

**The University of the 21<sup>st</sup> Century: a Catalyst for Creativity and Innovation**  
**Green College Lecture**  
**January 13, 2015**  
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Thank you, Mark, for inviting me, and thank you all for being here this evening.

I am delighted to see students, including Green College residents, faculty members from across the academy as well as community members who have made the trip to the campus to be here this evening.

This year marks the centennial of Graham house, and I imagine this type of gathering is what Cecil Green had in mind when he envisioned the college as a place to bring the community and the university closer together under the banner of “friendship and ideas”.

UBC is also preparing to mark the 100<sup>th</sup> anniversary of its first class this September. We will be celebrating all that has been achieved in the past 100 years and – most importantly – how our past is shaping our future.

So, it’s fitting that the theme of this series of talks is, “Ideas of the University of the 21<sup>st</sup> Century”.

We can’t talk about the evolution of the modern university without first acknowledging the forces of disruptive change that have marked the turn of the 21<sup>st</sup> century. The list includes globalization, environmental sustainability, economic stability, fast altering job markets, and technological advances, to name just a few.

These forces are also shaping post-secondary education, especially as we are pressured to view higher education in increasingly narrow terms. Governments everywhere are looking at ever shorter-term “fixes” for youth employment such as through promoting skilled trades, the implication being that our universities are simply out of synch with the economy.

There is a positive side to these pressures. It is pushing our post-secondary institutions to continually innovate, adapt to new realities, and define our place in the changing landscape. But we must always remember to do this within the context of our core academic mission of learning and research, ensuring we take a long-term view instead of being reactive.

Today I want to look specifically at our capacity and responsibility to ensure that our students and researchers continue to enhance every part of society – in building a more just world, in advancing human knowledge

whether in health, in social policy, in environmental sustainability or technology and in advancing economic prosperity through innovation.

Let's start by agreeing on the definition of innovation. To innovate, according to the *Oxford English Dictionary*, is to "bring in new methods (or) ideas." Borrowing from the Canadian Academies description, innovation is **giving creative people the resources to address immediate and long-term socio-economic challenges.**

Phrased as a sentence, that seems like a linear process: we nurture creativity; then we link to community; and, together, we reap the benefit.

But, in keeping with this definition, I suggest that the process is considerably more interactive. The best post-secondary institutions certainly have an advanced capacity to cultivate creativity – in students, among researchers and in the larger community. But the richest environment for cultivating creativity may come in the interplay among students, faculty, industry and civil society.

Specifically, I'd like to argue that creativity flows from a wealth of experiences, some of them from formal education, and some opportunistic.

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So how can universities support creativity?

In an interview in 1929, Albert Einstein said, "If I were not a physicist, I would probably be a musician. I live my daydreams in music. I see my life in terms of music. I get most of my joy in life out of music."<sup>1</sup>

Einstein told his friend, the Japanese violinist Shinichi Suzuki, "The theory of relativity occurred to me by intuition, and music is the driving force behind this intuition. My parents had me study the violin from the time I was 6. My new discovery is the result of musical perception."<sup>2</sup>

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<sup>1</sup> Albert Einstein, quoted in Alice Calaprice, and Trevor Lipscombe, *Albert Einstein: A Biography* (Greenwood Press, 2005), 5.

The point is that, whatever the specialty, a diversity of pursuits – a rich variety of inputs – is more likely to engender a creative output. From Leonardo da Vinci to Chris Hadfield, the polymaths have demonstrated, again and again, the benefits of a broad, interdisciplinary and ongoing education.

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How can we leverage what we know about creativity to cultivate research excellence?

If we accept that creativity flows from a wealth of experience, then we must ensure that researchers are immersed in diverse and stimulating environments.

Great researchers are inspired by their students, by their surroundings, by the music they hear or play, by the issues that challenge their society. If we are to be innovative, if we are to leverage our research capacity to increase the productivity of our community and our country, we will do so by embracing the pressures of the outside world.

So, if we are to cultivate research excellence and maximize our own capacity for innovation, we must do three things:

1. We must support the research enterprise at every level;
2. We must integrate it wherever possible with other elements of the academy; and
3. We must promote engagement – among our faculty, between faculty and students and between the academy and the community.

One of the first commitments I made when I became President was to invest 100 million new dollars in the people who discover, develop and deploy knowledge.

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<sup>2</sup> Robert & Michele Root-Bernstein, "The Art & Craft of Science," *Educational Leadership* (February 2013), 16; Shinichi Suzuki, *Nurtured by Love* (1969), 90.

That's critical because research excellence is our distinguishing feature and will position us to compete with the best in the world for talent and break-through discoveries.

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If inspiring creativity is our best hope for the future, the modern research university must be a catalyst, a place that attracts and combines people of vastly different aptitudes and interests, placing them in environments where they can learn, be entertained and provoked by one another. It's a nexus, a hub, a gathering place, where great questions from across the academy and from broader civil society are asked and addressed.

There can be no simple first-year course in originality or imagination. Creativity is complicated. It arises from the interconnections within and beyond the academy.

Our best discoveries – our most transformative revelations – will come in the complex interplay among disciplines and among those who think and those who do.

That being the case, in order to nurture and leverage creativity, we must maximize the opportunity for students to enjoy a diversity of experience, in and out of the classroom, in and out of the lab, within and amongst different disciplines, across geographic boundaries – and in connection to community.

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How can we most effectively deliver that innovative energy beyond the academy? And how do we tap into the needs, the demands and the creative energy of the wider community to inform and inspire our own work?

It all starts with talent. Whether in the social sciences and humanities or in the physical and health sciences – innovation comes most frequently from the most highly qualified people.

Yet, the Conference Board of Canada reports that, among our competitors in the Organization for Economic Cooperation and Development, only Japan graduates fewer PhD students per capita than Canada.<sup>3</sup> We educate half as many as the U.K. or Germany and about one-third of Switzerland.

We're especially conscious of this at UBC. British Columbia runs behind the national average in the number of PhDs we produce per capita.

Then, compared to the U.S., Canadian firms, not-for-profits, and governments hire fewer PhD graduates and pay them less – which the Conference Board suggests as an explanation for why more Canadians don't commit to doctoral programs.

It's a classic chicken-and-egg problem: fewer PhDs; lower Canadian demand for PhDs; less innovation; fewer opportunities for students.

Our civil society doesn't appreciate to the same extent as others the potential advantage of highly qualified people. In the current situation, it appears that lack of familiarity is breeding disinterest – to everyone's disadvantage.

The PhD conundrum is a symptom of a challenge we see across Canadian society. The first step is to understand our own role in addressing this. Have our post-secondary institutions done enough to ensure the success of our graduates? Are we adopting our educational paradigm to ensure it remains relevant for our students' increasingly diverse career outcomes?

In fact, students entering UBC across all disciplines tell us that gaining experiences through experiential learning opportunities is the single most important goal they hope to achieve at university<sup>4</sup>.

Let's consider this more carefully, by considering fields where students are already gaining direct exposure beyond the academy prior to their post-graduation career. In Education, for example, we would never send a

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<sup>3</sup> Conference Board of Canada, How Canada Performs. Retrieved October 9, 2014 from: <http://www.conferenceboard.ca/hcp/details/education/phd-graduates.aspx>

<sup>4</sup> New to UBC Vancouver Student Survey 2014

new teacher into the classroom without first giving them a structured opportunity to test their knowledge and skills.

We would not send a nurse, a doctor or a physiotherapist into the work world without hands-on experience. Integration in the fields of health and medicine is something that UBC does extensively: we have deep affiliations with 11 teaching hospitals and the BC Cancer Agency.

This model – of experiential learning and two-way communication between the academy and the working world – has also found a foothold in other disciplines. Our Engineering co-op program, for example, is the largest in western Canada and one of its greatest outputs is success stories.

First, from a student perspective, 90% of those who participate in a co-op placement wind up with a permanent job with their co-op employer. Students are clearly getting the experience they need – and they are proving it to prospective employers along the way.

They also become the engine for innovation. Consider Radu Postole, a self-described “mediocre student” until his first co-op term with a German research firm called GKSS. Thanks to this experience, Postole said, “It suddenly dawned on me how all the academic learning is applicable in the real world.”

Postole spent the rest of his study time on the Dean’s honour role. After working with UBC’s own Structured Surface Physics Lab on an alternative energy project called Solar Canopy, he leveraged his well-refined technical skills to get his first “real” job with a start-up company called SunCentral, helping advance the UBC solar lighting technology into a marketed product.

Workplace experience, however, is just one form of experiential learning and does not preclude the importance of the experience of the academic environment in and of itself.

UBC and any of the world’s great research universities offer an opportunity to interact with some of the foremost researchers in the world. UBC’s research excellence gives our students immediate access to the latest discoveries and revelations. There is assuredly a place for research chairs and professorships, and we

must never deny our students the inspiration, enthusiasm and cutting-edge knowledge that they can only get from professors who are innovating at the very top of their field.

UBC's graduate students play an integral role in our research success. With over 250 graduate degree programs in nearly every academic field imaginable, UBC supports a thriving community of over 10,000 talented graduate students whose ideas, discoveries and innovations seek to advance our community and society. They are pursuing targeted research as well as what our Nobel Laureate Dr. Michael Smith called "follow-your-nose" research.

Take Vanier scholar and UBC Psychology PhD student Michael Muthukrishna whose work with the Database of Religious History explores a big data approach to history that has the potential to offer an unprecedented breadth of knowledge amenable to the latest statistical and mathematical analysis.

This ambitious project aims to be the world's first comprehensive, on-line quantitative encyclopedia of religious and social history. Michael and a team of historians around the world are seeking to expand our knowledge of the patterns of the past. While there may not be an immediate practical application to this emerging line of inquiry, it is exciting to think of the potential implications if we gain new understanding of how history shapes our future.

Global research collaborations such as Michael's and international student mobility foster academic, cultural, and social ties that can help to navigate an increasingly interconnected world. Multi-institutional, multi-national teams are best placed to obtain the advances needed to tackle the global challenges that are simply too vast for any single institution.

UBC maintains a wide range of partnerships with universities around the world. One such network is the Max Planck-UBC Centre for Quantum Materials. The Centre links UBC's leading quantum materials researchers to the top minds at Germany's foremost basic research institution through joint research projects and student and faculty mobility programs.

The Centre also offers undergraduate students the opportunity to gain hands-on experience in research projects in Max-Planck Institutes during a summer or co-op job.

By exposing students early on in their education to research opportunities, we teach them to ask difficult questions about the world and challenge existing norms. We combine the full complement of the innovative energy of our faculty, graduate and undergraduate students. In other words, we fulfill our mission to be a catalyst for the bold and creative minds of tomorrow.

Experiential learning opportunities must tap into our strengths across the academy: from the historically and ethically informed critical thinking skills of the humanities, to the transformative capabilities of modern science. Universities must provide more opportunities for students to explore outside of their fields. If we leave it to them make all the connections themselves, then we are simply not doing a good enough job of marshaling the incredible resources at our disposal. Recognizing that the important questions of our day require the application of all types of knowledge, we must be actively exploring points of complementarity and synergy.

I'd like to briefly mention one multidisciplinary model for community integration. Mitacs is a national, not-for-profit that manages and funds research and training programs for graduate students and postdoctoral fellows. I was the CEO and Scientific Director for the past 15 years. Mitacs is fundamentally an engagement mechanism, working with 60 universities, thousands of employers in the private and public sectors, and with every provincial jurisdiction in the country.

For example, the Mitacs Accelerate program facilitates research internships for graduate students and postdoctoral fellows with industries across all disciplines. By building partnerships using all of the resources available to us, we would often find that scientific challenges could benefit from knowledge from the humanities, and vice versa.

One project I always found fascinating was working with a video game company on generating faster images. In video games, the faster you can get an image on the screen, the more realistic you can make things like driving games feel. We started with a technological challenge that quickly became a bigger conversation about

why some games are very popular and others wither on the shelf. We set up a project for a group of sociology and psychology PhD students to observe young people playing video games. Lo and behold they started learning all sorts of interesting things about the interplay between collaboration and competition in video games. And that lead to a series of popular non-violent games.

Mitacs also fosters international exchanges and undergraduate research experiences with the goal of creating a platform for novel student experiential learning.

This is just one example of the kind of multi-disciplinary community engagement that must become even more commonplace. It is part of our commitment to build a plethora of research and educational engagement innovations in the years to come.

The pursuit of creativity, the support of interdisciplinarity and the goal of more effective and community integration will demand attention throughout the academy. Because there is no simplistic secret of success, no magic formula. Rather we must always keep in mind that:

1. Creativity flows from a wealth of experience and is best engendered with a broad, varied and lifelong education – of the heart as well as the head;
2. In order to nurture and leverage the creative energies of our students and faculty, we must maximize their opportunity to enjoy a diversity of experience, within the university and in constant and intimate connection to community.
3. Every individual – and organization – that joins in a close collaboration between the academy and the community is likely to reap enormous rewards.

It is important to remember that universities do not, exclusively and narrowly, contribute to short-term economic goals. There is a great deal of good, in Canada and the world that cannot be expressed within the computations of Gross Domestic Product. Creativity, innovation and research excellence are certainly important to economic prosperity, but equally so to the quality of Canadian justice, to our personal health and social well-being and to our environmental health and sustainability. Canada begins with a huge advantage –

this vast, beautiful, rich country. We have built one of the most admired societies on the planet, with an education system that stands amongst the best in the world.

Our universities are already engaged in the issues that matter most to us. But the more we can immerse ourselves directly in society – the more we can bring the community even closer to the academy – the greater will be our chances for real innovation, that will benefit us all. It is by remaining true to this mission that we will make our greatest contribution in the 21<sup>st</sup> century.

Thank you.