Report of the Royal Institution Unconference for Young People

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Autumn 2011
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Introduction

On September 26 2011 almost 150 14-18 year olds filled the prestigious Faraday Theatre at the Royal Institution to take part in the UK’s first ever science ‘unconference’ for young people.

Their task was to discuss the issues facing the future of science in the UK: the environment, media, education and careers and make recommendations to policy makers.

Key recommendations were:

**Science and the environment**

- Establish a “beef tax”
- Promote carbon trading
- Educate the public about environmental impacts of lifestyle choices
- Invest in green technology

**Science and the media**

- Break up media conglomerates to diversify science coverage
- No increased regulation of the media
- Creation of a national escrow to separate funders and scientists
- Support greater involvement of scientists in the media

**Science and education**

- Make GCSEs harder and split science GCSEs
- Greater efforts to attract focused, passionate teachers
- Achieve higher standards in practical lessons
- Improve framework for student feedback of teachers

**Science and careers**

- Provide more workshops and careers talks from interesting scientists
- Showcase science careers beyond medicine
- Facilitate more work experience placements in labs
- Greater investment in the science industry
Introduction continued...

The Ri Unconference was hosted in partnership with the L’Oréal Young Scientist Centre, a centre for creative practical learning run by the Royal Institution.

In line with the principles of an unconference, which is traditionally an agenda-less day designed to stimulate free thought and where the agenda is produced organically by the delegates, the proceedings were designed to encourage creative thinking in science outside the classroom.

The day clearly demonstrated that students in Britain are aware and engaged with the major scientific issues currently facing the country and are a voice to be listened to in developing policy that affects their future.

Dr Gail Cardew, Director of Science and Education at the Royal Institution, reflected on the extraordinary event: “The Ri Unconference was quite simply amazing. The students were asked to give us their views on pretty complex issues, and they responded with such thoughtful and insightful comments.

“My only regret was that the likes of Vince Cable, Michael Gove and David Willetts weren’t there to witness first-hand the depth of thinking and passion of these students. I hope when they receive the report they’ll take note, take action and take a seat at the next Ri Unconference.”
About this Report

This brief report provides a summary of the key recommendations that arose from the inaugural Ri Unconference.

The purpose of this report is to capture the delegate’s ideas, and to show that young people have great ideas and can contribute valuable insight that can benefit senior decision makers in science and education policy.

The format of the unconference was designed to be as unstructured as possible, allowing for creative direction input from the delegates. Four speakers opened proceedings with short introductions to stimulate discussion amongst the young people. These were:

- **Science and the Environment**: Prof Hugh Montgomery, environmentalist, former Ri Christmas Lecturer and Director of the UCL Institute for Human Health and Performance
- **Science and the Media**: Sallie Robins, science publicist
- **Science and Education**: Alom Shaha, physics teacher
- **Science and Careers**: Dr Maggie Aderin-Pocock, British space scientist and TV presenter

Students then set the agenda and, by means of an open forum discussion, formulated solutions to the issues raised. Throughout the day, they shared their ideas on Twitter, using social media as a way to steer discussion and interact with a wider audience.

After the group sessions, the young people had the chance to deliver their recommendations to each other and key thought leaders from government, science, business, education and media.

These discussions and recommendations form the basis of this report.

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1 Full biographies of the speakers can be found at the end of this document.
Science and the Environment

Dr Hugh Montgomery provided the stimulus for this group, setting out the environmental challenges facing the planet’s future. Setting the scene, he told the young people:

“The global population has exploded in the last hundred years, and the resources consumed by each person have also increased. Together, this has strained the world’s resources to the point of collapse.

“To feed this population, the majority of the world’s agriculturally productive land has been farmed - much of what’s left lies under rainforests.

“Water and fertiliser usage have soared. At current rates, there will be no edible fish species in the ocean by 2050. Three known species become extinct every hour, the fastest global extinction on the fossil record by a factor of 10,000 or so.

“On top of that comes climate change - which acts as a massive ‘force multiplier’, and helps trigger resource wars: high food prices may well have helped trigger the Arab Spring.

“Adults are doing nothing meaningful to solve these problems - it’s up to you. How will you solve these problems?”

This was their response...

Discussion Highlights

The lively group of students debated the issues raised passionately. They reflected that it was likely they would not be able to enjoy the same standard of life that their parents do, recognising that the current standard of living in the UK was not sustainable, and that drastic changes would have to be made to prevent collapses in food, fisheries, land and freshwater availability.

Student Ahmed told the group: “It is our responsibility to start something, but others need to carry it on.”
“Saying this is all down to us gives the previous generation a get out jail free card” added student Hakeen.

The group came up with an impressive list of concrete suggestions including a shift in the current system of taxation and subsidies to support a low-impact model of food production and consumption, and further investment in green technology.

**Key recommendations:**

**Establish a beef tax**

The students supported levying taxes on products which have a high environmental impact, proposing that beef could be taxed while more environmentally-friendly foods such as chicken, pork and vegetables were not. They observed that taxing luxury items that have a detrimental effect on the environment could help solve environmental concerns.

“Lobster is expensive, but people survive without it. You can’t tax petrol and expect people to live without it” said student Aggy.

They felt that changes in lifestyle could be promoted by implementing this kind of sliding scale taxation on products such as beef, which they identified as a contributor to methane levels and environmental degradation.

**Be more aware of impacts of lifestyle**

The students felt that the public should be made more aware of the impacts of their consumer choices, to allow them to make better informed decisions. Students also suggested that the public take charge of their own carbon footprint.

**Carbon tax**

The students considered the issue from a global and UK perspective. They suggested that a carbon tax system, which could give countries the ability to trade credits, could be adopted to avoid penalising some of the world’s poorest economies.
Investment in green technology

The students supported greater investment in green technology. They said that the industry had the potential to create new skilled jobs. “Tackling climate change doesn’t have to be seen as a huge negative thing, a job to do,” said one student. “Britain could become the world’s biggest exporter of green technology.”

From the Twittersphere:

@RIUNCONFERENCE: Going vegetarian is not a perfect fix - we’re still running out of land which is why we’re encroaching on rainforest #RiUnconference
@RIUNCONFERENCE: What about a government funded initiative to create devices to put inside cars to convert them to accept renewable energy? #RiUnconference
@RIUNCONFERENCE: #riunconference all countries should have law - only 2 children per couple. Lower population = more resources...
@RIUNCONFERENCE: Climate change down to humans? I thought it was about cows and methane... RiUnconference
@RIUNCONFERENCE: Why not lock up excess carbon in a chemical compound? #RiUnconference
@RIUNCONFERENCE: #riunconference what will the world be like in the next 10 years? Will there be a sudden decrease of population due to the pressure
@RIUNCONFERENCE: forget bailing out Greece, get on some carbon capture research! #RiUnconference
@RIUNCONFERENCE: Why can’t all first world countries sign an agreement to have 50% of the power supply from renewable resources? Joshua #riunconference
@RIUNCONFERENCE: #RiUnconference the government will not really address the problem until it’s an emergency
@RIUNCONFERENCE: to convince people to stop using oil we might need to create a whole new cheaper market. #RiUnconference
@RIUNCONFERENCE: perhaps the production of renewable energy is being limited by the economic benefits to oil companies and governments #RiUnconference
@ RIUNCONFERENCE: Perhaps the economic benefits of oil are limiting research into renewables and alternative sources of electricity? #RiUnconference
Science in the Media

Science publicist Sallie Robins sparked debate about how science is reported in the media. She told the packed auditorium about the tensions she had observed between the media and the UK science community:

“Why do scientists feel so hard done by when it comes to the media in the UK? At the heart of all this angst are the completely different worlds of science and the media. This has been described beautifully by Quentin Cooper, of BBC Radio 4’s Material World:

“Science values detail, precision, the impersonal, the technical, the lasting, facts, numbers and being right. Journalism values brevity, approximation, the personal, the colloquial, the immediate, stories, words and being right now. There are going to be tensions.”

“What do the students at the Unconference think of the way science is presented to them by the media?”

Discussion Highlights

The students recognised that people read newspapers for entertainment and that newspapers were focused on their readers’ interests rather than education. “The role of the newspapers is to inform, not educate” observed one student. “People don’t care about science unless it will save or destroy the world” commented another.

The students even admitted that often they weren’t all inclined to follow sources from news reports - even if those were linked in article.

They favoured an approach that improved the coverage of science and facilitated the understanding and critical thinking of the public. One student told the group that: “Everyone should understand how results should be interpreted.”

Students felt it was important for the public to be able to make informed choices about their health and scientific issues, and needed to have all the information available to them.
They also felt that scientific establishments should make data available directly to the public.

Students debated whether there was any merit in introducing a requirement that half of all employees at media organisations should be scientists. They group rejected this suggestion – but it precipitated some other exciting suggestions.

**Key Recommendations:**

**Break up media conglomerates to diversify science coverage**

The students recommended breaking up conglomerates, in particular those producing various media forms. They felt that this would diversify reporting on issues, allowing more viewpoints to be discussed and preventing several outlets from toeing the company line.

**No increased regulation of the media**

The students rejected a motion for increased regulation, noting concerns about freedom of speech, and issues with who would pay and carry out the vetting.

**Establish checks between funders and scientists**

The students noted that the influence from sponsors could lead to suppression of research and proposed that a firebreak should be created and administered by the government to break a direct link between funders and scientists. They also encouraged the media to identify conflicts of interest in published research.

**Support greater involvement of scientists in the media**

The students rejected a proposal to ensure a specific percentage of newsroom staff were scientists. They suggested that efforts needed to be made to ensure more scientists were in the media spotlight, so they could represent themselves and help address the balance.
From the Twittersphere

@RIUNCONFERENCE Issue of trust not between the public and the journalists but between journalists and the scientists #RiUnconference

@RIUNCONFERENCE: #RiUnconference I think the media do their best.

@RIUNCONFERENCE: media needs to tell the truth! no dumbing down! #RiUnconference

@RIUNCONFERENCE: Ppl need to have all the info and have the ability to make their own decisions not just follow the media blindly #riunconference

@RIUNCONFERENCE: So science and the media like Chinese whispers. Maybe omit middle man better cos of greater Accuracy and non dramatized info. #RiUnconference

@RIUNCONFERENCE: Should there be scientists at every point in the media cycle? Anon #riunconference

@RIUNCONFERENCE: Science in media not good enough. Scientists should represent themselves more to show the public the truth. Anon #riunconference

@RIUNCONFERENCE: Why dont scientists make their conclusions & findings more directly accessible? Cut put the middle man. #RIUnconference

@RIUNCONFERENCE: Coverage often results in funding and increased awareness about these issues #riunconference

@RIUNCONFERENCE: science and the media is like a marriage, you gotta make compromises to make it work! just dont file for divorce ;) #RiUnconference

@RIUNCONFERENCE: General media and science media should be separated as de public wants to be entertained #riunconference
Science and Education

Physics teacher Alom Shaha provoked a controversial debate amongst the young people as he introduced the topic of science and education.

“Science in England is compulsory for students up to the age of sixteen. But it is not necessarily obvious why this should be the case. Indeed, there may be strong arguments to suggest that not all students should be required to study science for so long if they have no intention of becoming scientists.

“Should the curriculum be focused on creating “future scientists”, designed to equip those children who will grow up into scientists with the skills they’ll need? Or should it aim to make everyone “scientifically literate”, so that everyone can participate fully in a democratic society where science plays such an important role in our everyday lives?”

Discussion Highlights

Students praised science teaching in schools, whilst coming up with ideas of how to further improve it: “The current system is quite good, but there is more we can do” commented one student. The group was enthusiastic about the value of science education, with one youngster proposing that: “Science should be compulsory up to Year 11, we cannot get rid of science literacy. You can’t have too much science literacy.”

Students even mooted the idea of harder exams as a way to differentiate the ‘scientists of the future’ from the rest of the pack.

The group agreed that practical lessons were a worthwhile use of class time, but recognised that some pupils responded better to them than others. They recommended against setting targets for practicals (or dissolving them), instead opting for flexibility in teaching methods.
Key recommendations

Make GCSEs harder and split science GCSE

The students recommended that GCSEs be made harder to better distinguish between those achieving the top grade. They supported diversifying the science GCSE into that needed for basic science literacy (what is sometimes called “citizen science”), and a GCSE aimed at preparing those wanting to enter a career in science, differentiating students as early as year 7. They also supported the idea of a single, double and triple award approach to science GCSEs.

Greater efforts should be made to attract focused, passionate teachers

Many of the students felt that teacher training was inadequate, and newly-qualified teachers needed more support. They also recommended plans to encourage students at all levels – sixth form, gap year and university – to take placements in schools teaching younger pupils as a way of showcasing the profession.

Student Osmat told the groups that: “I don’t know many people who want to be teachers. We need to inspire more people to become teachers.”

Achieve higher standards in practical lessons

Overall, students felt that science education should be shifted toward the theoretical side rather than the practical. Students thought practical lessons concentrated too much on carrying out a prescribed task without experiencing any true experimentation. Practicals should be done only if they are relevant and illustrate the scientific method, and teachers should decide how many practicals should be done – especially since some students respond to learning by practicals, while others don’t.
Improve framework for student feedback of teachers

The students felt that they were in the best position to differentiate good and bad teachers, and recommended improving systems that would allow them to feedback on teachers, noting that ad-hoc channels such as RateMyTeacher were poorly moderated.

From the Twittersphere

@RIUNCONFERENCE: Science as a way of thinking is central to analytical thinking and sceptism - skills that should be fostered in everyone #riunconference

@RIUNCONFERENCE: #RiUnconference everyone deserves to be introduced to science and decide for themselves if they want to pursue it. This starts in schools.

@RIUNCONFERENCE: Science education doesn’t have to be about being a scientist. Issues like climate change need to be understood by all. #RiUnconference

@RIUNCONFERENCE: #riunconference Interactive teaching which relates to the world now is the way forward instead of text book regurgitation!!!!

@RIUNCONFERENCE: Everyone should study science it is very essential in life :) #riunconference

@RIUNCONFERENCE: The government should give money to school so that there’s more experiments and so its more interesting #riunconference

@RIUNCONFERENCE: Perhaps as well as the current curriculum have practical science course to prepare people for life? #RiUnconference

@RIUNCONFERENCE: #RiUnconference if people don’t have the opportunity to explore science the future will lack scientists to change the world

@RIUNCONFERENCE: If sci is made compulsory for longer, it must be taught well. The thought of global warming bores me, and shouldn’t! Anon #riunconference

@RIUNCONFERENCE: The people who become scientists are the people who learn outside of school #riunconference

@RIUNCONFERENCE: The practicals are a distraction so the lessons are not boring The practical is successful only if the teacher can teach #riunconference
Science and Careers

Dr Maggie Aderin-Pocock gave the young people a brief glimpse into her own unconventional route into a career in science to kick off a lively and stimulating discussion.

“We need people to stand up and inspire young girls to enter science” commented an inspired student.

Dr Aderin-Pocock told the young people: “I was interested in space from a very young age, partly due to the Clangers, so you never know what will influence your career choice.

“My dyslexia made reading and writing very difficult, which is a big part of early education. So I hated school. Later I discovered science at school and things improved greatly. My first job involved designing missile detection systems for airplanes and now I have my dream job as a space scientist so you don’t always start where you want to be!

“There’s so much more to being a scientist than just science, it can be a truly awesome career. However, we constantly encounter stereotypes – how can we tackle these?”

Discussion Highlights

The students felt more ought to be done to tackle stereotypes of scientists as “male, pale and stale” by highlighting the diversity of careers available. “Professor Brian Cox inspires a lot of children, but we need a female role model” commented one student.

The group also expressed a desire to facilitate interaction between practising scientists and students, and for greater efforts to be made to encourage women to enter science careers.

Overall, they saw the science industry as a major vehicle for growth and job creation, and felt that should be reflected in efforts made to boost science training. “We need workshops in schools showing there’s more to science than medicine.”
Key recommendations

Provide more workshops and careers talks from interesting scientists

In order to combat the stereotype of scientists being “male, pale and stale”, students felt that greater efforts should be made to invite scientists with diverse and exciting careers into schools.

Showcase science careers beyond medicine

The students felt that there was a need to demonstrate that studying science could lead into more careers than just medicine, noting that new fields of science were always opening up, providing new career paths.

“If there were more scientists in the first place, there’d be more innovation, more invention, and more jobs” said Ben and student Matthew added that “When polymers were discovered, whole new industries opened up.”

Facilitate more work experience placements in labs

Many students were interested to know what working as a scientist would be like, but highlighted the difficulty in finding out. They recommended that more labs should offer work experience placements for 16-18 year olds.

Greater investment in the science industry

The students thought that more pupils, rather than less, should be encouraged to enter STEM careers, rationalising that a strong scientific workforce leads to greater job creation. “It wasn’t just those building computers that benefit from the field of science it they created,” noted one student.
From the Twittersphere

@RIUNCONFERENCE: #riunconference making someone do science, will not be the way to motivate them into a scientific career

@RIUNCONFERENCE: #riunconference I think the problem lies in the fact that career opportunities in science are not as accessible or well known as eg law

@RIUNCONFERENCE: How do you actually define a scientist? #riunconference

@RIUNCONFERENCE: Young children don't understand about different careers. We should try and make science more fun and interactive for them. #riunconference

@RIUNCONFERENCE: Young ppl shud be gradually introduced in to teaching eg. Sport coaching. So that the career appeals to dem in de future #riunconference

@RIUNCONFERENCE: RT @alomshaha Why is the image of science "male, stale and pale"? #RiUnconference <--- good question

@RIUNCONFERENCE: More scientists should go into schools to directly show young people what career options are open to them #riunconference

@RIUNCONFERENCE: Young children don't understand about different careers. We should try and make science more fun and interactive for them. #RiUnconference

@RIUNCONFERENCE: Students very concerned about how having children is a barrier for women's career progression #RiUnconference

@RIUNCONFERENCE: We need more female role models in science to inspire more women to go into science, like a female Brian Cox #riunconference
Conclusion

The Ri Unconference was hugely successful. It clearly demonstrated that students in Britain are aware and engaged with the major scientific issues currently facing the country.

Despite their age – some delegates were as young as 14 – they were able to not only formulate coherent initiatives for problems in science education and careers, science industry and the environment, but to weigh the pragmatism of such strategies.

The problems discussed were not only problems facing adults: increasingly they are being left to the next generation to grapple with. The evidence from the day suggests these young people possess the aptitude, insight and energy to meet these challenges head on, and the policy makers should take note!

Geoffrey Carr, Science Editor of The Economist, was hugely impressed. He said: “These students probably can and should influence science education.

“Some of the stuff they were saying about how they themselves are being taught science is highly astute.

“On the question of practicals in schools, that seems to be something that you have an intimate knowledge of if you are a schoolboy or a schoolgirl, and ministers should be taking notice of that.”

David Porter, manager of the L’Oréal Young Scientist Centre at the Royal Institution, said: “The main point of the Ri Unconference for me was to show that young people could come up with innovative and creative solutions to the key issues that surround science in today’s world.

“Young people are as concerned as the rest of us about the environment, their own education and career path and the way stories are represented in the media. Too often however they are not given the chance to debate openly without constraints and have their views listened to.”
Contact

To respond to the findings in this report, or for more information, please contact:

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Appendix 1: Introductory speakers

Dr Hugh Montgomery

Dr Hugh Montgomery is currently the director of the UCL Institute for Human Health and Performance at University College London as well as being a Professor of Intensive Care Medicine at UCL. He is a consultant in critical care at the Whittington Hospital and was the first to discover any gene for fitness, ACE. Outside of medicine, he has been awarded the title of London Leader by the London Sustainable Development Commission for his work in climate change and health under the auspices of Project Genie; he was also a founding member of the UK Climate and Health Council. Hugh presented the 2007 Ri Christmas Lecture series ‘Back from the brink: the science of survival’.

Sallie Robins, Science Publicist

Sallie Robins is an esteemed freelance science publicist with a particular interest in Science, fitness and muscles. She studied an MSc in Science Communication and joined the public relations team at the British Association for Science (now the British Science Association) running the press office at the annual Festival of Science. She then worked as a publicist to many popular science authors including Richard Dawkins and Martin Rees, but more now works with a variety of organisations including the Royal Society, the Science Museum, the Cheltenham Science Festival and the Big Bang. She is a member of Association of British Science Writers (ABSW) and helped organise the international 2011 World Conference of Science Writers.

Alom Shaha

Alom Shaha is a Physics teacher at a comprehensive school in London and he also works as a science writer and science communication consultant. He specialises in making science and other difficult ideas easy to understand for mass audiences. In particular, Alom has written and produced a number of TV programmes about science, ranging in subject matter from particle physics to mathematics. His creative approach to science communication has been recognized with a fellowship from the National Endowment for Science Technology and the Arts (NESTA) and he has recently been awarded a fellowship by the Nuffield Foundation to help develop resources to enable science teachers to get more out of practical work in lessons.

Dr Maggie Aderin-Pocock, Space Scientist, University College London

Dr Maggie Aderin-Pocock MBE studied at Imperial College London, where she obtained her degree in Physics and her PhD in Mechanical Engineering. Since then she has spent her career to date making novel, bespoke instrumentation in both the industrial and academic environments. Maggie has worked as a space scientist for the last 10 years. She has managed large projects making instruments that monitor the variables of climate change. Maggie has a fellowship at UCL, enabling her do more of the science communication work that she loves. She also does some of this work through her own small company, Science Innovation Ltd.
Appendix 2: Expert panel

- Geoffrey Carr, Science Editor of the Economist
- Dr Gail Cardew, Director of Science and Education at the Royal Institution
- Sian Griffiths, Education Editor at the Sunday Times
- Dr Tom Wells, Policy Advisor for the Science and Society Team at the Department for Business, Innovation & Skills
- Dr Chandrika Nath, Senior Scientific Advisor at the Parliamentary Office of Science and Technology
- Liz Else, Associate Editor, The New Scientist
Appendix 3: The L’Oréal Young Scientist Centre at the Royal Institution

The L’Oréal Young Scientist Centre at the Royal Institution is a modern laboratory where young people aged 7 – 18 years old can explore all aspects of science and technology outside the classroom - from cosmetic and colour chemistry, to using a crash test rig and analyzing DNA. The programmes offer teachers and students the chance to ask scientific questions and to design their own creative ways to answer them, whilst the experience ignites a passion for scientific discovery and encourages curiosity-driven learning.

The Royal Institution (Ri), founded in 1799 was the first organisation established specifically to communicate science. The L’Oréal Young Scientist Centre (LYSC) is the latest initiative of the Ri’s long standing programme for young people, following in the footsteps of the famous Ri Christmas Lectures (started by Faraday in 1825), science lectures for schools and the Mathematics Masterclasses (started by Prof Christopher Zeeman in 1981).

Since its launch in late 2009, over 10,000 children and teachers have visited the Centre.

L’Oréal

L’Oréal was founded by a chemist – Eugène Schueller over 100 years ago and science has been at the heart of the company since then. L’Oréal employs 3,420 scientists worldwide, invests €665m in research & development and patents over 600 new discoveries each year. It is passionate about inspiring young people in the world of science and its collaboration with the Ri and The L’Oréal Young Scientist Centre reflects this. Julie McManus, Scientific Director of L’Oréal UK commented: “We are extremely proud that the L’Oréal Young Scientist Centre has made such an impact on encouraging children into science since it opened. As scientists we have a responsibility to ensure this enthusiasm is encouraged through fun and engaging learning.”
Appendix 4: About the author

Frank Swain is a freelance science writer who has written for the Times, Telegraph, Guardian, Wired, New Scientist, and BBC. He also works in broadcast and has developed programs for BBC Radio 4 and Bravo as well as appearing on TV and radio to discuss science issues. He currently works at the Royal Statistical Society as National Coordinator for Science Training for Journalists.