

Presentation to the  
BC Economic Advisory Council:  
Research-intensive universities and transitioning  
economies

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# Talent

*Talent - in particular scientists, researchers and top technology business executives – is the most important resource in the knowledge economy. We need to reorient ourselves around the talent challenge. Our economic success in the future will depend on our ability to retain and attract these Highly Qualified Personnel (HQP).*

*Premier's Technology Council, 10th Report September 2007*

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- ✓ Ranked among the best institutions in the world means UBC is able to attract some of the world's top flight researchers and students and allows all British Columbians to engage with some of the world's best and most creative minds
- ✓ UBC produces all of BC's, dentists, physical therapists, pharmacists, midwives and almost three quarters of BC-trained engineers. In addition, through the Distributed Medical Program, UBC is the lead partner institution educating BC-trained doctors
- ✓ **Talent is the ultimate tech transfer**

# Graduate Students

- ✓ Linkages between graduate education and the labour market are strong. Career outcomes reflect the importance of the graduate degree – recent data indicates almost non-existent unemployment, very high earnings, highly relevant skill sets, and jobs almost entirely (94%) classified as “management” or “professional”
- ✓ The average salary for graduate degree holders is almost double that of the average annual salary for Canadians
- ✓ BC’s research-intensive universities are “talent magnets”. The Province sees a net gain of HQPs through the recruitment of grad students
  - About 1,300 – or 20 per cent – of UBC’s graduate students are from outside Canada.
  - UBC faculty supervise over 8,000 students completing masters and doctoral degrees in more than 140 programs.
- ✓ And these are highly sought after, nationally recognized, students. For example, since the inception of the Trudeau Scholarship, one-third of the award recipients have been UBC graduate students.

A large part of the new knowledge generated by university research is transmitted into the economy through people – university graduates and others who have learned, through doing research, to apply the new knowledge to the economy.

While we cannot quantify “new knowledge transmitted into the economy” by way of graduate studies at UBC a recent survey of Master’s degree and PhD holders provides evidence that this is surely taking place in the BC economy:

- 73% of graduates (including international students) are employed within BC
- 90% are in a job which is “very related or somewhat related” to their program
- 93% report that the skills, abilities and knowledge acquired in their graduate program is “very useful or somewhat useful” in their work (60% say “very useful”)
- 79% reported a high level of development of their innovation skills
- 88% reported a high level of development of their research skills

## Student talent is benefiting the private sector now!

MITACS was founded in 1999 to apply mathematical tools and methodologies to industrial and societal problems for the benefit of all Canadians. Launched in 2007, the MITACS ***Accelerate BC*** internship program connects the province's up-and-coming graduate student researchers with BC companies for short-term, applied research projects that address a key business or technology challenge.

These connections provide graduate students with the opportunity to apply their knowledge and training to actual business challenges. While, partners get the change to try out new tools and technologies to address scientific issues vital to their organization's success.

Since the program was launched in BC in 2007, more than 140 students have been placed in research internships across the province. Participating BC companies have included: Azure Dynamics, CrowdTrust Technologies, Eagle Plains Resources, Elastic Entertainment, JASCO Research, Kinexus Bioinformatics Corp., Next Level Games, ParetoLogic, Radical Entertainment, SyncWave Energy and Viking Air Ltd

# Distributed Medical

- ✓ UBC's internationally recognized Distributed Medical Program works in collaboration with the University of Victoria and the University of Northern B.C. Thanks to provincial support, UBC will soon be adding the Southern Medical Program at UBC Okanagan
- ✓ The effect is to encourage more graduating students to enter general practice in all regions of our Province
- ✓ In just four years, UBC has doubled its intake of first-year medical students
- ✓ This year, through the Distributed Medical program, UBC graduated 195 new doctors – the largest class ever

# Undergraduate Students

The vast majority of UBC students are undergraduates – one of the most important economic impacts on the Province.

There is considerable evidence demonstrating that university graduates earn much more than those without university degrees. The 2006 Census shows that full-time workers with bachelor's degrees earn 57% more than those who have not completed university.

## Employment Income in Constant 2005 Dollars, Full-time

	2000	2005
Below Bachelor's level	42,373	43,681
Bachelor's	65,219	68,689
Above Bachelor's level	81,748	85,532
<b>Salary Differentials</b>		
Bachelor's <u>vs</u> no Bachelor's	22,846	25,008
Bachelor's <u>vs</u> above bachelor's	16,529	16,843
above Bachelor's level versus no degree	39,375	41,851

Source: Statistics Canada 2006 Census: Data products; Topic-based tabulation

# Aboriginal Education

Aboriginal youth is the largest growing, untapped human resource in Canada.

The 2006 census revealed that Canada is experiencing an aboriginal baby boom. The average median age for aboriginal Canadians is 27 years, considerably younger than the national non-aboriginal average of 40. It is the fastest-growing segment in the country

- ✓ **Native Indian Teacher Education Program (NITEP)** is a UBC Bachelor of Education Program which aims to build on Aboriginal identity and cultural heritage while preparing and challenging persons of Aboriginal ancestry to be effective educators for public, band and independent schools in BC
- ✓ **Cynthia Nicol** is a UBC Assoc. Professor and former math teacher in Haida Gwaii. For the past two years, Nicol and a team of UBC education scholars have been collaborating with the Haida Gwaii and Nisga'a nations to transform the teaching and learning of mathematics for Aboriginal school students.
- ✓ Based at UBC, the **Pacific Institute for the Mathematical Sciences (PIMS)** is a consortium of 8 universities vigorously promoting mathematics in Canada. One initiative is the PIMS math summer camps.

In recent memory (20yrs), no aboriginal students has taken a Principles of Math 11 course at Britannia Secondary School. Following the 2008 summer camp four aboriginal students passed Principles of Math 11 and two are now in Math 12 (and doing very well). In addition, a Junior Math Camp at Britannia prepared 19 children for students coming into Grade 8 mathematics.

# Researchers

*“The number one reason to fund basic research well and with vision is to attract the very best researchers from around the world. Once here, they can prepare Canada's next generations of graduates, masters, PhDs and post doctorates, including the finest foreign students. All else flows from this.”*

*Founder, President and Co-CEO of Research in Motion, Mike Lazaridis  
(November 2004)*

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- ✓ In partnership with government, communities and industry, UBC is producing discoveries and innovations that advance human understanding and that make our world a better place.
- ✓ These researchers are linking new ideas and best practices into our local communities, and bridging Vancouver and the Okanagan to global networks of innovation.
- ✓ From 2002-2006, UBC has been the fastest growing university in terms of Natural Sciences and Engineering publications. UBC has increased publications by 37%, compared to Toronto at 20% and Harvard at 16%.

## Some recent examples:

- **Dr. Kishor Wasan**, a professor in the Faculty of Pharmaceutical Sciences, is working to develop a novel formulation for the treatment of visceral leishmaniasis. As 90% of the world's cases of leishmaniasis (which kills 60,000 annually) exist in India, Kishor's research is of great interest to partners in India, both at academic institutions and at various government agencies (including the Department of Biotechnology, the Indian Council of Medical Research, and the Council for Scientific and Industrial Research).
- **Dr. Michael Krausz** was trained at the University of Berlin and is a world authority on addiction treatment, particularly on dual diagnoses of addiction and mental illness. BC and UBC welcomed Michael in 2007 when he was named the Leading Edge Endowment Fund Chair in Addiction Research and a clinical researcher at St. Paul's Hospital. Michael is currently working with community and government partners to establish the Centre of Excellence for Addiction and Concurrent Disorders at UBC.
- **Dr. Paul Beaudry** is internationally recognized for his work in the field of macroeconomics, particularly labour markets, business cycles, and economic growth. Paul is one of six Bank of Canada Research fellows and a Canada Research Chair in Macroeconomics. An advocate for informed debate of social and economic policy, Paul and his colleagues have organized a series of public panels titled "Balance and Blowup" to discuss the various factors that have led to and currently influence global markets.

# Research

*“... In a world powered by ideas, research provides the fuel. More than two-thirds of the global economy is already a knowledge economy, with invention and imagination creating whole new industries on the strength of an idea. This brings real benefits to all of us.”*

*Kevin Lynch, Clerk of the Privy Council (October 2008)*

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BC benefits from four outstanding research-intensive universities:  
UBC, SFU, UVIC and UNBC

As a leading research-intensive university UBC attracts significant research dollars to the province:

- ✓ For 2007/2008 UBC secured \$469M in research funding from government, industry and non-profit sources
  - Approx \$70M of this came from the Province
  - Over \$40 million of research activity at UBC is directly funded by the private sector— making UBC a leader amongst Canadian universities
- ✓ In 2007/08, nearly one half (\$224M) of research at UBC was conducted in partnership with provincial and regional health authorities

# Tech Transfer

UBC researchers are translating discoveries to the marketplace in remarkable ways:

- ✓ UBC created five new spin-off companies in 2007/08 for a total of 130:
  - 95% are located in BC
  - Raised more than \$2 billion in investments
- ✓ UBC is an active participant in 5 of the 11 grants awarded for the new federally funded Centres of Excellence in Research and Commercialization (CECR). Close to \$75M has been awarded to UBC-affiliated Centres of Excellence
- ✓ In 2006, UBC became the first Canadian university to exceed \$100 million in cumulative licensing revenue

## Some recent examples:

- **Galvanox™**, a new technology for copper leaching, which reduces the environmental footprint of mining by reducing SO<sub>2</sub> gas emissions and eliminating the need to transport ore to a smelter, continued successful testing throughout 2007/08 and was licensed for the first time to a Vancouver company, First Quantum Minerals Ltd., in August 2008.
- Another spin-off, **Ostara**, recently won a \$2.5-million contract with a Portland suburb to draw high quality chemical fertilizer from liquid sewage. Through a process that removes phosphorus and other nutrients from wastewater and recycles them into environmentally safe commercial fertilizer, **Crystal Green™**, the town expects to recover its investment in five years.

# Biotech

The link between university talent and the biotech sector is particularly strong.

- ✓ B.C.'s biotech cluster is made up of about 100 companies and is the 7th largest in North America, and employs 2,600 people
- ✓ 16 public companies have a market capitalization value of \$3B
- ✓ B.C.'s biotech industry has attracted more investment dollars in the biotech industry than any other province in Canada.

The biotech sector is one of the key pillars of BC's high tech sector – a sector that has consistently outperformed the economy as a whole over the last decade.

# Sustainability

UBC is helping put the Province on the map as a sustainability leader:

- ✓ UBC has become a recognized world leader in campus sustainability by advancing climate solutions in our operations and our research endeavors.
  - During a 2007 UN-hosted sustainability conference of university presidents, former U.S. President Bill Clinton singled UBC out as one of three universities that he described as “sustainability leaders.”
- ✓ In September 2008, UBC was ranked third among all North American institutions and the only Canadian post-secondary institution in the top 20 in the “College Sustainability Report Card”, released by the Massachusetts-based *Sustainable Endowments Institute*
- ✓ UBC’s Vancouver campus is nearing 1990 GHG levels notwithstanding immense growth on the campus since that time. Initiatives included:
  - UBC U Pass Program – increasing transit ridership to and from the Vancouver campus by 185%
  - UBC ECOTrek – Canada’s largest energy and water infrastructure upgrade
  - UBC Renew – Renovating rather than demolishing aging infrastructure (which also saved nearly \$89 million in construction costs compared to new construction)

# The Economic Impact of UBC on the BC Economy (annual local spending)

<b>Source of Economic Impact</b>							<b>Estimated impact after local multiplier (\$million)</b>
Direct Spending by UBC							1,800
Student Spending (excluding direct UBC spending)							250
Visitor Spending							120
Increased income resulting from education (alumni in B.C.) net of costs							2,600
Impact of UBC research on BC economy (new knowledge and knowledge transfer)							5,000
<b>Total economic impact of UBC (Spending in BC)</b>							<b>9,770</b>
<b>Economic Impact of UBC as a proportion of the B.C. economy</b>							<b>5.1%</b>

Source: UBC Office of Planning and Institutional Research, The Economic Impact of UBC, 2008 (forthcoming)

# Research Universities: Engines of Economic Recovery

Government funding for universities has a much higher multiplier effect on the economy than many other forms of fiscal policy spending, because of the university's unique set of multiple economic activities: direct economic stimulus, education, attraction of students and visitors, and research.

## Estimated Government Spending Multipliers

<b>Total Government revenue multiplier for UBC</b>				<b>9.4</b>
<b>Maximum value of keynsian macroeconomic multiplier</b>				<b>2.0</b>
<b>Moody's estimate for multiplier from infrastructure spending</b>				<b>1.6</b>

University spending has a “dynamic” (as opposed to “static”) multiplier. That is, new knowledge fundamentally changes the economy.