Dear Sir/Madame

I am Professor of Biochemistry and Director of the Centre for Chromosome Biology (CCB, http://www.chromosome.ie/) at NUIG Galway.

I would like to add my full agreement with the submission below from my TCD colleague, Adrian Bracken.

There is no point reiterating Adrian's arguments in this submission. Adrian has expressed them eloquently and passionately. Even in today's Irish Times there is an Editorial Opinion piece (http://www.irishtimes.com/opinion/editorial/some-800-of-our-best-scientists-spell-out-how-to-achieve-the-right-balance-for-irish-research-1.2144385) pleading for science funding that supports a balanced scientific ecosystem. In the longer term, scientific funding funnelled into relatively few areas will have serious consequences for the health of the Irish economy. A narrow funding base does not give us the ability to develop, let alone efficiently respond to, future applications arising from basic research in Biology, Chemistry and Physics. All translation and application science is based on prior basic research.

Adrian refers to a former colleague of mine, Sir Paul Nurse, Nobel Laureate and President of the Royal Society. In summer 2013 Paul, a frequent visitor to Ireland, presented a well attended (including Professor Ferguson of SFI) lecture entitled "Making Science Work". I asked Paul for a draft of this lecture which he duly supplied and which I now attach to this email. Paul is a renewed communicator and his lecture was uplifting to all who attended. He referred to the scientific continuum and how important it is to support a broad base "*spanning discovery through translation to innovation".* How talented individuals, rather than overly narrow thematics, typically defined by committees lacking currently successful scientists, are crucial for impactful research. We in Ireland need to combine good scientific advice with good political decisions, surely talented scientists need to be part of this discourse and not just by way of any cursory box ticking exercises.

Finally, a concern many of us have at this time is the length of the current downturn. Previous recessions have been typically "V-shaped", quick in and quick out, which minimises the damage the cause. Governments tend to react to recessions by scouring all budgets for resources to reduce unemployment, an important and natural response. However, once the recession is over politicians typically lose interest in what are effectively rather small, at least relative to the big spending in Health, Education and Welfare, science funding budgets. The current recession has not just been deep but exceptionally long lasting with potentially severe impact on Ireland's scientific base. Once a scientist is out of funding for several years, and the publications that follow funding dry up, that scientist is effectively not fundable. If this situation is combined with the perfect storm of overly prescriptive funding decisions by government you will severely erode the broad scientific base that is so critical to Ireland's long term economy. Does the government really want to generate the next generation of deadwood in the Irish university sector? A cohort of formerly highly active scientist, increasingly embittered but permanently employed, often at Professorial level. Would such a situation really be in the best interests of Irish society? Would a balanced scientific ecosystem with its long term sustainability be a preferable situation?

I urge the consultation process to support sufficient funding for as broad a scientific ecosystem as possible.

Yours faithfully

Professor Noel Lowndes
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From: <Lowndes>, Noel Lowndes <[redacted]>
Date: Monday 23 March 2015 01:28
To: Adrian Bracken <[redacted]>
Cc: "IDCsecretariat@djei.ie" <IDCsecretariat@djei.ie>
Subject: Re: Submission to consultation process

Adrian
An excellent and very admirable critique that I agree with fully. I'm happy to support you in any way I can, just let me know.
Well done
Noel
Chair, Biochemistry
NUI Galway

Sent from my iPhone

On 22 Mar 2015, at 22:32, "Adrian Bracken" <[redacted]> wrote:

> Dear Sir/Madam,
>
> I am an Assistant Professor at Trinity College Dublin.

I read the full Consultation Paper and overall felt it was very biased towards the short-term commercial benefits of science. There was little on the long-term benefits of science to the health and education in this country. Therefore, I felt the narative and questioning was unbalanced in that respect.

Despite this, I've written some feedback below, which based on March 18th's letter signed by 1000 researchers, is representative of the view amongst the majority of university based scientists.

My three key points are:

1. The current unbalanced funding policies are damaging the training of 'Human Capital': IBEC came out last week on RTE News and warned that the training of our Human Capital for Industry is being degraded by current science policies. Our universities need more support for researchers across all disciplines to foster education and training of human capital. In Pillar 1 of the Consultation Paper, it cites statistics showing that support for Higher Education Research and Development (HERD) is lagging behind other "Innovative nations" such as Sweden and Denmark, and also it is decreasing year on year since 2009. The Consultation Paper recognises that "this is a critical issue that must be acknowledged". **The solution would be to rebalance funding towards basic science**. In Pillar 8, the Consultation paper cites a report that states "If graduates are to be best equipped to enter the labour market, then they need to be educated across all disciplines by staff who are in tune with the latest research in the particular field. The connection between research and education within a higher education environment is of integral national importance". I believe that Government needs to recognize that this is the exact opposite of what has happened in the last 3-4 years. **We urgently need a switch in policy towards supporting a broad support for top researchers in all disciplines, a complete reversal of the prioritisation strategy.**

2. We need an Independent Scientific Adviser: Why in a democratic country such as Ireland have we a chief scientific adviser who is employed by the Department of Jobs, Enterprise and Innovation and Director of the biggest national funder of science? Would a person in such a position be best placed to provide independent advice on what would be best for the long-term benefit of our education and health sectors? Clearly, the current arrangement is a conflict of interest that has been pointed out on several occasions in Dáil Éireann, in the

national media and in the prestigious international Nature journal. This Scientific Adviser position should be filled by a representative who isn't also the head of the largest Irish Funding agency that is under the umbrella of the DJEI. This is a clear conflict of interests, not best practice and an ongoing source of concern and embarrassment for Irish scientists.

3. We should replicate "Best Practice" and learn how Belgium and Austria fund science? Our stated goal is to be a knowledge economy and to generate jobs from scientific innovation. However, we're going about this in a short-sighted and misguided manner. Why can't we reach out and seek advise from similar sized countries who have successful research innovation such as Belgium and Austria. To help with this, I have made contact with the head of VIB, Belgium (http://www.vib.be/en/about-vib/organization/Pages/default.aspx), who is willing to visit Ireland, meet with Ministers and advocate the benefits of Government funding of basic research. VIB was established by the Belgian Government 18 years ago to fund excellent basic research. Their scientists are located in the top four Belgian universities. In just 18 years they have very many patents, spin out companies to the point that for every 1 euro the Government invests, the patents and industry provide another 2. This is exactly what we all want. The irony is that Belgium knew that funding the best scientists across all disciplines was the way to get there. We need to replicate their success.

Below are some more detail comments:

Pillar 1. Investment in STI and key goals/targets: Key areas to be explored include:

Q: What should Ireland's ambition be in STI?

Ans: To increase HERD in line with leading small innovative economies and rebalance funding towards contributing 30% of total spend to basic research across all disciplines. The Consultation Paper recognises that funding support of HERD (Money spent on the Higher Education Research and Development Sector) "increased from €378m in 2002 to €750m in 2008, but since 2009 it has decreased annually and is estimated at estimated €649m in 2013'. The Consultation Paper also acknowledges that these "Declining investment trends in

higher education in particular - the reduction in funding per student, increases in the staff/student ratios and a significant reduction in the higher education sector's research and development - HERD - is a critical issue that must be acknowledged". It states that "HERD as a percentage of GDP is now at EU and OECD average but still lags behind leading small innovative economies" such as Denmark, Germany, Austria, Finland and Sweden.

Q: Ireland is currently an innovation follower and lags other small developed countries in R&D intensity. Should we have more ambitious targets for investment?

Ans: The underlying reason for this is because our support for new ideas – basic research – is not strong enough. We are 'following' because other countries are making the discoveries through excellent basic research. We need to provide our Irish colleagues in the applied research fields with new innovations from basic research and critically, an often under appreciated role, support them with our specialised knowledge, acquired through working at the forefront of fundamental research. In short, Yes, we should be more ambitious in this area as we are falling behind. We should put more money into top, international researchers doing basic research in our best universities.

Q: How can that level of ambition be justified? Where would we target increased funding and how could this be justified?

Ans: We should fund the best researchers based on track record as is International Best Practice. This investment will set down a clear message for industry that this country is serious about developing a knowledge economy. This will attract more industry and investment here and feed into both applied and translational research, creating more jobs in the long term. It will also increase the reputation of Ireland as a leading scientific nation. It will also attract more top researchers, thereby leading to further improvement in the quality and number of innovations from this country. One only has to look at best practice in Denmark, Sweden, Austria, Belgium etc. For example, look at the VIB institute in Belgium, established only 18 years ago to fund only the very best basic scientists in biology. This has lead to many start up companies, patents and jobs. If you fund the best, don't prescribe, then good discoveries will come. We should adopt the VIB model in Ireland. In my opinion it is incumbent on our Government to consult with leaders in VIB. **In fact, Jo Bury, the Managing Director of VIB has accepted my invitation to visit Ireland and consult with Government on their considerable success. Perhaps this is a wonderful and timely opportunity – I'm available to facilitate this.**

Pillar 2. Prioritised Approach to Public Research Funding: Key areas to be explored include:

Q: How can research prioritisation better serve our national objectives of a strong sustainable economy and a better society?

Ans: Only if it is abolished completely. Failing that, we should prioritise to support our best researchers, no matter what discipline they happen to be in. The best will deliver if trusted and given the opportunity. In terms of how to fund science, **Sir Paul Nurse** on a visit to Ireland (http://bioinf.nuim.ie/leading-scientists-comment-on-irish-research-policy/) made the following points:

1. **Identify excellent scientists and fund them.** The scientist is more important than the project. Evidence of recent success means that this kind of scientist is at the cutting edge and will plot the right course. Beware of those who write a good proposal, but don't actually do good science.

2. **Invest broadly in both basic discovery science and in translational science. Focussing on one or the other is a big mistake and likely to damage your research "ecosystem".**

3. **Don't get a bunch of "experts" together to decide what science is the best to fund. These experts have biases and often they are years behind the curve in terms of what is likely to be the best science to carry out. Just ask for excellent proposals, because contained within those proposal pages will be the leading edge research, not in a report written by what Sir Paul called "Silverbacks".**

4. **Prescribing which science to fund will only appeal to those scientists who are opportunists with funding, change their field of research to follow the money and really are not expert in those fields. Thereby often resulting in poor-quality science being done.**

1000 Irish scientists strongly believe these are wise words from the UK's top scientist and Nobel Prize winner.

Q: How best do we identify emerging areas of opportunity and challenge i.e. horizon scanning?

Ans: We can not, this is a random process. Non scientists are especially poorly positioned to judge on what is next hot on the horizon – basic researchers are most likely to judge this and run after the hottest topics. Therefore, my point here echoes those made by Sir Paul Nurse above.

Pillar 4. International Collaboration and Engagement. Key areas to be explored include:

Q: How can we further increase/strengthen the effectiveness of our international collaboration and engagement across all areas of STI investment in pursuit of economic and societal goals?

Ans: Simply fund the best researchers who international scientists will want to collaborate with. There has to be recognition in Government circles that individual PI's drive collaboration, especially PI's who are of an international standing. This has always been the way. We should of course stay a member of EMBL, ESA, COST etc.

Q: What additional measures could be taken to enhance Ireland's participation in Horizon 2020 and other EU Programmes – industry, academia, SMEs and MNCs?

Ans: If the Government funds broadly across the basic sciences then more scientists will be in a position to have running projects, preliminarily data, maintained expertise, established collaborators etc. so as to be in a position to compete in H2020. Every single point in this consultation process comes back to the same elephant in the room – current policy has created a crisis of funding for science across most disciplines in this country. Instead, if the Government simply funds the best scientists, then they will be 'alive' to compete for H2020 funding. **The majority of Irish Scientists won't be competitive at H2020 if current policies continue.**

Q: Are there research policy or programme developments taking place at EU level where enhanced engagement by Ireland could provide opportunities for research collaboration and ultimate economic or societal benefit?

Ans: Yes, Irish scientists are performing poorly at Advanced ERC level because the Government is not supporting basic science across the full spectrum in

Ireland. This seriously disadvantages Irish Scientists efforts to produce data and papers to compete at European level. It's an unfair playing field if competitor scientists across Europe are supported by their Governments to the sum of 20-30% all science funding going to basic research in those countries.

Pillar 5. Organisational/Institutional arrangements to enhance research excellence and deliver jobs. Key areas to be explored include:

Q: What could we do to further enhance our landscape and institutional arrangements to maximise the impact of research excellence and deliver jobs?

Ans: Fund the best scientists across all all disciplines.

Q: Is there a need for a complementary market focused research centre structure in Ireland and how should that be organised?

Ans: What is the point in creating such a top heavy infrastructure if there is no support for basic science, which is the source of all innovation. Instead, I think the priority should be first to establish a basis of excellent science, which has been unfortunately seriously, almost terminally eroded in the last 3 years by current Government policies.

Q: How can Ireland optimise its strategic advantages of location, scale and environmental quality as a fundamental component of its research infrastructure?

Q: How can we further increase/strengthen the effectiveness of our national collaboration and engagement across all areas of STI investment in pursuit of economic and societal goals?

Ans: Again, these questions are academic and certainly premature. The whole current policy is based on a fundamental misunderstanding of how innovation happens, how ideas begin in basic research labs. The current policies have starved the roots and are focused on the flowers. Of course, unless we feed the roots soon, we will have nothing to apply and profit from in 5-10 years time. Best international practice would be to feed the roots and establish a thriving research ecosystem in the next 5-10 years – remember we had 10 years of growth between 2000-2010 - another 10 years will put us in a position to ask reap the benefits economically – it's established that it takes 17-20 years for investment in basic research to lead to spin out companies and jobs. This is beautify illustrated with Belgium's VIB policy established 18 years ago and becoming a real

international powerhouse, rated as Europe's 3rd best research organisation and having several profitable spin-out companies. As mentioned above, I can host the director of this institute here in Ireland. He is willing to speak with Government and present on their success story.

Pillar 6. World class IP regime and dynamic systems to transfer knowledge and technology into jobs. Key areas to be explored include:

Q: The establishment of Knowledge Transfer Ireland has seen an important evolution in our knowledge transfer system but what more can we do to enhance further the transfer of knowledge into jobs?

Ans: New knowledge comes from basic research and excellence. Transfer of knowledge comes from engagement between research active universities and movement of human capital between under- and post-graduate training and industry. Therefore, the single best thing that can be done here is to support excellent basic scientists in our Universities.

Q: In terms of Intellectual Property policy, are there specific interventions or supports of a legislative or non-legislative nature that would improve the business environment and act as an incentive to create and sustain an innovative culture?

Ans: It would be ideal to adopt the exact model in VIB, Belgium. That is to support excellent basic researchers with excellent IP expertise.

Pillar 7. Government-wide goals on innovation in key sectors for job creation and societal benefit. Key areas to be explored include:

Questions -

 What steps need to be taken to further the translation of investments in STI into the achievement of stated public policy goals? How can the Strategy enable research programmes to optimally support policy development and actions to address key national challenges in areas such as environment, health, etc.

 What are the synergies between Government's goals in building a better society and the goal of creating jobs and economic growth?

 How can we address national challenges and also provide economic opportunities through development of new products, processes, systems?

 How can we address local and national challenges that are also regional and global challenges - how can Ireland through its research turn national challenges into global opportunities in areas such as sustainable land use, urban and rural development, and vulnerabilities to global trends and changes?

 How can Ireland harness the opportunities presented by the major developments on observation systems, including the analysis and use of Earth Observation data by a wide array of sectors and users?

Ans: All of these desires and hopes of Government can all be achieved by funding in the best scientists in this country across the full spectrum of basic research. If you fund the best and not pre-select areas of priority, then good things will come of it. As pointed out by Sir Paul Nurse, we are currently wasting a lot of money on poorly selected 'priority areas', which is extremely unfortunate. Surely, an independent science advisor would highlight this very unfortunate reality.

Pillar 8. Research for knowledge and developing human capital

The section of the Consultation Document starts by acknowledging the importance for research excellence and educational institutions "The successful realisation of all aspects of a new Strategy will depend on people and will recognise the role of education to Ireland's research and innovation performance. Human capital is both a critical component of Ireland's innovation infrastructure and a key output of investment across all the activities considered in earlier chapters. It is about the quality of the people who conduct research and who improve scholarship in our educational institutions and enhance Ireland's reputation for research excellence and those who start up and work in companies to drive innovative performance and who create new innovative companies". It then points out that "The first progress report (June 2014) on Research

Prioritisation notes that “human capital is the single most important enabler for the National Research Prioritisation Exercise”. The Action Plan for Jobs 2015 advises that “Ireland’s competitive advantage in international markets […] will increasingly be driven by the availability of world-class skills at all levels” and that “the OECD has called skills the new global currency of 21st century economies […]”.

Based on these statements, why is the Irish Government not prioritizing support for our top level researchers or ‘human capital’ simply on merit alone?

The consultation document then goes on to recognise that education of science is important "If graduates are to be best equipped to enter the labour market, then they need to be educated across all disciplines by staff who are in tune with the latest research in the particular field. The connection between research and education within a higher education environment is of integral national importance”

In my opinion, and the stated opinion of IBEC (RTE news on March 18th, 2015), this connection between research and education is being severely compromised due to decreased support for basic research, the bedrock of university scientific activity.

The Consultation Document goes on to state that "Research Prioritisation recognises that research for knowledge is an important part of a sustainable, well-functioning STI system. Together with research oriented towards the Irish enterprise base and research for policy, it helps to develop the human capital that is required for a sustainable, competitive STI system including postgraduate and post-doctoral training of researchers and the recruitment and retention of world class senior researchers”.

However, where is the scope within the previous Research Prioritisation to allow for research for knowledge in many areas of science such as Maths, Plant Cell Biology, Basic Epigenetics, Neuroscience etc etc? The whole narrative here is a complete contradiction. It makes no sense to me at all as a logical minded person.

It’s clear to me that we need to have an open and fair discussion on this in the next few months before the final Policy is agreed upon.

The Consultation Document goes on to state that "The post of Chief Scientific Adviser (CSA) to the Government was established in 2004 to provide the Government with independent, expert advice on issues related to public science policy. The current incumbent, Prof Mark Ferguson, Director General of SFI, was appointed CSA to the Government in October 2012.

The duties of the CSA are to:

1. To provide high level advice on specific scientific issues of concern to the Government, as required;

2. To provide such scientific input into the work of any relevant body or advisory group as the Minister for Jobs, Enterprise and Innovation may from time to time reasonably require;

3. To fulfil, on behalf of Government, a representational / ambassadorial role in the science field;

4. To attend, as may be required, Cabinet or Cabinet Committee meetings and Houses of the Oireachtas Meetings; and

5. To report periodically to the Minister for Jobs, Enterprise and Innovation, or as may be requested by the Minister”

As I mentioned above, in my view this post should not be shared with the Director of SFI position. It’s a clear conflict of Interest. **I believe that Government needs to urgently remedy this clear conflict of interest for the long-term benefit of our education, health and economic sectors, as is best international practice.**

Key areas to be explored include:

Q: What more can we do to best harness the potential of our knowledge base for sustainable economic and social well-being?

Ans: Support the best researchers in all areas of science, based on merit alone, as assessed by international peer review, as is best practice.

Q: What additional steps can government take to ensure the development of human capital across the population to ensure the success of the new Strategy?

Ans: Same answer as above. Support the best researchers in all areas of science, based on merit alone, as assessed by international peer review, as is best practice.

Q: How can we ensure that the requisite links between research and scholarship are maintained across all RPOs? [RPO = Research Performing Organisation].

Ans: Rebalance funding more towards basic research and less towards applied research in which there is limited or no scholarship.

Q: In order to achieve a sustainable research capacity, are the outputs of our research system at doctoral and postdoctoral level the right ones in terms of volume, quality and relevant discipline?

Ans: Quality publications is the most important output. Numbers are less important. One Nature paper is better than five papers in journals of impact factor below 5 because most people don't read or cite such papers. There's not enough high quality papers in journals such as Nature or Cell Press journals due to decreasing support for basic research. Applied research does not achieve high level publications or 'output'. Increasing support for basic research will achieve a sustainable research capacity, with quality outputs on the international stage.

Q: How can we better leverage our research talent into the economy? How can those individuals active in research (and those seeking to be), both in the public and private sectors, be best supported to perform and progress including through optimum researchers' careers, recognition and mobility mechanisms.

Ans: An excellent university research sector will encourage research orientated industry to establish or expand here and this will be the best means to leverage our research talent into the economy once a proportion move from university based labs and bring their expertise to these industries based in Ireland. This is a natural process that has happened all around the world in top regions known for excellent university research e.g. Boston, Cambridge and Stanford.

Q: How can the Action Plan for Jobs 2015 objective to increase the number of researchers in enterprise be fulfilled?

Ans: Why is this question in this under Pillar 8, which is about Research for knowledge and developing human capital? This reflects a biased view of Research for knowledge and developing human capital. For example, why are Irish Research Council grants being linked with commercial interests? These should be supported by the Department of Education for Research for knowledge and developing human capital and this should not be at all linked to commercial projects.

Q: Should research and innovation performers be supported to engage citizens more actively in the innovation process to achieve optimal outreach to the public?

Ans: Yes, but only when a paper or research finding of merit is made, e.g. A threshold of impact factor 10 and above could be set. There are too many stories in the media from lower level papers. I believe if the paper is of international merit, then of course the 'research performers' should be supported to engage with Irish citizens, as they have been doing. The troble is that top research output from Ireland is now waning as a direct result of the reduced funding to the best scientists in the university sector doing excellent basic research. It could be helpful to encourage scientific training for journalists. It would be most helpful if we have a greater representation of scientists in Government and also in Departments engaged in science funding policy. Failing that, we need to recognize that best international practice would be to have independent scientific advisors, not one that is effectively employed by the jobs department of a Government in its final year. This can only foster short-term thinking. We need to be honest and think about what is best in the long-term for this country in terms of a vibrant university sector actively engaged with innovative companies. The path we are taking is seriously flawed, not at all best practice and 1000 scientists came out on March 18th and voiced their criticisms. This is an unprecedented move, highlighting the desperation of the situation. The 1000 scientists are dismayed by current Government policies and are willing to engage with Government for a common goal, a real knowledge economy.

Your Sincerely,

Adrian Bracken, Ph.D.
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Phone: [redacted]
WWW: http://www.gen.tcd.ie/bracken