The Royal Institution 2012 Unconference for Young People Report
On 9 November 2012 almost 150 14–18 year olds visited the Royal Institution to take part in its second annual science ‘unconference’ for young people. The topic this year was science and the economy.

The unconference was launched by four keynote speakers who introduced four pressing issues facing science in Britain today. The student delegates then discussed the issues in breakout sessions and devised recommendations to ensure this country remains a world leader in science.

The atmosphere in the famous Faraday Theatre was heightened because on the same day at the Royal Society, Chancellor George Osborne was giving a speech on the same issues. The Ri Unconference was hosted by the L’Oréal Young Scientist Centre, a centre for creative science learning at the Royal Institution.

Unconferences are designed to encourage ‘grass-roots’ creative thinking. Traditionally, they are agenda-less, although the Ri Unconference participants were asked to frame their thinking around four key themes:

1. Investment in science research
2. Funding and fees at universities and how this affects science
3. Corporate investment in scientific talent and the science brain drain
4. Science and economics

Throughout the day, students were invited to participate via Twitter and in break-out discussion groups. At the end of the session, students presented their key recommendations to a panel of experts drawn from the education, business, policy and media sectors including: Professor John Perkins CBE, Chief Scientific Advisor for the Department of Business, Innovation and Skills (BIS); Mark Stockdale, Leader of the Raising Standards in Science Team at the Department of Education; Maxine Cahil, representing the Confederation of British Industry (CBI); Jeremy Schwartz Managing Director of L’Oréal UK & Ireland and Dr Gail Cardew, Director of Science and Education at the Royal Institution.

“The Unconference was a truly a unique experience, meeting people that I wouldn’t normally get the chance to was captivating and thrilling; each person addressing a different topic to do with science. I was enthralled and immersed all of the day and was freely able to express my scientific opinions. It was great!”

Jacob, King Charles I School, Kidderminster

EXECUTIVE SUMMARY

The Ri Unconference offers students a unique opportunity to shape science policy
1. Investment in science research:
   • More money should be invested into fundamental research
   • The government should be more inventive in how it raises money for scientific investment, for example tax business profits to fund science research
   • More investment in science education
   • Formation of a publicly elected body that votes on how the government’s science budget is invested

2. Funding and fees at universities and how this affects science:
   • Those who can afford to pay university fees should not be eligible for grants
   • Introduce a merit-based sliding scale of university fees
   • Raise awareness of apprenticeships as an alternative to university
   • Increase the number of ‘sandwich’ courses with industrial placements
   • Different courses should have different fees relative to real cost

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“The RI Unconference clearly demonstrated that students in Britain are aware and engaged with the major science funding and policy issues; that they care, and have some creative and innovative proposals for developing policies that affect their future.”

Dr Gail Cardew, Director of Science and Education
The Royal Institution

3 Corporate investment in scientific talent and the science brain drain:

- Universities and industry need to work together more closely
- Find more inventive sources of research funding and collaboration
- More business outreach to communicate science to the public

4 Science and economics:

- Scales of scientific funding to allow both long term and short term research projects to exist
- Continue to develop and refine existing technologies as well as investing in new ones
- Invest in technologies that encourage cost efficiencies in the future
- Early education in science, more science in the media and schemes to counter public apathy

Clearly, one of the consequences of having separate break-out sessions was that some of the recommendations were duplicated across the themes. One reoccurring point concerned public involvement in the decision-making process. Participants generally thought that the public should somehow be involved in key decisions, but that currently they lacked the necessary enthusiasm and skills to do so. Students therefore advocated investment in science education and public science engagement activities. Another consequence of separate breakouts was that groups sometimes disagreed. This was especially apparent in the balance of spending on fundamental versus applied research.
Students from schools all over the UK, came together at the Royal Institution to take part in the day.

The day began with students being invited to respond electronically to a series of policy and career related questions, introducing the themes to be covered on the day. (See page 22).

After polling, there were keynote speeches on the four main topics, followed by questions and answers. The keynote speakers were:

1. **Investment in research**: Imran Khan, Director of Campaign for Science and Engineering
2. **Funding and fees at universities and how this effects science**: Professor Julia Buckingham, Vice Chancellor, Brunel University
3. **Corporate investment in scientific talent and science brain drain**: Dr Andrew Herbert, former Chairman of Microsoft Research EMEA
4. **Science and economics**: Tom Standage, Digital Editor at The Economist

Throughout the speeches the students shared their thoughts via email, post-it notes and on Twitter. Screens around the theatre displayed real time reactions. The use of the hashtag (#RiUnconference) meant that the public could also follow the discussion happening inside the theatre.

Once the keynote speeches concluded, students chose to join one of four breakout groups. They were encouraged to debate the issues and come up with recommendations to solve the key problems presented to them by the morning’s speakers. After these sessions they delivered their recommendations to each other and to a panel of experts which included leaders from government, science, business, education and the media.
INVESTMENT IN SCIENCE RESEARCH

Mr Imran Khan, Director of the Campaign for Science and Engineering, launched proceedings with a startling fact which immediately shocked and intrigued the audience: in the fiscal year 2010/2011 the government’s total spending was £700bn and out of that, a mere £6bn was invested in science – less than 1% of the government’s annual budget.

Mr Khan argued that science has the solution to many of the major challenges that face Britain today (e.g. climate change, healthcare), but that the level of investment shows that the country doesn’t take science as seriously as it should do.

Mr Khan introduced the debate about fundamental research versus applied research and the need for investment in both. He argued that politicians tend to have short-term objectives when it comes to decisions on science funding, when most scientific research takes many more years than an average four year political term.

Both private and public investments are key, doing equally important jobs, Mr Khan stressed.

The students were then posed two questions to consider:

1. Do we have enough control of scientific research?
2. Do you want more of a say in how it’s done?

Those questions were particularly pertinent given George Osborne was giving a speech down the road at the Royal Society on the very same issues.

Findings from the group discussion:

There was intense discussion about whether there should be greater public investment in more ‘blue-skies’ fundamental research versus applied research, with fundamental research rising as the favourite. They argued that the government is best placed to fund fundamental research because companies tend to want to develop science that can be applied and made commercial immediately, whereas university academics have more freedom to focus on fundamental research.

Students felt strongly that the government should ensure that some of the profits from science-related schemes/businesses should be reinvested directly back into the sector, helping science spending become more self-sustaining.

Students thought that there are too few MPs with science backgrounds – and that there should be more scientists advising the government. It was therefore agreed that there needs to be some sort of body of scientists who could direct the government’s science spending. The debate centred on whether it should be elected by peer review or directly by the public, and if it was the latter, whether this would waste more money.

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One idea that didn’t gain enough support to be carried forward was whether 15% of the science budget should be put out to a referendum-style vote, i.e. the public would vote on projects they wanted the investment put into. Pupils were too concerned, however, that the public aren’t informed enough and mostly wouldn’t care enough to vote, and that the exercise could end up being a waste of time and money.

Recommendations:

1 More money should be invested into fundamental research
   - Too much money goes into slightly improving current technology at the expense of fundamental research

2 The government should be more inventive in how it raises money for scientific investment, for example tax business profits to fund science research
   - Profits from the science industry should be put back into the sector for research purposes e.g. the recent windfall from selling 4G
   - Capitalise on business investments

3 More investment into science education at a young age
   - Age 12 is a key point for harbouring interest in science. There should be more outreach programmes aimed at creating a ‘new generation of scientists’
   - If the public cared more through being more informed about science, the government would care more

4 Formation of a publicly elected body that votes on how the government’s science budget is invested
   - This would be dependent on generating strong public interest and thus the government needs to invest more in science engagement
   - Existing bodies, e.g. ‘learned societies’ such as the Royal Society of Chemistry should have a greater say in the science budget.

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Questions from the panel of experts to students:

Q: What do you think about an X-Factor-style TV show, where scientists competed for research funding?
A: The problem with it is that the public would vote for the immediate, short-term type ideas rather than voting for more general, long-term research funding, which might be more worthy. Also, whereas students at the unconference and other keen scientists would definitely watch it, the rest of the public might not be so interested.

Q: How should the extra money in education be invested?
A: More education and communication: there should be more speakers, engagement programmes and trips to museums. This is key to ‘sowing the seeds of interest at an early age.’

Q: Why should science get money over investment in sport, or health, or anything else?
A: Britain has always been a leader in science. Investment is vital because we could lose that advantage. It’s so important for the future of the economy, and one of the few things this country is still very good at.

Tweets:
@Miss SinthuCiva “#RiUnconference public should have a say on everything that government does as what they are doing is affecting us”
@shenisaleesen “@imrahkhan I love yr lecture at #RiUnconference today, so interesting :)”
@tosic_tara “Not enough structure in research funding #riunconference”
@ThatGuyyes “#RiUnconference the tv show about government investments is top notch”
@SeanThurston2 “outreach leads to interest in research, research leads to outreach!”
@slothboy “People deserve more control on how their money is spent on scientific study #RiUnconference”
@theGuy1996 “#RiUnconference do the public have enough knowledge about areas of science to influence spending?”
FUNDING AND FEES AT UNIVERSITIES AND HOW THIS AFFECTS SCIENCE

Professor Julia Buckingham, Vice Chancellor of Brunel University, recalled the changes she has seen in the university sector since she was an undergraduate. These include: a jump from less than 10 per cent to 40 per cent of the population attending university, which means the government can no longer afford to pay for everyone to attend; and that guaranteed graduate employment is less certain today.

She predicted that increased university fees will have four important consequences:

1. The number of students studying science at university in the UK may change, since students may choose to do apprenticeships, study abroad or take online courses such as MOOCs instead.

2. There will be a sharper focus on budgets as science is very expensive to teach, with universities making better and more creative use of technology (e.g. more interactive online learning and simulated practicals), more team-based learning and increased partnerships with the private sector.

3. There will be increased emphasis on employability and transferable skills.

4. The costs of post-graduate master's and research degrees will rise and students may be deterred from doing them because they can't afford it. This places science under threat in Britain.

In these and many other areas, science has the solution, Mr Khan argued, and the level of investment shows that the country doesn't take science as seriously as it should do.

Findings from group discussion:
All the students agreed that university fees are too high, especially considering the lack of job security a degree brings you today. Debate centred on where universities and the government could cut costs and where they should charge more money, in order to ensure a fair university system.

Some students argued that the government and student should split the cost of the degree equally, and others argued that universities should charge students relative to the cost of the actual degree taken. Students felt that international students should be charged more, although fears were raised about whether this would deter too many so that the international prestige of British universities would decline. There was even talk of cutting Britain's international aid budget and putting the money into universities to ensure quality education.

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“...The questions were very pertinent. I thought the students themselves might be more focused on fees and what’s university going to be like, and I think it was very encouraging to see that they were interested in far broader aspects of science and the economy. They had some interesting views.”

Professor Julia Buckingham, Keynote speaker
Recommendations:

1. Those who can afford to pay university fees should not be eligible for grants
   - With university so popular, not everyone can have a grant. Those who can afford to pay should, and they would help fund the scholarships for those who can't

2. Introduce a merit-based sliding scale of university fees
   - So that ‘the more you work you put in, the less you pay’ because placements at universities are merit-based, so why shouldn't fees be the same?

3. Raise awareness of apprenticeships as an alternative to university
   - Not everyone needs to go to university and it wastes money for everyone to go
   - Apprenticeships would also help build relationships with employers thus increasing the likelihood of getting a job at the end of training

4. Increase the number of ‘sandwich’ courses with industrial placements
   - If students spent two years at university and one at work in a company they would have better job prospects
   - It would also decrease the cost of the course for the university, saving vital money

5. Different courses should have different fees relative to real cost
   - While university fees shouldn't differ across the country, courses that cost more to train an undergraduate should be more expensive

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Questions from the panel of experts to students:

Q: While ‘sandwich’ courses are good for maths and biomedicine, what about courses with less of a commercial value, like particle physics? How do you get employers or students interested then?

A: Sandwich courses won’t be for every student on every course, but it doesn’t mean they shouldn’t be there for some students on some of the courses. They’re cheaper, they’re good for building relationships with employers and thus bettering job prospects, so we should definitely be encouraging more of them.

Q: Apprenticeships even at the moment are struggling to attract people to them, and you’re suggesting increasing the awareness and perhaps even the number. Do you think they have a PR problem and if so, why?

A: Nowadays, every pupil is expected to go to university and that’s wrong; university isn’t for everyone. So they do have a PR problem because university is considered the only option at the moment.

Tweets:

@dolphin6994 “#RiUnconference apprenticeships do have an image problem, they need to be made more attractive and more sought after in jobs.”

@tosic_tara “Instead of paying fees, students could do a work placement in their field of study, contributing knowledge earlier on #RiUnconference”

@morgan9060 “Three main points to this speech: education, education, education #RiUnconference”

@stevenhill “#RiUnconference another group proposing better engagement and education in science. A clear theme emerging from the day”

@dolphin6994 “#RiUnconference there should be more awareness of apprenticeships and sandwich courses allowing earning and training”
Dr Andrew Herbert, former Chairman of Microsoft Research EMEA pointed out that companies don’t just rely on research, they also exploit design, fashion, marketing and demand creation. Therefore, he asked, why should companies invest in science at all? There are of course some concrete examples of when research has led to a commercially successful product, such as the discovery of electrons in 1897 that finally ended with the invention of the microprocessor in 1971.

The problem with corporate investment in science, Dr Herbert pointed out, is that scientific progress often depends on full disclosure and sharing ideas. However, scientific innovations have a commercial value, and both universities and corporates are aware of this. The area of intellectual property and who owns what discovery can therefore be problematic. What should the ideal relationship be, therefore, between research, development and innovation? Dr Herbert asked.

Finally, Dr Herbert raised the issue of who should pay for the grand challenges facing society (healthcare, climate change, energy, for example)? He suggested that although industry is important in scientific research on these areas, governments should be involved as well.

Findings from group discussion:
Students discussed how to try to balance government money for academic research and corporate investment for applied research. There were various discussions about what the relationship should be between companies and universities.

The students agreed that they needed to work more closely, but often disagreed on what the precise nature of that relationship should be.

One student suggested that each university should have a partnership with a corporation – where departments would feed their top students to that corporation in return for investment in research and grants for students.

However, to prevent a particular university or department becoming a breeding ground for a particular company, another student argued that the relationship should work on a broader basis – that roughly five different universities would team with five different corporations and they would all share resources and knowledge.

The relationships would need regulation, but students thought that the arrangement could have potential benefits for all parties involved: the student would pay less because companies were helping to fund scholarships, they would also have a better chance of getting a job because they would do a placement with a company during or after their time at university. The university would have better relationships with employers and would save money through corporate investment in research and scholarships. The companies would be on the cutting edge of development, and have direct access to the top talent the university had to offer.
Recommendations:

1. Universities and industry need to work together more closely
   - There should be tax credits and other financial incentives for companies that invest in universities and research
   - Create more bursaries and scholarships: work closely with the students on internships, contributing to more job security

2. Find more inventive sources of research funding and collaboration
   - Not just financial incentives, long-term job prospects for students at a good company
   - Collaborative ideas would also help attract funding from the government
   - Incubator buildings that become hubs of research

3. More business outreach to communicate science to the public
   - More community outreach programmes and scientists in schools
   - Research internships for graduates or a year out researching during university
   - Create a ‘Teach First’ type initiative so that after university, graduates would spend a year in the community, spreading their love of science in schools before they go back into science.
Questions from the panel of experts to students:
Q: Have you yourselves had much exposure to research in your schools?
A: In primary school there was the occasional museum visit and in secondary school there have sometimes been visits by scientists. But this should happen on a much more regular basis because they make a big difference to inspiring young children to get interested in science.

Q: Scientific research is very personal, so how do you allow individual ideas to flourish if a student is on an internship with a company their university was collaborating with?
A: Internships should be all about variety – companies should take on multiple students who are all interested in different things, and allow them the freedom to say “I want to try this” and then see what works and what doesn’t. Companies want the best talent, so if someone is very creative but it works, a good company will be very interested in that student.

Tweets:
@gailsci “#RIUnconference Great answers from students to the Q about balance between pure and applied research”
@sl0thb0y “The government only say stuff for votes, they should leave science alone #RIUnconference”
@CharRyder “How do we get science into the countryside? More school trips needed! #RIUnconference”
@RIUnconference “Students would like to see investment in scientists going into schools to inspire kids directly, esp outside of London #RIUnconference”
Tom Standage, Digital Editor of The Economist, used the telecoms industry as an example of how much of a difference one sector can make to the overall economy of a country and the world. This is especially apparent in the developing world, he argued, where the spread of mobile phones and basic connections has been the biggest tech story of the last decade. Mobile phones in Africa make such a difference because the infrastructure is so bad. Their use saves time, which means a more productive day and growth generation.

A lot of technology we use today is based on research from the 1980s. E.g. 4G is based on 3G research, which went on in the 1980s–1990s. So it is an old idea, argued Mr Standage, which has taken a long time to get from the laboratory to become a product on the shelf. Mr Standage also talked about possible inventions in the future, and how they might change the world. In particular, he mentioned neutrinos and quantum computers as having great future potential.

Mr Standage said that a failure to invest in science would have damaging consequences on Britain’s economy. We don’t need to just maintain our levels of investment, ‘we need to press harder on the accelerator of tech investment if it’s going to help our economy.’

Findings from group discussion:
The primary concern of pupils was ensuring that the public care more about science because if they care more, then the government will act, and invest more in it. Likewise, we could maximise the impact of scientific developments by having an informed, interested public, which would lead to a more productive economy. Pupils felt that the media have neglected their responsibility in writing about science, although there were differences of opinion within in group discussion about how to ensure the media improved their reporting on science.

Some pupils felt that to ensure good ideas get funding by the government, there should be smaller amounts of funding to lots of different projects, and see which ones develop more successfully. Others disagreed, arguing that it’s difficult to quantify the success of science research in annual or even sometimes five-year time periods. Often important breakthroughs take decades.

There was a split between those who felt investing in the modification of existing technology would help the economy more than investing in new technology. However, there was agreement on the need for ‘higher end’ technology investments, especially with medical equipment and producing organic chemicals and plastics.
Recommendations:

1. Scales of scientific funding to allow both long-term and short-term research projects to exist
   - This would prevent large sums of money being spent on inefficient research
   - It would enable less well-funded scientists to develop potentially exciting research and ideas

2. Continue to develop and refine existing technologies as well as investing in new ones
   - Many developments today e.g. the laser, use are based on research from the 1980s and 1990s

3. Invest in technologies that encourage cost efficiencies in the future
   - For example, robotic surgery is less intrusive, and means a quicker recovery time which means it costs the hospital less money
   - Organic chemicals and plastics can help solve the problems of climate change

4. Early education in science, more science in the media and schemes to counter public apathy
   - We need more coverage of science in the media more so that the public becomes interested and concerned
   - Get scientists like Brian Cox on TV more – they inspire young people
Questions from the panel of experts to students:

Q: How would you allocate the split between commercial and non-commercial investment in science research?  
A: Both are important. On the one hand the commercial aspect generates short-term gains, but without investment in fundamental research none of this could take place.

Q: What would be the best way to communicate science to your age group?  
A: The media definitely needs to be utilised more – getting science in the papers, on the television. You’ve also got to use things like social media which are becoming increasingly important in communicating ideas, and which young people use a lot.

Q: How do you get science in the media in the first place?  
A: Make science fun for young people so that they care about it. Use famous figures like Brian Cox to sell science to the media and do outreach programmes to young people about science.

Tweets:
@MissSinthuCiva “#RiUnconference science does improve the economy because new inventions are being made to reduce costs and making things easier”

@angelfish207 “Should we concentrate on managing imports of technology as well as increasing exports to produce more capital?? #intriguing #RiUnconference”

@tosic_tara “Modernising life in developing countries has a bigger impact on their growth than on developed countries! #RiUnconference”
STUDENT OPINION POLL

Are you considering pursuing a science-related degree at university? 86% strongly agreed or agreed

Should science degrees be subsidised by other subjects? 50% agreed; 50% disagreed

What is the most important factor in why science graduates don’t pursue a science-related career? 26% said low salaries; 25% said it was a good grounding for an alternative career

The public should have a say in how the government invests money in science research? 60% strongly agreed or agreed and around 20% strongly disagreed or disagreed

Science and technology can help bring us out of the economic crisis? 70% strongly agreed or agreed

What areas should be prioritised for government-funded science research? 40% said “finding cures for diseases”; 31% said “no priority”

I would move abroad to further my career? 65% strongly agreed or agreed; 22% weren’t sure

What is the item of technology you’d miss most if it disappeared? 41% said their laptop/computer; 20% said iPod/MP3 player

What is the most important aspect of science to help improve the economic crisis? 36% said furthering education; 32% said new technologies

How should the public influence research funding? 37% said having an independent body of experts assigned by peer review; 30% said having an elected non-political representative

Where should science be focusing its research? 46% said synthetic biology and regenerative medicine

Full results available on request
REATIONS FROM STUDENTS AND TEACHERS

“I thought it was really inspiring. It was great to hear all sorts of ideas from other people, to connect with different people, and just to learn.”
Enaab, Walthamstow School for Girls

“It’s pretty cool that we were debating the exact same issues as the Chancellor on the future of science investment.”
Beth, St Mary’s School

“It was great to find out and discuss the way in which science funding is found and distributed. It brought up some key issues on the future and a lot of food for thought.”
Eva, Grey Coat Hospital School

“It was amazing. It was so interactive with Twitter and everything, it was so interesting. I don’t go to events like this much and I’d love to go again.”
Almas, Virgo Fideles

“I loved hearing people’s different thoughts on things, and it showed me all the different things you can do with science, all the different jobs you can get, which I hadn’t thought about.”
Vanessa, Virgo Fideles

“It’s been a good opportunity to increase my social skills. It’s cool – we never have this kind of opportunity at school.”
Nik, Whitefield School

“I like the building, I’ve seen lots of weird stuff... I’ve learnt more today, I’ve met new people and we’ve got advice from one another.”
Siva, Whitefield School

“It was different. Good though. I liked discussing ideas and the talks were good...I would say it’s made me more enthusiastic about science.”
Jemma, King Charles I School

“Discussions about science in universities was an eye-opening experience. It was inspiring to know how much a science degree is valued.”
Mel, Sir Joseph Williamson’s Mathematical School

“I feel honoured that I was able to take part in this day to help decide where the investment of science by the government goes. I also thought the twitter feed was an effective way of publicly expressing my thoughts.”
Matthew, Sir Joseph Williamson’s Mathematical School
“It’s a great opportunity to network, speak to people, hear ideas. I’ve definitely learnt a new perspective.”
Kathryn, Sir Joseph Williamson’s Mathematical School

“I learnt a lot about the issues my generation will have to face in the future and how complex they can be to solve. It was a good chance for us to voice our opinions and have discussions with people from other schools.”
Eloise, Thomas Hardye School

“I think this will help the students to start making the links between what can happen in science that they know, and how it actually works in the bigger picture... Apart from today, there’s no real opportunity for our students to get feedback and ask questions to such influential people.”
Elliot Lee, Director of Science and Maths at Sir William Borlase’s Grammar School

“I hadn’t thought about these issues, but now I know they affect me.”
Luna, Virgo Fideles

“The day’s going really well, they’re really enjoying it and they’ve come up with some fantastic ideas... We don’t get any opportunity to talk about these things during lessons because there’s so much content to cover, so it’s nice for them to have an opportunity, especially as they are so interested, to really think about how science is impacting the world.”
Amy Morris, science teacher, The Grey Coat Hospital School
The Ri Unconference was a great success and demonstrated that students from all over the UK are aware, engaged, and have interesting ideas about the major scientific issues facing the country. Despite their young age, they formed coherent initiatives for problems regarding the investment in science research, university fees and funding, corporate investment in scientific talent, and the economics of science. They were also able to weigh up the pragmatism of such strategies.

Finally, they were able to present their ideas in a lucid and engaging way to some of the most important individuals in the science world, and to representatives from the media, government, education and business. Every panellist prefixed their questions to the students by first stating how impressed they were with the presentations and the ideas they came up with.

If the UK is to have a strong future in science, it needs today's pupils to start planning ahead and think about the issues that our country faces in all the areas discussed. The evidence in this report clearly shows that we can be confident that we have a generation of intelligent young people with the aptitude, insight and energy to meet the challenges of the future – policy makers should take note!

Professor John Perkins, from the Department of Business, Innovation and Skills, was on the panel. He commented:

“I was seriously impressed... The atmosphere in this room was just incredible. I think given these young people had only looked at these issues for a matter of hours; they came up with a very mature, sophisticated analysis of these issues.

“Clearly one of the big take-home messages from today is that more public engagement in science is needed: genuine engagement, not just informing them about science, but actually involving them in scientific matters and decision-making about how money needs to be deployed.

“! I'll have to go away and think about how that might work...”

Contact

To respond to the findings in this report, or for more information about the Ri L’Oréal Young Scientist Centre, please contact:

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Imran Khan,
Director of Campaign for Science and Engineering

Imran studied Biology at the University of Oxford, specialising in disease and animal behaviour. He also has a Masters degree in Science Communication from Imperial College. He has worked in Westminster as a Senior Parliamentary Researcher for Dr Evan Harris, and spent time as a science communicator, working with organisations including the World Health Organisation, the British Medical Journal, the Guardian, the BBC, and New Scientist.

He also serves as a Trustee of Practical Action, sits on the Science Committee of the Institute of Physics, has been named by The Times as one of the ten most influential people in British science under the age of 40 – and was Mr December in the 2010-11 ‘Geek Calendar’.

Professor Julia Buckingham,
Vice Chancellor, Brunel University

Professor Buckingham is Vice Chancellor of Brunel University. Previously, she was Pro-Rector for Education and Academic Affairs at Imperial College London.

A specialist in Pharmacology, Professor Buckingham is currently President of the Society for Endocrinology and a Trustee of the Royal Institution and the Society of Biology.
Dr Andrew Herbert,
Former Chairman of Microsoft Research EMEA

Andrew is a computer scientist who started his career at the University of Cambridge Computer Laboratory as assistant professor under Maurice Wilkes and Roger Needham. He previously set up two of his own technology companies and worked at Citrix Systems Inc. before joining Microsoft Research in 2001 as an assistant director. He became managing director in April 2003. In 2010 he became chairman of Microsoft Research EMEA. He retired from Microsoft in September 2011.

Andrew was appointed Officer of the Order of the British Empire (OBE) in the 2010 New Year Honours and is a Fellow of the Royal Academy of Engineering, a Fellow of the British Computer Society and a Liveryman of the City of London Worshipful Company of Information Technologists. He is a member of ACM and IEEE. He is a Visiting Professor at University College London, an Emeritus Fellow of Wolfson College, Cambridge and a member of St John’s College, Cambridge.

Tom Standage,
Digital Editor at The Economist


He studied engineering and computing at Oxford University and has written for publications including the Daily Telegraph, The Guardian, Wired and Prospect, taking a particular interest in the internet’s cultural and historical significance. He was previously The Economist’s Business Affairs Editor.
APPENDIX TWO:
EXPERT PANEL

Alessio Barnardelli
Science Subject Lead, TES Resources

Maxine Cahil
The Confederation of British Industry

Dr Gail Cardew
Director of Science and Education at the Royal Institution

Professor José Chambers, MBE
Development Fellow at the Comino Foundation and former Assistant Vice Chancellor at the University of Winchester

Jason Palmer
Science correspondent at BBC Online

Professor John Perkins CBE
Chief Scientific Adviser for the Department of Business Innovation and Skills (BIS)

Jeremy Schwartz
Managing Director of L’Oréal UK & Ireland

Mark Stockdale
Leader of the Raising Standards in Science Team at the Department of Education

Tom Whipple
Science correspondent at The Times
APPENDIX THREE: THE ROYAL INSTITUTION’S L’ORÉAL YOUNG SCIENTIST CENTRE

L’Oréal was created by a chemist over 100 years ago and science has been at the heart of the company ever since. It is passionate about inspiring young people in the world of science and its collaboration with The Royal Institution on the L’Oréal Young Scientist centre reflects this. The laboratory facility at the Royal Institution in central London, provides children aged seven to 18 and their teachers with an interactive, experimental space in which to explore science. The centre aims to promote curiosity and investigation-led learning as well as offering access to advanced technology and experiments outside of the normal school remit.

About The Royal Institution

The Royal Institution was established in 1799 with the purpose of ‘diffusing science for the common purposes of life’. Over 200 years on, we’re a charity dedicated educating, entertaining and enthuse people of all ages about science, technology and the world through our science video channel, public programmes for adults and education initiatives young people, Faraday Museum and history of science activities, scientific research and the famous Christmas Lectures.

At its home on Albemarle Street in Mayfair, the Ri is where scientists such Humphry Davy, Michael Faraday, James Dewar, William and Lawrence Bragg and George Porter discovered 10 chemical elements, won 14 Nobel Prizes, made world-changing discoveries in the laws of electromagnetism and molecular biology, and pioneered public science lectures and science events for children.

About L’Oréal

L’Oréal is the world’s largest cosmetics company; present in over 130 countries with 68,900 employees world-wide. The company had a turnover of 22.46 billion Euros in 2012. L’Oréal is the only cosmetics group that is present in every distribution channel: mass market, hair salons, department stores and pharmacies. Its brand portfolio includes: L’Oréal Paris, Garnier, Maybelline, Soft Sheen Carson, Matrix, Redken, L’Oréal Professionnel, Kérastase, Shu Uemura Art of Hair, Vichy, Roger & Gallet, Inneov, La Roche-Posay, Lancôme, Yves St. Laurent Beauté, Biotherm, Kiehl’s, Shu Uemura, Armani, Cacharel Diesel, and Ralph Lauren fragrances. The company acquired The Body Shop in 2006.

The company has been present in the UK for more than 70 years and in 2009 celebrated its global centenary. L’Oréal UK and Ireland is a major player in the UK cosmetics market with 67% of women in the UK using one or more L’Oréal products. L’Oréal UK and Ireland remains dedicated to supporting L’Oréal’s global commitment to sustainability and was a finalist in the 2009 RSPCA’s Good Business Awards. In 2009 the group renewed commitments to reduce greenhouse gas emissions to half of 2005 levels by 2015. L’Oréal UK and Ireland remains committed to workplace diversity and hosted the 2009 Summerx Conference encouraging ethnic diversity in the workplace.

More information at www.rigb.org and www.richannel.org
APPENDIX FOUR: ABOUT THE AUTHOR

Lucy Pawle is a freelance journalist and recent graduate of Columbia University’s Graduate School of Journalism in New York. She has written for The Economist, Wall Street Journal Europe, Wall Street Journal Asia, Your Middle East, The New York World, The Uptowner and The Daily Telegraph.

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