UNIVERSITY OF
TORONTO

Zombie vs Zombies:
Tackling Two Dangerous Myths
About Higher Education & Advanced Research

An address by Professor David Naylor
President of the University of Toronto
To the Empire Club of Canada

March 7, 2013

Check against delivery

Earlier this week, the University of Toronto made a wonderful decision in naming Meric Gertler as my successor as President. As my term winds down, I have to say that it has been an extraordinary privilege to serve the University of Toronto community.

At the same time, impending retirement does mean that I am now something of a zombie…lurching around for a while in a transitional state. And who better than a zombie president to tackle two zombie ideas about higher education and advanced research!

You may ask: What's a zombie idea? Well, it's one of those persistent and infectious pieces of misinformation, a meme that shouldn't be alive but just won't die.

There are two zombie ideas that trouble me these days.

Two Zombie Ideas

Zombie #1
Universities should produce job-ready, skills-focused graduates.

Zombie #2
Universities should focus on applied market-facing research.

Zombie 1: Universities ought to produce more job-ready, skills-focused graduates. Stop all this liberal arts guff and this social science silliness. What Canada needs to compete and win in the world economy are more folks with college diplomas, and universities that focus on preparing people for careers – for the real world.

Or, as the Governor of Florida memorably put in a radio interview 18 months ago: "You know, we don't need a lot more anthropologists in the state. It's a great degree if people want to get it, but we don't need them here."

Zombie 2: Those ivory towers full of fat-cat academics and loopy students asking unanswerable questions. Their willful irrelevance is a waste of taxpayers' money. Get them out of the public trough and get them doing things that Canadian business can really use.

The reason these zombie ideas are dangerous is not just because decision-makers in the US and Canada have been infected by them. They are also hard to destroy because there is unquestionably some truth, and therefore some life, to both of them.

We know employers are frustrated with the skills mix that young people are bringing to the modern work-place. And we do know that Canada, like many industrialized and developing nations alike, has a youth unemployment challenge.

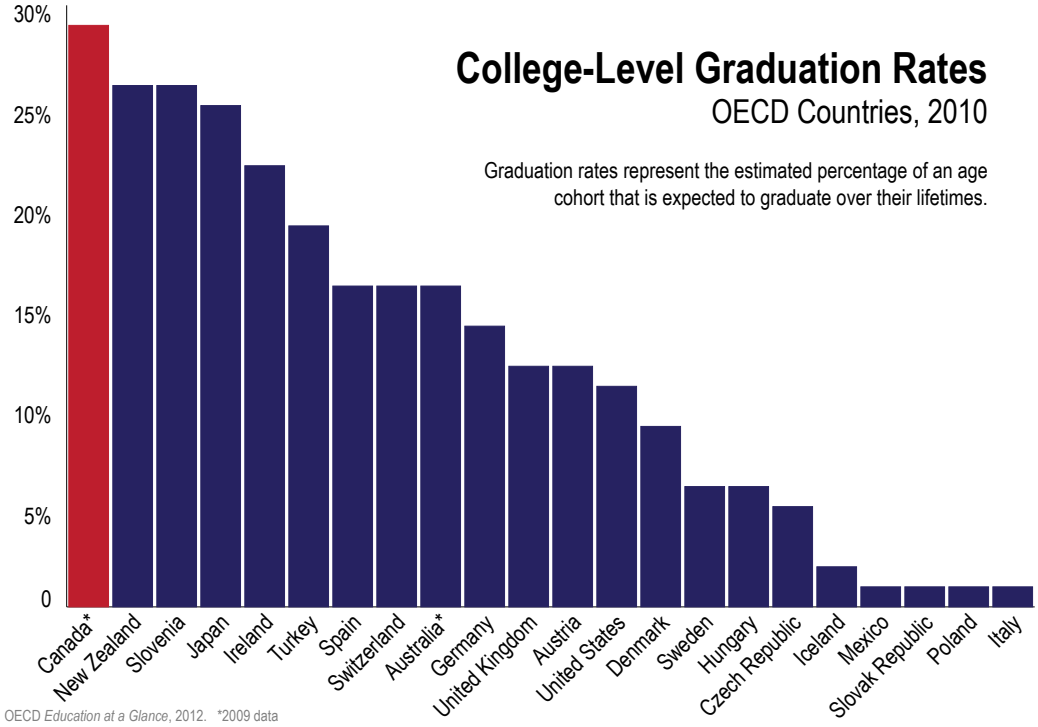
Turning to our research Zombie, again there's some fire with the smoke. Federal and provincial governments sharply increased their spending on research starting in the 1990s. We owe a debt to the university leaders who advocated for those increases. But, in making the case, they expected an economic bonanza – just a hop and a skip from the lab-bench to a new multi-national superstar companies. Everyone forgot that the private sector – not universities – that ultimately drives commercialization. But failure to meet those expectations has fed the clamour for applied research with a short-term orientation – about which, again, more later.

Now, let's shine a little more light on these two ideas.

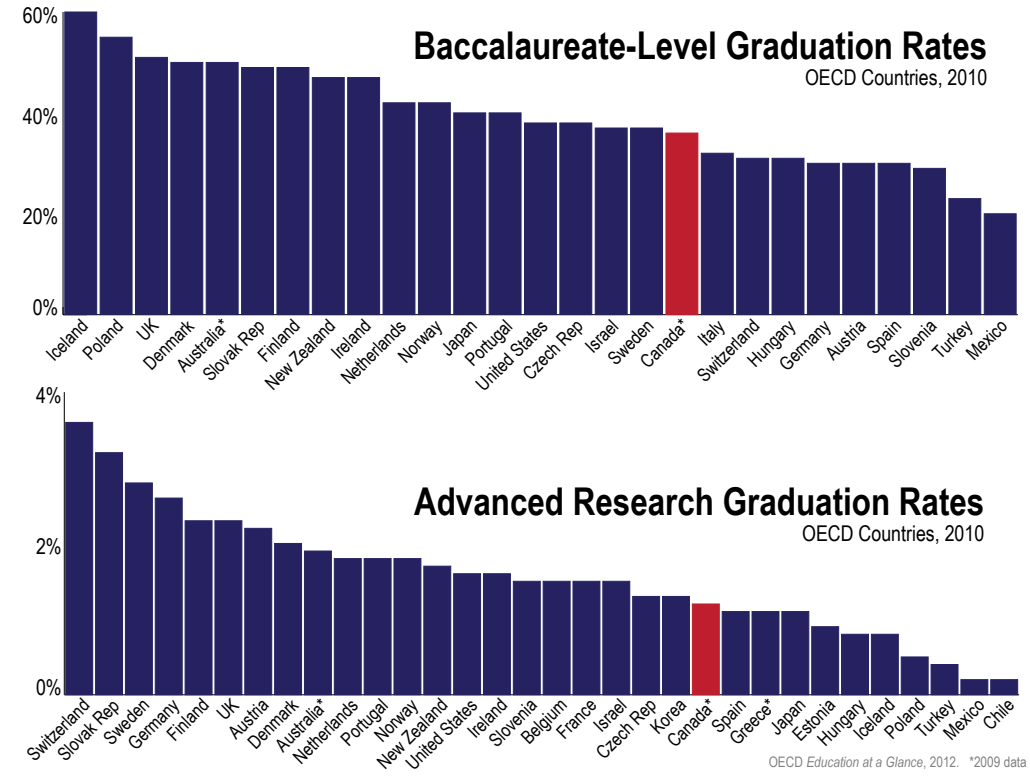
Zombie 1

If Canada were really a wasteland for vocational or career-focused education, you might expect us to be overwhelmingly invested in university degrees – a place where baccalaureates and doctorates littered the landscape.

Well, we are world-leaders – in college-level attainment.



We are not close to being world-leaders in the number of university-level baccalaureate and advanced degree holders that we produce.



If you think about it for a moment, this doesn't mean we shouldn't address the skills shortages. It doesn't mean that we shouldn't improve apprenticeship opportunities. It doesn't mean that we shouldn't respect and elevate skilled trades or champion some career-focused education at our universities.

But if Canada's competitiveness problems were going to be solved by colleges and polytechnics, or by universities that behave like them, we'd already be rolling in tax revenues.

What, then, should we do?

First, students know that a baccalaureate degree is important to credibility and to life-time earnings. In tough economic conditions, if a student's wiring is more practical than academic, it is completely reasonable and to be expected that he or she might gravitate towards universities that are more vocationally focused. But with all the great college capacity in this province and this country, one also has to ask: Why aren't more colleges allowed to deepen and lengthen their programming and offer applied baccalaureate degrees? Why is their role constrained in our system? And why then are we asking universities to change their role, rather than effect some smart differentiation?

A related solution, of course, is to promote shared programming between universities and colleges. We're all doing it – and I am delighted to see some representatives from Seneca here with whom we have a great partnership in multiple programs. But as they could tell you, it's not quite as easy as it sounds. The students aren't the same, the courses aren't the same, and the expectations aren't always the same.

What we aren't doing, however, is celebrating the fact that tens of thousands of university students who have finished a baccalaureate go on to get a college diploma or certificate. That's seen somehow as a mistake. Could someone tell me why those credentials should be stuck together in some pre-packaged fashion, primarily through articulation? Why shouldn't a young person get a liberal arts education, learn to think better, acquire some breadth of competencies and general knowledge, be challenged intellectually by professors and peers – and then go on to get specific vocational skills?

There's another problem with that educational Zombie idea. It obviously downplays the simple fact that many universities already educate large numbers of accredited professionals in every imaginable discipline.

And we also offer very successful and well-subscribed programs ranging across the sciences, technology, engineering, and mathematics – the important so-called STEM disciplines.

In that respect, I firmly believe Canada needs to enhance its commitment to literacy in math and science for people of all disciplines and backgrounds, especially for children and youth. This must be a priority.

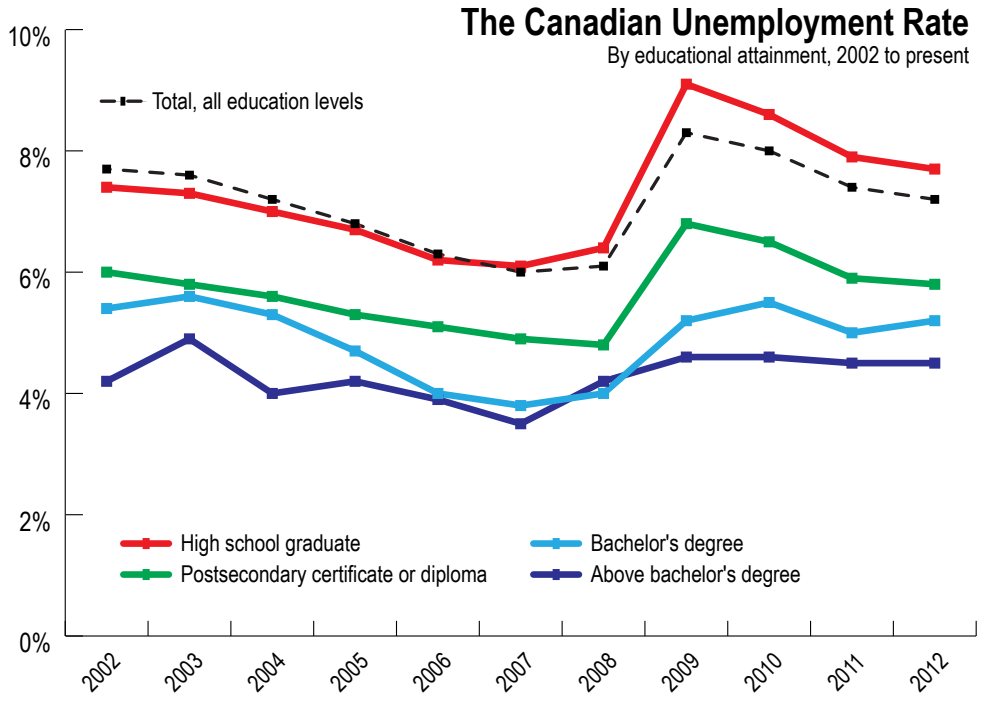
I am very glad that Professor Ray Jawardhana has taken on a lead role in science outreach and literacy for the University of Toronto.

But while the STEM disciplines are vitally important, inter-jurisdictional data do not really support the presumption that Canada's competitiveness challenges will be solved simply by a massive increase in the output of scientists, technologists, engineers, mathematicians, and medical scientists.

Let's remember here that successful companies, innovative nations, and healthy communities also depend on management, marketing, communications, design, and many other disciplines.

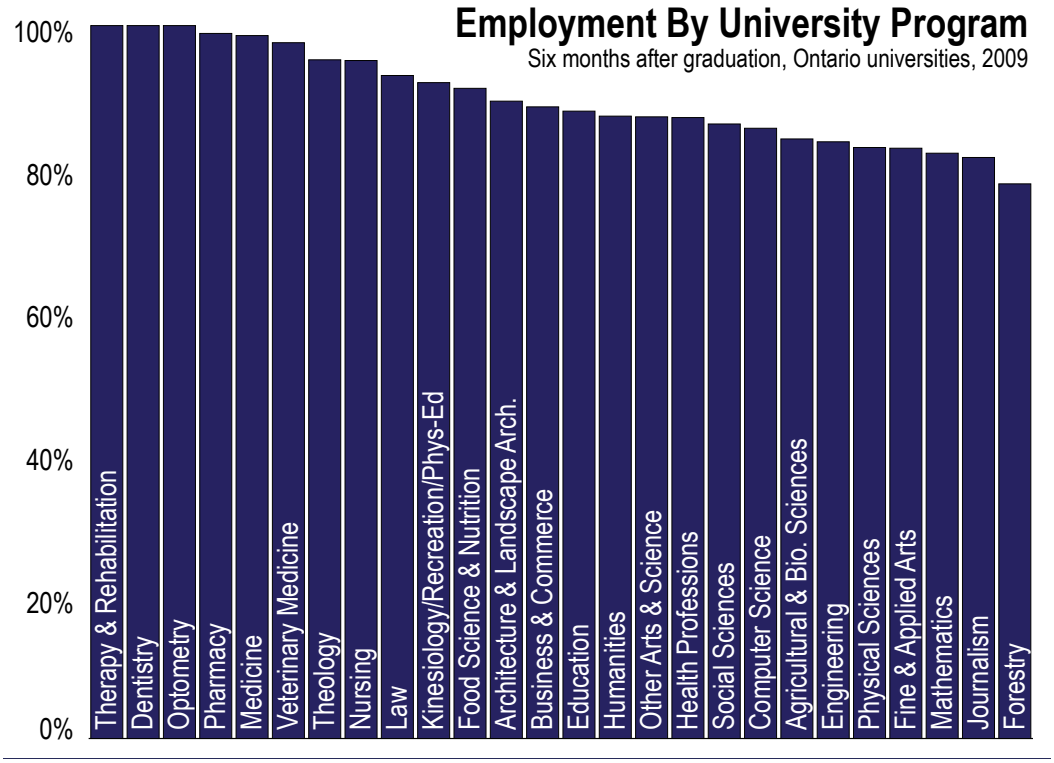
Indeed, in a borderless world, fluency in other languages and other cultures will have a great deal of influence on our success as a trading nation.

I know. You're probably still skeptical because of all the gloomy statistics floating around. So let's have a closer look at some data.



Unemployment levels have indeed risen. And youth unemployment rates as a subset are even higher. But the best antidote to unemployment – and the best insurance against recession-triggered unemployment – is still a university degree.

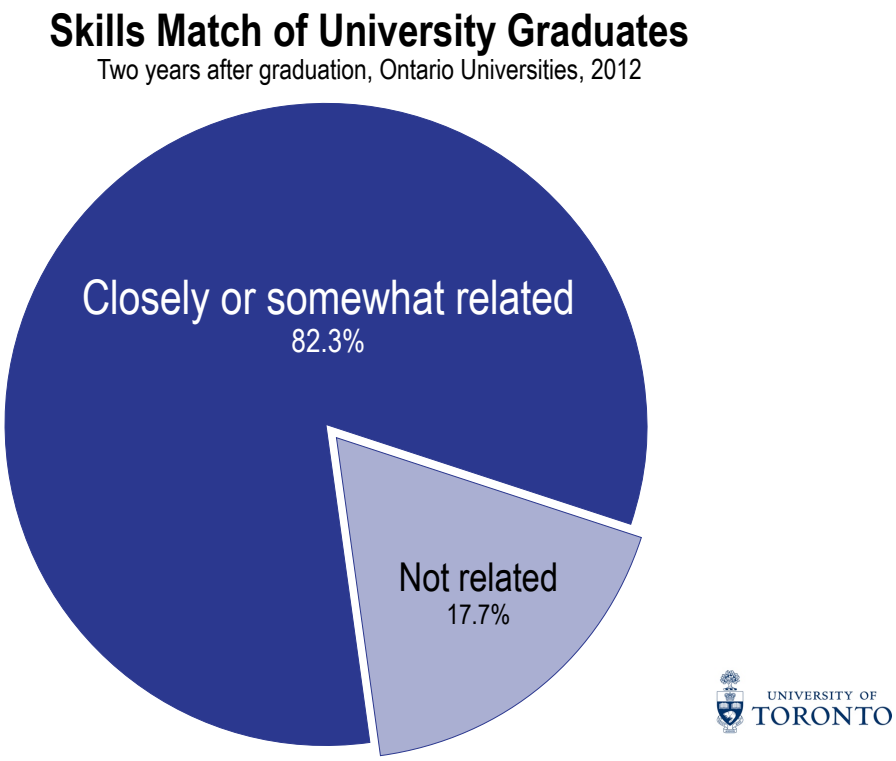
Zombie 1 returns and says: Mr President, those are just all the STEM graduates finding jobs. Well, Mr Zombie, you're wrong.



If you examine employment levels by program six months after graduation, it turns out that humanities graduates are finding jobs as quickly as computer science graduates. And after two years, it pretty much levels out.

Well, you may say, all those art history graduates are baristas at Starbucks – to which I will say, as a good nationalist, I hope they are at Tim Horton's or Second Cup… but never mind.

The answer is: Some are, many aren't.



Breakdowns in Canada are hard to come by, especially reliable ones. We know the US data; they suggest that the match between the skills acquired in the baccalaureate and the job is lower and slower for the social sciences and humanities. But the economy is still sputtering. It's a time of tremendous change. And I would caution strongly against undervaluing those disciplines in this complicated world.

Maybe instead we should be thinking about the kinds of students and graduates our global community needs not just for today, but for tomorrow.

After all, our students will confront challenges – everything from climate change to cyber-security – that are more intertwined, complex, and social than ever before.

Our graduates must analyze and synthesize information, test hypotheses, challenge assumptions, weigh arguments from different viewpoints, and communicate clearly and effectively in multiple media. These are skills one can learn at research-intensive universities in philosophy and anthropology – with apologies to the Governor of Florida – as much as in physics and computer science.

Let me conclude my thoughts on Zombie 1 with three observations.

First, educators world-wide, even in quite applied areas like the health professions where I have spent much of my life, are moving away from a narrow and term-limited skills focus, and towards what one might call “renewable competencies”.

In this regard, my successor, Meric Gertler, has been Dean of our very large Faculty of Arts and Science for the last five years. That huge division has undergone a transformation, balancing big lectures with small seminars, and offering more opportunities for undergraduates to do research and study abroad. And, they’ve also focused on ensuring that all students graduate with several core competencies. They’ve set them out: quantitative reasoning, no matter what your program is; critical thinking; effective writing and communications; problem-solving; and ethical and social reasoning. These are competencies for a life-time, for any job, and for every citizen.

Second, on a related point, when you look at surveys where employers are asked about deficiencies in their employees, it is intriguing that employers most often cite not technical expertise, but attitude, punctuality, time management, motivation, and team work – soft skills that used to be called "character issues" in some cases. Well, universities get asked to do a lot of things, and we are certainly helping with teamwork, but many of the rest of these traits get shaped some time before students reach us!

In loco parentis?

UNIVERSITY OF TORONTO

There are some limits to what we can be asked to do.

Third, as I said, the world is changing fast. We recognize that our graduates may often invent their own jobs, and in the process, create jobs for others.

I think here of our late and great graduate, Ted Rogers. Ted not only built an extraordinarily successful company; he laid the foundations for Canada's integrated telecommunications industry.

And in the realm of déjà vu, here at the head table is Tony Lacavera of Globalive and Wind Mobile. On the sunny side of 40 Mr Lacavera is a serial entrepreneur who founded an upstart wireless company to challenge the so-called Big Three, including Rogers. And here's a twist: Ted Rogers was an arts graduate with a law degree. Tony Lacavera is a computer engineering graduate of U of T. In like fashion, when you examine executive suites across North America, or in the UK, successful business leaders and great entrepreneurs have backgrounds that range across disciplines, with a great many rooted in the humanities or social sciences, including undergraduate management and commerce degrees.

On that front, let me digress briefly to say that we also recognize that universities should catalyze and respond to the entrepreneurial energy of our faculty and students.

Thousands of University of Toronto students have taken Entrepreneurship 101 on line or in person through the MaRS Discovery District. Last fall, we had to take our iconic Banting and Best medical research buildings, and repurpose them as incubator and technology transfer space. They're almost full already. And so is MaRS, which is why we are lucky that MaRS Phase II is nearing completion across the street.

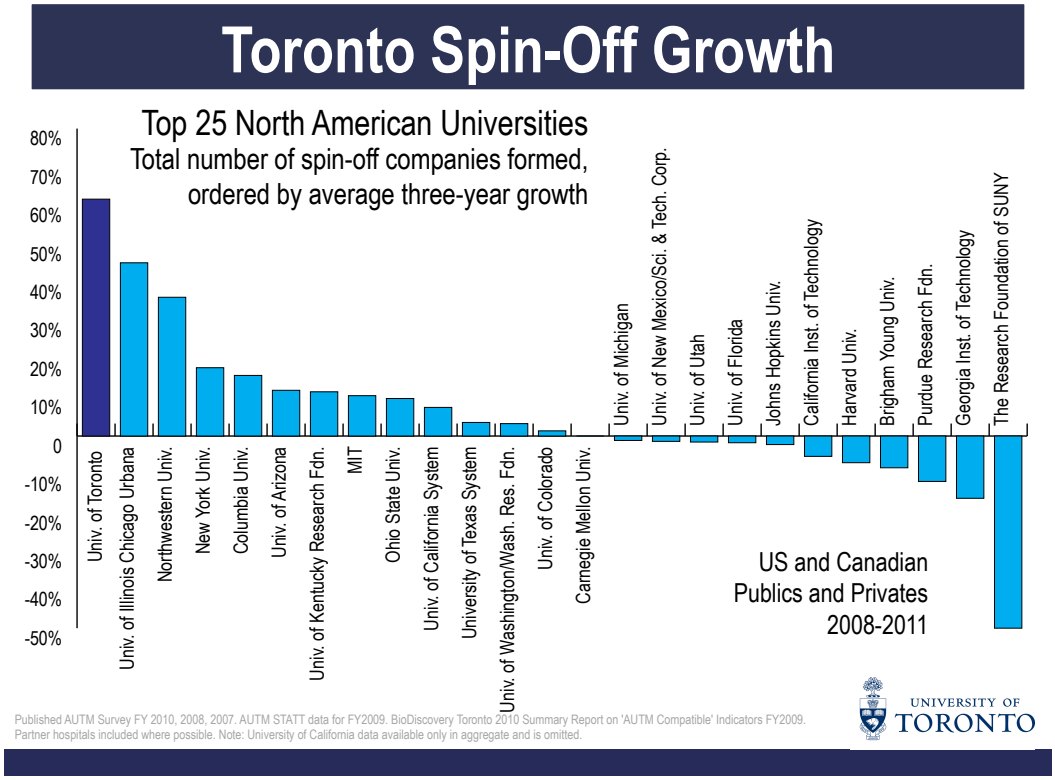
Here at the head table are two gifted practitioners and teachers in the entrepreneurship space to whom I want to pay tribute.

Reza Satchu, a very successful serial entrepreneur, conceived and offered over several years an undergraduate course at U of T on the Economics of Entrepreneurship. It had the highest approval and retake ratings of any course at U of T. Mr Satchu has now taken those ideas national with his colleagues and partners in the Next 36 program, headquartered here in Toronto.

Cynthia Goh, an award-winning professor and researcher, is also an entrepreneur who has helped create multiple start-up companies based on her outstanding research in nano-chemistry.

In her spare time, Cynthia is working with MaRS to make Entrepreneurship 101 a standard credit course open to students across disciplines. Cynthia also mentors a small army of student start-up companies in our Banting and Best Centre.

And here's one tangible result of all this creative energy, combined with the mentorship of our friends at MaRS and MaRS Innovation. Over the last three years, faculty and students at U of T and in our great partner hospitals have achieved the fastest rate of growth in start-up generation among leading institutions in North America.



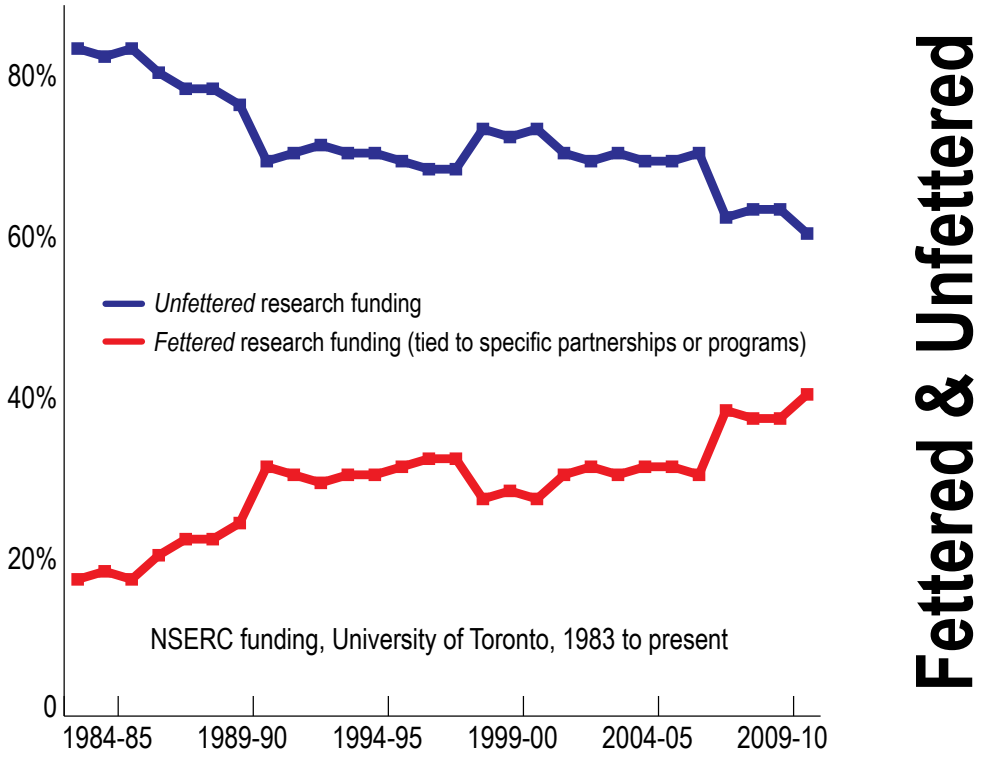
And so this notion, that research-intensive universities with a balanced portfolio are not in the space of technology-transfer and entrepreneurship, is simply wrong.

Good news, I think, for Canadian prosperity and employment. And I hope it is enough to keep Zombie 1 at bay for a few more days.

Zombie 2

Let me switch now to Zombie 2.

First, this Zombie has already had an effect on research funding.



These data show the funding patterns for the Natural Sciences and Engineering Research Council of Canada over the last 30 years.

You can see the pronounced trend. Converting the proportions into real dollars, about $230 million dollars of federal funding has moved from unfettered to fettered research at U of T over the past five years alone, roughly consistent with a pattern stretching back almost a generation. In other words, we are already engaged with partners. We are already engaged in match-funded, industry-facing research with an applied orientation. That trend has been driven by funding decisions over many years.

Now, that didn't just happen at U of T. It happened nationally. Did anyone notice that over this period our innovation and competitiveness indicators improved? I didn't. In fact, the real problem was never the type of research that universities were doing. Wrong diagnosis; wrong prescription. It was business-related R&D spending that lagged, which is why the Jenkins Panel on which I was privileged to serve was put together by the Minister of State for Science and Technology and the Minister of Industry federally to examine how to stimulate business spending on innovation.

Now, despite these changes, obviously many universities across this great country have remarkable scientists who are doing fabulous fundamental research – and they represent Canada very well on the international stage.

But let's be clear that this funding ecosystem, combined with many disincentives to excellence, makes it harder for us to reach the top tier of the podium. Perhaps this is why no Canadian has won a Nobel Prize for 20 years.

The research Zombie masters would have you believe that it doesn't matter. Nobel, Schnobel – let's level down in the best Canadian tradition and go for the bronze.

But there are actually some very good reasons why great basic, disruptive, fundamental research matters.

The first is that the success of home-grown Nobel laureates – not imports – raises aspirations for everyone, especially as their scholarship inspires and attracts others to follow suit. Put another way, a country where world-shaking discoveries are made routinely is a country that will always be able to compete by attracting the best and brightest to our shores. The war for talent is global and more than ever attracting the best and brightest matters.

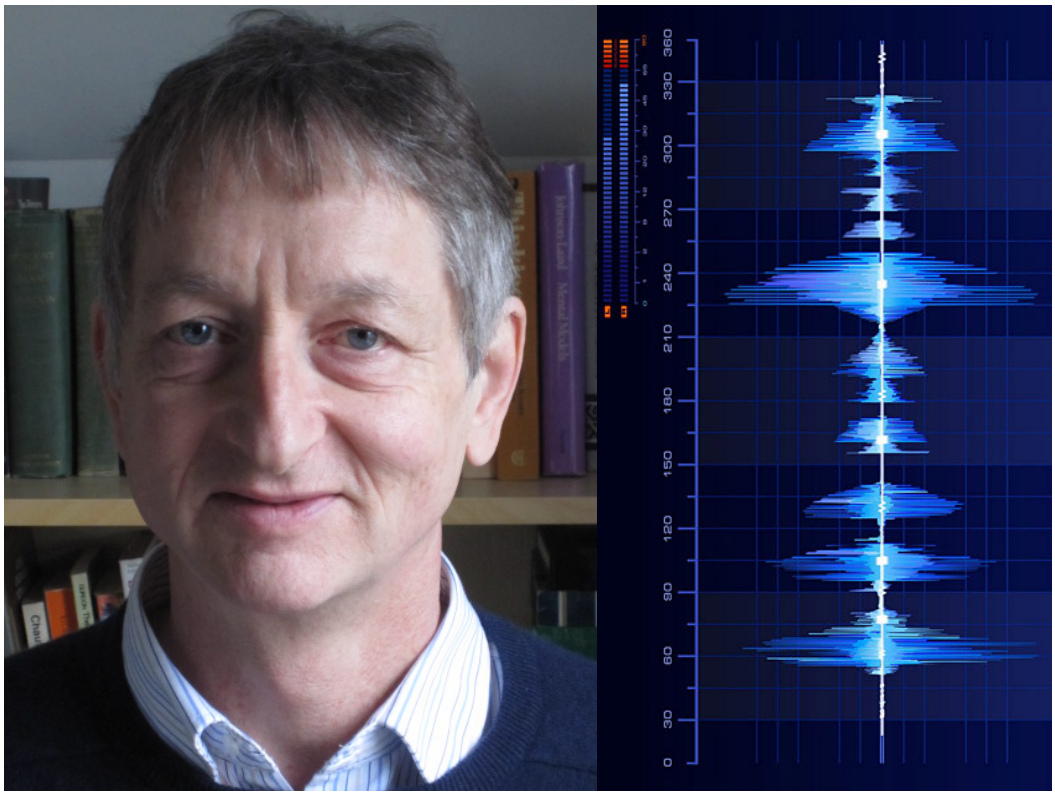
The second is that great scholars doing fundamental research can be inspiring teachers. Ray Jawardhana, for example, is a star-gazer. He's hunting for planets like Earth in other solar systems. What's the value of that? Can't turn that into a product or service tomorrow. Well, to me, Professor Jawardhana's work also raises fundamental questions about humanity's place in the cosmos. RayJay and countless other colleagues spend their lives asking the questions that stretch young minds and change expectations. We want – and we need -- a generation of young Canadians for whom the sky itself is not the limit. Young people like Conor Emdin, also at the head table today, one of three U of T Rhodes Scholarship winners this year, who will be tomorrow's leaders.

The third and final reason why serious fundamental research matters is that the distinction between fundamental and applied research is somewhat misleading.

As Nobel laureate Sir George Porter famously pointed out, there is applied research and yet-to-be-applied research. In my field, medical research, countless discoveries that had no immediate application turned out to be the foundations for life-changing and live-saving innovations in clinical care. You can't predict this in advance.

You know, John Polanyi was not thinking of inventing chemical 'vibrational' lasers when he did his Nobel winning research on non-thermal infrared chemiluminescence and reaction dynamics.

Similarly, Geoffrey Hinton's research into machine learning algorithms and deep neural networks, has led to unexpected advances in computer vision, speech-recognition, data mining, and – astonishingly – real-time language translation that is now used by Google and Microsoft.



There is another facet here. One needs excellence in research and scholarship across disciplines because no one can predict how disciplines will collide. So much of the best innovation is convergent.

Let me give you an example. Lorna MacDonald teaches performance, opera, and vocal pedagogy in the Faculty of Music at the University of Toronto – a very strong program, internationally renowned. But how does it connect?

Well, it turns out, that Professor MacDonald collaborates with the clinicians at the Hospital for Sick Children on cochlear implants, laryngology, speech-language pathology, and pediatric voice and hearing care.

Perhaps with this type of trans-disciplinary approach, we can calm our second Zombie with beautiful music.

I want to close these remarks with both a warning and a note of optimism.

First, the warning.

Measuring Up In Global Rankings?

	Times Higher Education 2012	Shanghai Jiao Tong 2012	Newsweek Top 25 Outside the US	QS World University Rankings 2012	SCImago 2012	National Taiwan University 2012
Toronto	21	27	3	19	3	7
UBC	30	39	8	45	25	28
McGill	34	63	13	18	51	33
McMaster	88	92	15	152	116	98
Alberta	121	101-150	*	108	54	78
Montréal	84	101-150	*	114	171	106
Queen's	201-225	201-300	*	175	255	289
Ottawa	171	201-300	*	*	184	199
Western	226-250	201-300	*	173	158	190
Waterloo	226-250	151-200	*	191	161	279

UNIVERSITY OF TORONTO

These are composites of rankings across multiple league tables involving the U15 universities which work together as a group of research-intensive universities on some common issues.

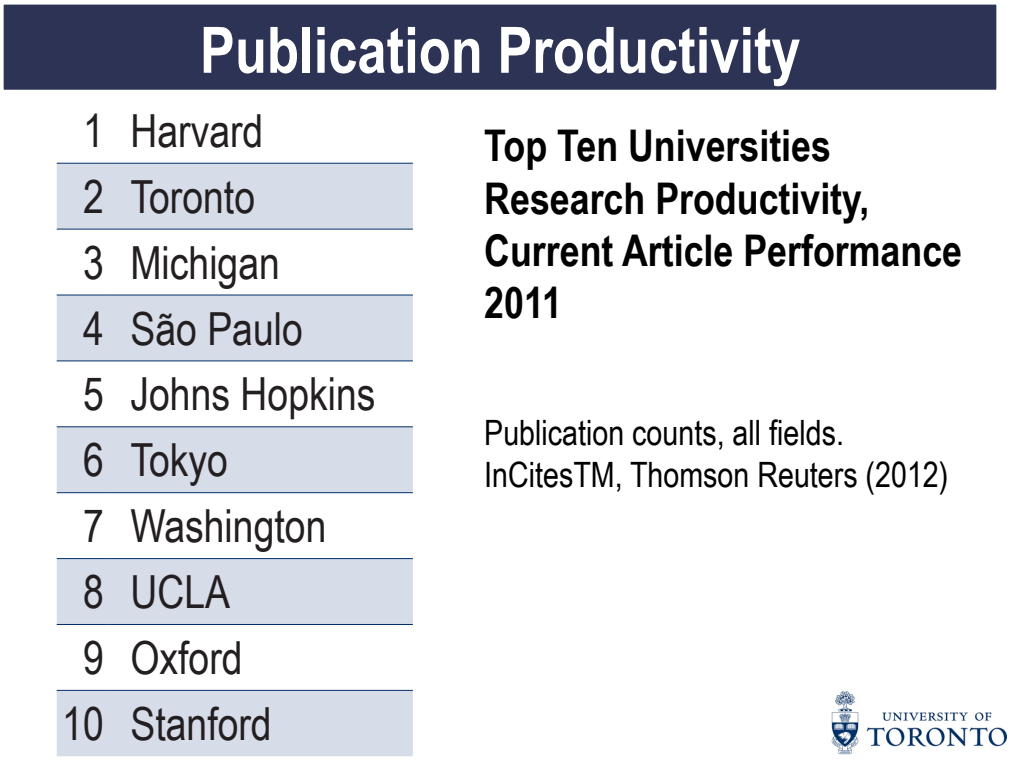
The data suggest that many of the best research universities in this country are at serious risk of losing ground. And not enough of them are figuring strongly on the world stage.

The media don't seem to care much. There are no headlines – no gotcha moments – no upstarts to coddle – nothing to be gained by flagging this potential and slow decline of great Canadian institutions. And I am sorry to say that some in government, at all levels and across the spectrum, politicians and civil servants alike, seem to be blinded by Zombie dust.

But in one jurisdiction after another – China, Brazil, Singapore, France, Germany, the US and the UK, major targeted investments have been made to ensure that the strongest research universities are able to compete on the global stage.

And it is a competition.

These are total publication outputs world-wide:



We have managed to stay second to Harvard for a long time. But let me just make a point here about our Brazilian friends. When I became President eight years ago, the University of São Paulo was barely on the research radar screen. Today USP is a key partner for the University of Toronto – and it is also an established research powerhouse that is right on our heels.

Just this week, the Times Higher Education group released their rankings of university reputations.

University Rankings & The State of the Nations

2013 Rank	2012 Rank	Institution	Country
1	1	Harvard University	U.S.
2	2	Massachusetts Institute of Technology	U.S.
3	3	University of Cambridge	Britain
4	6	University of Oxford	Britain
5	5	University of California, Berkeley	U.S.
6	4	Stanford University	U.S.
7	7	Princeton University	U.S.
8	8	University of California, Los Angeles	U.S.
9	9	University of Tokyo	Japan
10	10	Yale University	U.S.
...			
16	=16	University of Toronto	Canada
=31	=25	University of British Columbia	Canada
=31	=25	McGill University	Canada

Times Higher Education World Reputation Rankings, 2013

Number of universities by country in the top 100…

Country	Number
U.S.	43
Britain	9
Australia	6
Germany	5
Japan	5
Netherlands	5
France	4
Canada	3
Hong Kong	3
Sweden	3

These results are based on a survey of thousands of professors world-wide.

McGill and the University of British Columbia slipped to 31st from 25th place. Toronto held steady at 16th. And here, let me share the warning from Phil Baty, the editor of the rankings and a veteran observer of universities world-wide. Mr Baty said that the decline was a direct result of Canada's "highly egalitarian approach". He said that Canada was refusing to focus its resources on a select number of top research universities strategically so that they could truly compete. He put it precisely: "Countries around the world are picking winners and investing heavily in them, so they are coming up the ranks while Canada is slipping."

The Montreal Gazette paraphrased Baty's final warning as follows: "The risk… is that Canada could end up with many mid-ranked institutions, but lack the big flagship institutions that drive investment, research and development and the economy."

Phil Baty's concise formulation did miss what for me is the most important asset of all – and the asset that will be devalued the most if the Zombies win. I am referring, of course, to young talent.

The resources that matter most aren't in the ground or off-shore. The resources that will win the day for Canada are the inquiring, agile, and creative minds of the next generation.

And here I continue to believe that, given the right education and opportunities, with a full suite of institutions with different missions, including research universities that can compete on the global stage, the next generation of Canadians will make great discoveries, develop transformative technologies, imagine more successful societies, ask hard questions, and lead with verve and vision.

I also have faith that, in the years ahead, if we make the right choices, the Zombies will disappear – and our young people will secure a bright future for this great country.