciences and humanities.
- Secondly, we run a program that supports research Chairs in Design Engineering. It places a strong emphasis on giving students the skills and knowledge they need to work in a design environment. It also expects grant holders to establish partnerships to promote design engineering and develop products and technologies.
- NSERC has taken other steps to continue moving away from silo thinking. Many of you will know that, like the other granting councils, our research funding is awarded through a highly respected peer review process. In the last few years, we have evaluated and restructured that process in a way that

recognizes what I just said about knowledge becoming more interdisciplinary. By next spring, we will have fully implemented a new enhanced peer review system that easily allows us to assemble groups of reviewers with the appropriate variety of expertise to evaluate research proposals that don't fit neatly into a single discipline. And we are working with the other funding agencies to see where there are opportunities for common approaches in peer review best practices.

- We are making these changes in response to the changing research landscape, but there are plenty of additional reasons for us to encourage interdisciplinary thinking.
- One of the most important results of interdisciplinary thinking is that it helps research teams to examine an issue from all possible perspectives.
- This approach fits well with the historical reality that many of the best innovations have come from applying a scientific concept in a completely new and unexpected way.
- Or, to quote the well-known science writer Isaac Asimov: “The most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka!' (or I've found it!), but rather ‘That's funny...’ (as in that's odd... as they realize some completely new insight).
- At NSERC, we are becoming accustomed to working with the social sciences and with health researchers. But we certainly appreciate that we, and the researchers we support, could benefit from casting our net even wider.
- Health research is certainly one area where expanding the tool kit can yield great benefits. This is already an incredibly diverse field.
- By the way, for those of you who are interested in numbers, NSERC funds about \$140 million in health-related research each year, which represents just under 15 per cent of our budget.

- The projects we fund include collaborations between and among experts in nanotechnology ... biotechnology ... engineering ... physics ... computer science ... chemistry ... microbiology ... and more.
- I'd like to give you just a few examples of the kind of innovative work that we are supporting. Some of these are health related and some relate more to design.
- The first is a new media initiative at École Polytechnique in Montreal. Our funding partner is CTT Group which provides a range of services to the textile industry in helping them develop new and innovative products. The project is titled "*Karma chameleon: minimally invasive interactive textiles for dynamic personalities.*" I think I can explain this best through the words of those involved. They are going to, and I quote: "... develop a collection of interactive electronic garments constructed out of a new generation of composite fibers that are able to harness power directly from the human body, store that energy, and then use it to change their own visual properties. These animated garments will change color and illuminate on the body in response to physical movement. [they will have] both highly utilitarian applications and demonstrators, as well as very poetic, artistic, and critical outcomes." Unquote. How cool is that??!
- At Ryerson University, NSERC-funded researchers are using computer simulation technology to integrate the 'Human Factor' into factory design. The World Health Organisation reports that work-related illnesses cost up to four per cent of the world's gross domestic product. 'Human Factors Engineering' aims to use knowledge about people to improve the way we work for better productivity, and also for better employee safety and well being - a win-win proposition. This is particularly helpful where the costs of poor design might emerge months or years after a manager has chosen a particular design. This technology helps

designers evaluate both human and productivity criteria in their designs, without the large costs of retrofitting or last-minute changes.

- Researchers at the University of Guelph are also looking at human factors in relation to the design of working environments and, very specifically, to evaluating the design of joysticks and other hand held tools. According to the Canadian Centre for Occupational Health and Safety, work related musculoskeletal disorders are the most commonly diagnosed workplace injury class. Design improvements have the potential to reduce health costs and improve the quality of life for many workers.
- More closely connected to health care, a Collaborative Health Research Project based at the University of Toronto is looking at technology that can help keep in check the spiralling costs of delivering home care to older adults. The various components of this research will develop ways to monitor patients in a non-intrusive way, then send the data to health care workers who can determine whether the patient needs to be visited. The system will save money, and the patients will receive better care.
- And as another demonstration of inter-agency collaboration, when I got a call one Thursday last June from Christine Fitzgerald, the Executive Vice-President of CIHR proposing a new \$6 million program for Alternative Medical Isotopes that would not require nuclear reactors, I immediately agreed and the following Monday it was announced by the Minister of Health. It brought in 19 applications and 7 projects have now been funded – projects that would not exist without inter-agency collaboration and interdisciplinary research.
- NSERC also funds researchers working on drug delivery systems, artificial tissue, prosthetics, and countless other innovative solutions.

- Many of these successes would not happen without collaboration at all levels. As I said, we're not strangers to this road, but we could certainly travel further along it.
- It goes without saying that the key contributions of NSERC-funded researchers will remain on the technical side. But through events like this one, we stand to learn more about bringing other kinds of knowledge to bear on solving challenging problems.
- Ultimately, it is the research community that will have to build the relationships and interest to incorporate design thinking.
- And in many of these cases, NSERC can look for ways to help this happen. Very often, this will mean researchers working more closely with companies to develop new innovations and technologies. Today in Vancouver, NSERC is announcing a new Strategy for Partnerships and Innovation that will bring together companies and university researchers in new and exciting ways – and health and design companies and researchers can be very much a part of that new dynamic.
- One thing we can say for certain is that Canada is home to some of the brightest minds in the world, and when they decide to tackle a problem, good things happen.
- We will continue to encourage our grantees to tackle problems in holistic ways and recognize the benefits of erasing boundaries between and among disciplines.
- I will leave you with a challenge. For those of you who are design experts, I invite you to learn more about NSERC-funded research. We would be happy to help put you in touch with potential collaborators. Go to our Web site – it has a search engine that connects to a database of all our grant holders. We look forward to seeing what new innovations could come out of collaborations between our researchers and your designers.
- Thank you very much.