

# insidescience

Summer 2011

## Science Live

Recreating bat habitats at the Society's  
2011 Summer Science Exhibition

## Arabick Roots

New exhibition unravels the Society's old  
connections to Arabic science



EXCELLENCE  
IN SCIENCE



THE ROYAL SOCIETY

## Message from the Executive Director

**For many years, the Royal Society has provided a hands-on experience of cutting edge science at our annual Summer Science Exhibition. This year is no exception, with a diverse range of exhibits representing the full spectrum of the sciences, here at Carlton House Terrace in July. This issue brings news of some of the exciting things you can expect from this year's exhibition and its surrounding programme.**

In March, the Royal Society Science Policy Centre launched *Knowledge, Networks and Nations: Global scientific collaboration in the 21st century* produced in partnership with Elsevier. The report is the result of a far-reaching study into the changing international scientific landscape and offers new insights into how this has evolved over recent years.

Other current policy reports from the Society tackle emerging issues in science education. In this issue of *Inside Science*, we find out why the Society has recently called for reform of the A-level system in order to facilitate progress to higher education within the core sciences. We also look at the compelling reasons for utilising research in the area of neuroscience when formulating education policy, as highlighted in the report *Neuroscience: implications for education and lifelong learning*.

The Society supports around 1300 outstanding scientists, engineers and technologists in the UK through various grants and award schemes. In this issue, several Royal Society Research Fellows tell us about their research and the ways in which they have been able to contribute to the Society's wider programme of activities. Amongst these, Dr Racheal Pearson describes her research in retinal degenerative diseases and Dr Rim Turkmani discusses her experience of curating the exhibition *Arabick Roots*, taking place at the Society this summer.

During these first months, it has been a pleasure learning about the wide range of activities taking place at the Society, several of which are mentioned in this issue. I would like to thank the Fellowship, staff and the wider scientific community for the welcome I have received and look forward to working with you all in the future.



Dr Julie Maxton, Executive Director

## Publishing News

Royal Society Publishing launched a new journal, *Open Biology*, in April 2011. This is an exciting venture for the Society as *Open Biology* is an open access journal covering research in cellular and molecular aspects of biology. The journal will be overseen by a team of academic subject editors with support by an international editorial board. Open access will be funded by article-processing charges that will cover the expenses associated with peer review, composition, hosting, and archiving.

# open Biology

A call for papers will be issued in July 2011 and we urge researchers to support the journal by submitting research papers. Additional information is available from [rsob.royalsocietypublishing.org](http://rsob.royalsocietypublishing.org). For enquiries please contact [phil.hurst@royalsociety.org](mailto:phil.hurst@royalsociety.org).

## Fundraising News

Since its earliest days, legacy gifts from Fellows and friends have built the Society's endowment, enabling us to maintain independence and the flexibility to respond to emerging scientific priorities. During the 350th Anniversary Campaign, a significant percentage of the total raised came from legacy bequests and we remain most grateful for this support.

The Society welcomes the recent budget initiative, reforming inheritance tax laws, intended to encourage everyone to leave a charitable legacy when they die. In a move to make leaving 10% or more of your estate to charity the norm, the Government will reduce the inheritance tax levied on the estates of those who do, from 40% to 36% from April 2012.

For more information about how to remember the Society in your will, or to advise us of your intention to do so, please contact Jenny Boyd on 020 7451 2215 or email [jenny.boyd@royalsociety.org](mailto:jenny.boyd@royalsociety.org).

# From neural pathways to policy

## Royal Society study calls for neuroscience to have a greater role in education policy

In a recent study exploring neuroscience and its implications for education and lifelong learning, the Society set out a challenge to education policy makers to give greater consideration to the rapidly progressing field of neuroscience.

The report *Neuroscience: implications for education and lifelong learning*, argues that neuroscience enables us to understand the key brain processes which influence educational outcomes, potentially providing a scientific basis for evaluating different teaching approaches.

Professor Sarah-Jayne Blakemore, Royal Society University Research Fellow and Professor of Cognitive Neuroscience, University College London, a member of the study's working group, summarised why this report is so relevant to education practitioners:

"Education, by definition, changes the brain. Whenever you learn something new or are taught something, your brain changes. So in order to optimise education, we really need to pay attention to the wealth of knowledge that has been acquired through neuroscience about how the brain learns and how best to teach it."

Launched in February 2011, this report has since been discussed with policy officials at the Departments for

Education and Business, Innovation and Skills, as well as the Research Councils and Technology Strategy Board. Public discussions were also held at the Cambridge Science Festival, the British Neuroscience Association Biennial Meeting, and also planned for later this year at the British Science Festival.

This report was part of the Society's *Brain Waves* project investigating the latest developments in neuroscience in the context of their implications for both society and public policy. The first module, launched earlier this year, is a compilation of essays reviewing the current state of neuroscience and neurotechnology.

The project's next two modules examine the exciting areas of neuroscience, conflict and security and neuroscience, responsibility and the law. To learn more and keep up to date with this project visit: [royalsociety.org/brainwaves](http://royalsociety.org/brainwaves)



***Brain Waves Module 2: Neuroscience: implications for education and lifelong learning*** was produced by a Working Group including neuroscientists, cognitive psychologists and education specialists, chaired by Professor Uta Frith FBA FRS, Emeritus Professor, Institute of Cognitive Neuroscience, University College London. The report makes four key recommendations:

- Neuroscience evidence should inform the assessment of different education policy options and their impacts where available and relevant. Neuroscience evidence should also be considered in diverse policy areas such as health and employment.

- Training and continued professional development of all teachers should include aspects of neuroscience which are relevant to educators, in particular, but not restricted to, Special Educational Needs.
- Neuroscience can make valuable contributions to the development of adaptive technologies for learning.
- A knowledge exchange network is required to bridge disciplines to help structure dialogue between the teaching profession and neuroscientists. This should include a professionally monitored web forum to permit regular exchanges and feedback.

To read the full report visit:  
[royalsociety.org/brainwaves-education](http://royalsociety.org/brainwaves-education)

**University Research Fellow, Dr Rachael Pearson, explains how the Royal Society contributed to her research in retinal degenerative diseases**

# Eyes on the future



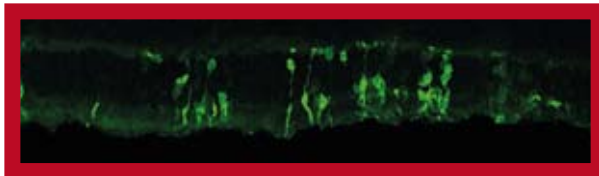
*Dr Rachael Pearson, Royal Society University Research Fellow at the Institute of Ophthalmology, University College London*

Retinal degeneration is a major cause of blindness affecting millions of people. The term encompasses a wide range of conditions that lead to the loss of light receptive cells, called photoreceptors, in the retina. Unfortunately, there are no known cures. The majority of treatments can at best slow the rate of loss and are only effective in a minority of patients.

Royal Society University Research Fellow (URF), Rachael Pearson, from the Institute of Ophthalmology, University College London (UCL), describes how cell replacement therapy could be used in the future treatment of retinal degeneration:

“Cell replacement therapy offers a strategy for replacing the cells that are lost in the degenerative process. The aim is to be able to transplant cells into a patient’s eye and that these cells would migrate into the recipient retina and form new functional and healthy photoreceptors.”

*A model of retinal dysfunction showing cells (green) as they migrate to the outer nuclear layer of the retina following transplantation*



Along with her colleagues at UCL, Rachael has been able to demonstrate, through research in mice, that photoreceptor replacement is a technically feasible option for retinal repair. This has been achieved by identifying the types of cells that possess the capability to both migrate into, and integrate within, a foreign retina. Their research was published in *Nature* and received widespread media coverage. The challenge now is to see whether the same principles may apply in humans:

“Whilst there has been much progress made in recent years, there is much more we need to know before this type of research moves into the clinic. We need to know how much visual function might be restored via this strategy, how long the cells will survive and whether disease type affects the success of the transplantation.

Our findings demonstrated that the developmental stage of the donor cell is critical to the success of transplantation. They must be post-mitotic photoreceptor precursors, rather than stem cells. However, to take these cells from the equivalent stage of human development would neither be ethical nor practically feasible so we need to find alternatives. Stem cells are a likely option but we need to be able to direct their differentiation in the petri dish, to turn them into photoreceptor precursors *in vitro*, before transplanting them.”

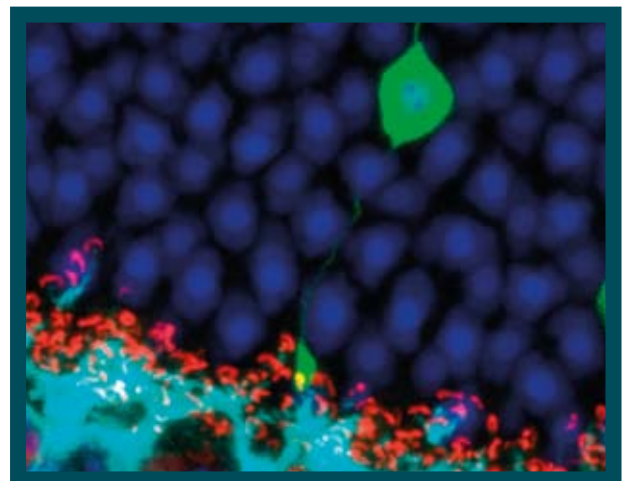
Rachael has been inspired by several others in her field:

“There are many to respect and admire, Professor Connie Cepko and Professor William Harris FRS have done some truly beautiful work to further our understanding of how the eye forms. It is only by understanding these fundamental basic mechanisms that we can hope to develop stem cell biology into something translational.”

The Society’s University Research Fellowships scheme aims to provide outstanding scientists, who have the potential to become leaders in their chosen field, with the opportunity to build an independent research career. It has had a significant impact on Rachael’s career:

“It means a great deal to have this incredibly prestigious award. It has enabled me to make the first steps towards independence while receiving the continued mentorship and support that is so important. I have been fortunate in securing a number of significant grants and I am sure that being a Royal Society URF played a major part in that. The award has also provided me with the flexibility and security to balance work with family life, something that can be an incredibly difficult decision for women in science.”

For more information about Royal Society funding schemes visit: [royalsociety.org/funding](http://royalsociety.org/funding)



*Image of a recipient retina as a transplanted photoreceptor (green) makes a synaptic connection (red) with a bipolar cell (cyan)*

# Profile of an Editor

## Professor Dave Garner FRS

Professor Dave Garner FRS became editor of the Royal Society journal *Philosophical Transactions A* in January. Here, he discusses both his own research as a chemist and his plans for the journal's future.

*Philosophical Transactions A* publishes twice a month, each issue is devoted to a specific area of the mathematical, physical and engineering sciences, which defines a research frontier that is advancing rapidly, often bridging traditional disciplines.

### What is your area of research?

I'm interested in the role of inorganic elements in biological systems, especially metals like molybdenum, nickel, copper and iron, also known as d-transition metals, which can be found at the centre of enzymes.

These are traditionally considered as trace elements as they are generally present at low, or very low, levels in organisms. We can now employ the techniques of biology, chemistry and physics to move beyond the detection of these elements, towards a greater understanding of their chemical roles in biological systems.

### What attracted you to the role as Editor of *Philosophical Transactions A*?

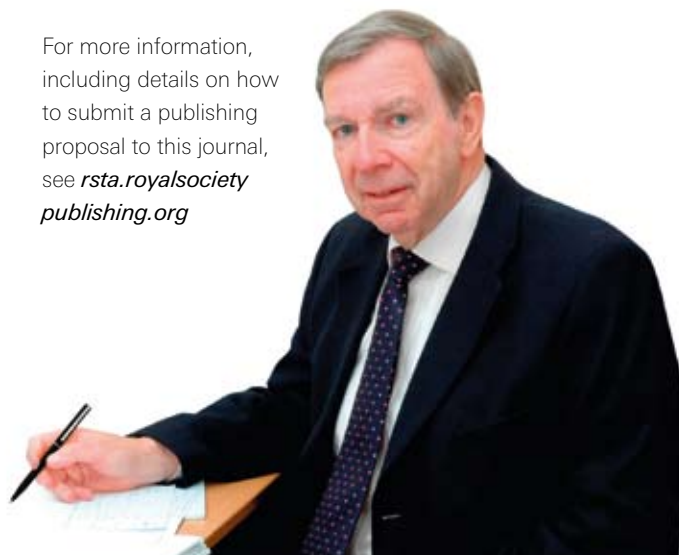
It is a great honour to be the Editor of the longest continuously published scientific journal. Looking back on the history of the journal, the giants that have published in *Philosophical Transactions A* have set the scene for generations of scientists to follow. My aim is to maintain the quality and standard of

this journal so that people will continue to be impressed by its content in years to come.

### What plans do you have for the future of the journal?

One of the challenges is to ensure that the full spectrum of the physical sciences is covered. Some areas of strength, such as physics, are well represented whereas contributions from others like chemistry and astronomy are encouraged. Part of my role will be to identify the areas where we would like to see more contributions and stimulate members of the community, including Fellows, to regard this as a journal that they wish to publish in. Above all, my aim is to maintain the journal's high quality.

For more information, including details on how to submit a publishing proposal to this journal, see [rsta.royalsocietypublishing.org](http://rsta.royalsocietypublishing.org)



# Enterprise Fund makes a new investment

In February, the Royal Society Enterprise Fund announced that it would be participating in a £2.75m investment round for OrganOx Ltd which is developing a medical device that will help to significantly increase the number of human livers available for transplant.

OrganOx's device operates by maintaining the organ in a fully functioning state during transport and storage, by providing blood flow, oxygen, nutrients and temperature within physiological parameters required by the liver. This both enables the liver to be stored safely for a longer period and provides the surgeon with real-time, cumulative data to assist with making a decision whether

to transplant. Sir Peter Williams FRS, Treasurer of the Royal Society, said:

"With almost 2000 livers being retrieved and then discarded each year and a waiting list of 30,000 in Europe and the US, there's an obvious need for the technology that OrganOx is working on. The Royal Society Enterprise Fund is very pleased to join OrganOx's investors and we look forward to the results of their clinical studies later this year. This is exactly the sort of company that the fund was set up to support."

You can find out more about the Enterprise Fund at [royalsociety.org/enterprisefund](http://royalsociety.org/enterprisefund)

## Royal Society calls for reform of the UK's A-level system

# Increasing the size of the pool



Royal Society University Research Fellow, Dr Cristina Lazzeroni

A recent education policy report calls for A-level reform in order to allow more students to progress to higher education within the core sciences (biological sciences, chemistry and physics) and mathematics. This would help encourage more people into science, technology, engineering and mathematics (STEM) professions, including school and college teaching, and ensure that the UK remains a world leader in science.

This recommendation came from the final report in our *state of the nation* project, entitled *Preparing for the transfer from school and college science and mathematics education to UK STEM higher education*, which assessed participation in science and mathematics in post-16 examinations, namely A-levels and Scottish Highers.

The report's main finding is the worryingly low level of participation in science and mathematics by 16-19 year olds in all parts of the UK except Scotland. This means that the pool of students able to proceed to study STEM

subjects at degree level is too small to fulfil the needs of UK employers. In England, Wales and Northern Ireland, only 28%, 27%, and 37% respectively, of all A-level students achieved at least one mainstream science qualification in 2009, compared with 50% of students in Scotland. A broader Baccalaureate-type approach to post-16 education is currently being taken forward in Wales and Scotland, and the Society suggests that an A-level based Baccalaureate or similar system is also needed in England.

Other key recommendations from this project include the need for increasing the number of specialist science and mathematics teachers, and improving careers advice for students.

Dr Cristina Lazzeroni, Royal Society University Research Fellow from the University of Birmingham and member of the project's working group, explains her involvement:

"Some time ago I signed up to participate in policy work at the Royal Society – I almost always say yes to Royal Society activities.

To be involved in a project looking at school

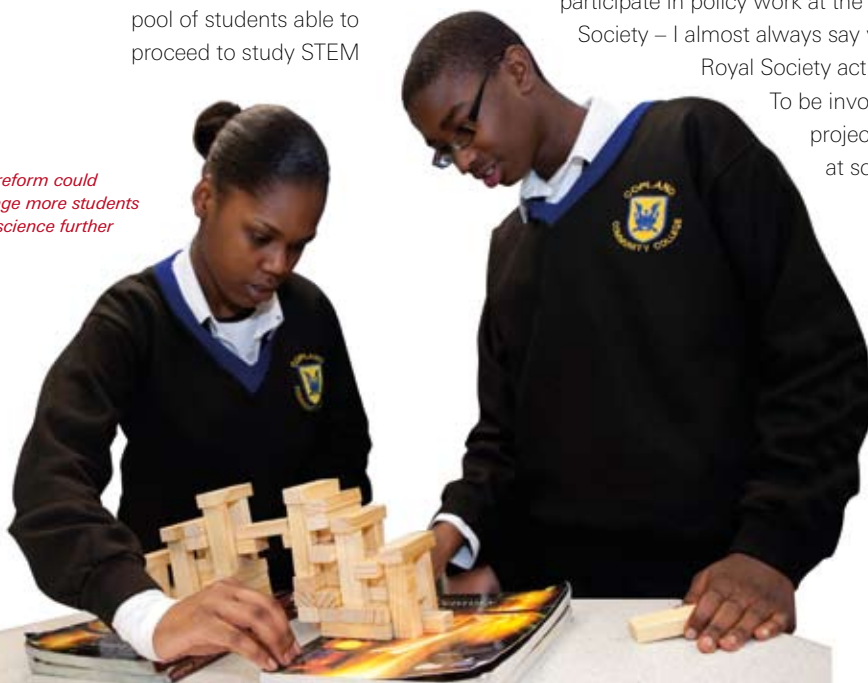
leavers and entry to higher education attracted me, as it helped me to improve my understanding of the British school system (I was educated in Italy). In terms of higher education, I was keen to collect information about graduate recruitment and put this all into a bigger picture. It was also extremely interesting for me to compare the UK school system to the Italian system, and see how post-16 education differs.

As part of the project, I participated in meetings of the working group, discussing data and interpretation. I also contributed to a chapter looking at UK higher education admissions processes and entry requirements. Seeing how policy recommendations are formed, and how writing for policy reports is different to writing academic papers, was a great learning opportunity. For my role at the university, it was also useful to have broadened my knowledge of A-level statistics and the different admissions processes at different institutions.

I think it is really important for researchers to learn about the policy issues surrounding education, because it is so interconnected with research and funding in the UK. Getting involved in education policy projects at the Royal Society doesn't take up a huge amount of time, and is a great way to achieve this."

To read the report visit: [royalsociety.org/state-nation-increasing-size-pool](http://royalsociety.org/state-nation-increasing-size-pool)

A-level reform could encourage more students to take science further



# Reaching out to Local Heroes

## New grants help organisations to celebrate local science

In November 2010, the Society awarded 14 grants to organisations such as libraries, observatories, galleries and museums organisations to develop and extend their work with school audiences, whilst celebrating a scientific 'Local Hero'. Priority was given to smaller organisations that often do amazing work with few funds.

The grants enabled some exciting science and maths projects to take place: Braintree Museum developed some John Ray Discovery Boxes, Lewes Castle ran a series of Mantell Maths workshops and the Prickwillow Engine Museum brought hands-on science challenges to isolated Fenland schools.

Some of the Local Hero organisations often do not have the opportunity to include science and maths activities in their programming, but the support offered by the Royal Society has helped develop skills and promote further activities.

Anna Sims who developed the Electrifying Workshops with expert Tony Hall for Gallery Oldham explains:

"We ran a series of workshops for 9-13 year olds which was based around the themes of generating and transmitting electricity using our local hero, the electrical engineer Sebastian Ziani de Ferranti. The highlight for the children was building 'brush-bots' – simple battery powered nail brush



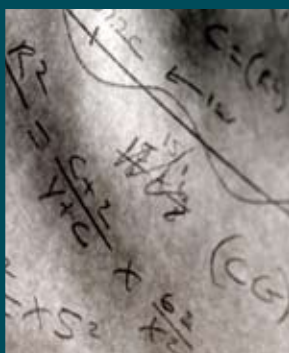
*Children explore the generation and transmission electricity in celebration of Local Hero Sebastian Ziani de Ferranti, an electrical engineer*

robots that moved across the ground drawing a track as they went.

As I am not from a science background, I was not confident leading schools sessions around this topic. This grant enabled me to work with the expert Tony Hall which I found valuable and produced an engaging workshop experience. We hope to work with him again in the future developing the brush-bots activity and utilising our giant foyer area for a 'Big Draw' event in the autumn."

## Meeting our mathematical needs

### ACME report highlights the importance of mathematics literacy



For the last two years, the Advisory Committee on Mathematics Education (ACME) has been working on a project looking at the mathematical needs of the nation. The first part of the project looks at the mathematical needs of higher education and employment and was supported by the Nuffield Foundation and the Clothworkers' Foundation. The second part of the project outlines the mathematical needs of the learners themselves, for example what learners need in order to be successful

and proficient in mathematics, to learn mathematics well, and to engage in mathematics lessons.

Some of the key messages from the reports are that we need more people to do more mathematics and to be confident, robust and fluent in their use of it, as both

higher education courses and jobs are becoming more mathematical. This implies not only understanding the content, but also being able to apply mathematics in a range of different situations, including unfamiliar ones.

ACME will be launching its report in June and the report will include recommendations to address those key messages, including recommendations to government which should input into its National Curriculum review.

ACME is an independent committee, based at the Royal Society and operating under its auspices, that aims to influence Government strategy and policies with a view to improving the outcomes of mathematics teaching and learning in England and so secure a mathematically-enabled population.

Find out more at [acme-uk.org](http://acme-uk.org)



*Evidence gathering in Ghana for the new report 'People and the Planet'*

# People and the Planet

## Gathering evidence for a new study on global population

The Society is undertaking a major policy study into the role of global population in sustainable development, entitled *People and the Planet*. As part of the evidence-gathering activities to inform the study, the Working Group chair, Sir John Sulston FRS, travelled to Ghana on a fact-finding trip with Working Group member Dr Eliya Zulu (Executive Director, African Institute for Development Policy and President, Union for African Population Studies) and Ian Thornton and Marie Rumsby from the Society's Science Policy Centre.

The project team met with several different ministries to discuss how population is viewed in terms of sustainable development within Ghana, and went to Elmina Harbour to see firsthand how overfishing in this area is having an effect.

As part of this trip, and under the *Royal Society Pfizer African Academies Programme*, a one and a half day workshop on the links between people and the environment was held in partnership with the Ghana Academy of Arts and Sciences. The workshop was chaired by world-renowned maternal health specialist, Professor Fred Sai FGA (Fellow of the Ghana Academy), and provided an opportunity to hear about the great deal of research being conducted in Ghana on relevant topics, such as land use, resource scarcity and the role of national and international policymakers.

When opening the workshop, Professor Sai commented:

"Both rich and poor countries cannot continue as they are if we are serious about sustainable development. It will be the poor countries that suffer the most from global environmental challenges. We should try to seek the facts and not be guided by politics."

For more information on the *People and the Planet* study, see [royalsociety.org/people-and-the-planet](http://royalsociety.org/people-and-the-planet)

For more information on the Pfizer African Academies Programme, see [royalsociety.org/Pfizer-African-Academies-Programme](http://royalsociety.org/Pfizer-African-Academies-Programme)

*Workshops in Ghana brought together a delegation from the Royal Society and representatives from the Ghana Academy of Arts and Sciences*



## Planet under pressure

The Royal Society has successfully fronted a bid, as one of the host organisations, for a major international conference, *Planet Under Pressure: New Knowledge towards Solutions* which will take place at ExCel in London, 26-29 March 2012. This meeting will bring together participants representing the science, policy, business and development communities to discuss the current state of the planet and solutions to move

societies on to a sustainable pathway and it is hoped that the Society's current study *People and the Planet* will make a valuable contribution. The outcomes will provide scientific leadership towards the 2012 UN Conference on Sustainable Development, Rio+20. For further information and to submit abstracts, visit: [www.planetunderpressure2012.net](http://www.planetunderpressure2012.net).

# New knowledge networks

## Royal Society report reveals the changing international landscape of science

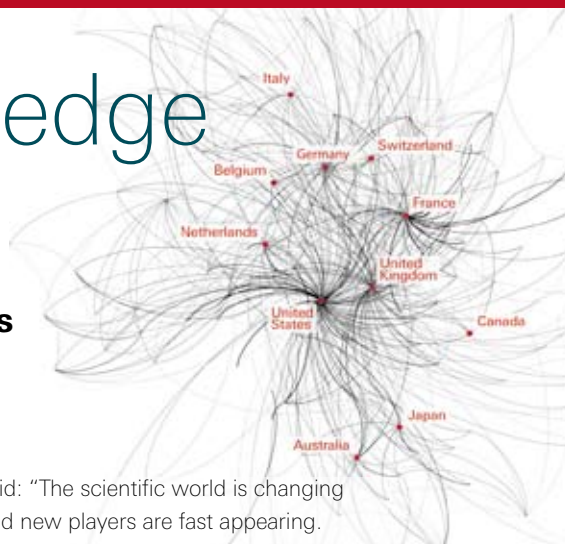
In March 2011, the Society launched *Knowledge, Networks and Nations: Global scientific collaboration in the 21st century*, a report that offers a snapshot of where science is happening around the world in 2011, who is conducting it and the crucial role that international collaboration plays in strengthening the breadth and quality of research.

The report, produced with support from Elsevier, makes high-level recommendations about how to better navigate the increasingly global scientific landscape. It reveals how a new group of countries, led by China and followed by others including Brazil and India, are emerging as major scientific powers to rival the traditional scientific superpowers of the US, Western Europe and Japan.

Professor Sir Chris Llewellyn Smith FRS, Chair of the Advisory Group for the study,

said: "The scientific world is changing and new players are fast appearing. Beyond the emergence of China, we see the rise of South-East Asian, Middle Eastern, North African and other nations. The increase in scientific research and collaboration, which can help us to find solutions to the global challenges we now face, is very welcome. However, no historically dominant nation can afford to rest on its laurels if it wants to retain the competitive economic advantage that being a scientific leader brings."

At the report's launch conference Lidia Brito, the Director of Science Policy at the United Nations Educational, Scientific and Cultural Organization (UNESCO), joined other speakers in addressing a high-level audience on some of the key issues emerging from the report. To read the full report, visit: [royalsociety.org/knowledge-networks-nations](http://royalsociety.org/knowledge-networks-nations)



Diagrammatic representation of global scientific collaboration from 2004 – 2008

## A design for life

The rapidly evolving field of synthetic biology and its social and economic potential, provided the focus for a joint symposium hosted by the Royal Society and Royal Academy of Engineering in April 2011. The meeting was the first in a series of three symposia, produced through a partnership between the science and engineering academies from the UK, China and the US.

Researchers, policymakers and companies interested in the field of synthetic biology gathered to take part in discussions on a wide range of issues. Topics included the recent developments in research, the development of biotechnological applications and

international governance amongst others and the keynote speech was by Professor George Poste OBE FRS. Professor Peter Leadley FRS led the meeting on behalf of the Society. He spoke about his work at the University of Cambridge that led to the foundation of Biotica, a company that develops natural product-based drugs through biosynthetic engineering. Find out more about the event at the Science Policy Centre blog: [blogs.royalsociety.org/in-verba](http://blogs.royalsociety.org/in-verba)

[blogs.royalsociety.org/in-verba](http://blogs.royalsociety.org/in-verba)



# Science witness

## Looking at the impact of neuroscience on developments in law

Lawyers, judges and neuroscientists gathered together for the second Royal Society – United States National Academy of Sciences Sackler Forum to discuss neuroscience and the law. The meeting, which took place in March 2011, raised issues such as how 'brain reading' technologies might, in the future, provide a better understanding of legally relevant areas such as deception, pain and memory. For instance, could neuroscience ever help to detect whether a defendant is lying, whether a claimant really is in the pain that they claim to be, or whether a witness' memory is real or false? There was also lively discussion on what findings from neuroscience might mean for criminal responsibility, particularly in relation to psychopathy and the developing brain.

Opinion varied over how relevant neuroscience may prove to be for the law, and indeed the true potential of most of the developments discussed will not become apparent in the short term. A clear message from the Forum was that communication between the neuroscience and legal communities will be essential as work continues in this area.

The Forum, made possible thanks to a generous gift from the Sackler family, provides an opportunity for the two academies to discuss a topic of mutual interest. This year's event took place at the National Academy's Beckman Center in Irvine, California. The Society's Science Policy Centre will follow up on several of the issues raised in the fourth module of the *Brain Waves* study, which is examining the social and ethical implications of advances in neuroscience.

# Science Live

**Interact with the science that is shaping our world at this year's Summer Science Exhibition**

The Royal Society's 2011 Summer Science Exhibition hosts over 20 fascinating exhibits, covering a diverse range of sciences. *Rotting fish and fossils, Guns, knives and bombs* and *Interactive bionic vision* are just a sample of intriguing titles that can be found in the list of exhibits, taking place from 5–10 July 2011.

One of these exhibits *Bats and bugs: balancing conservation and public health* demonstrates the importance of research into the ways that bats and humans interact. Co-exhibitor Professor Andrew Cunningham, Zoological Society of London, describes what visitors can expect:

"We often conceive of bats as creatures that live in old barns or churches and that only come out at night to eat insects. However, millions of people around the world live in very close proximity to massive roosts of thousands of large fruit-eating bats. Our exhibit aims to show how important fruit bats are to people, including as a source of food, but these bats can also be a source of viruses that can cause fatal diseases in people. Our exhibit will demonstrate the importance of the conservation of fruit bats while also mitigating the public health risks."

To achieve this, visitors will get firsthand experience of bat habitats as well as getting to try the latest tracking technology:

"Fruit bats can live in a wide variety of habitat types, from remote tropical islands and rain forests to the centre of large cities. In fact, some species, such as the African straw-coloured fruit bat (a focal species of our exhibit) seem to preferentially roost and feed in association with humans. We will recreate an African straw-coloured fruit bat roost as part of



*Using technology for tracking bats to help us understand how diseases spread through human and animal populations*

our exhibit while also demonstrating some of the different ways that people interact with fruit bats.

As part of our mocked-up bat roost, visitors will be able to experiment with live radio-telemetry. This is a technique whereby bats, that have been caught and released with a radiocollar, can then be re-detected and located, thus enabling scientists to track the movements of the bats. This is done using a directional antenna to pick up the radio signal from the bat. By comparing signal strengths at various points and orientations of the antenna, the tagged bat can be located. Visitors will have the opportunity to try this out for themselves and to see how many tagged bats (in the mock-up colony and elsewhere in the building) they can locate. The African bat we primarily work with is migratory, leaving our study site for up to six months at a time, so it is particularly important for us to know if the same bats return to the same roosts and, if so, when this happens."

The techniques employed demonstrate the cross-disciplinary nature of this research which has brought together veterinarians, medics, ecologists, virologists and social scientists, amongst others, in a field that has significant implications for public health.

Dr Olivier Restif is a Royal Society funded scientist who works at the University of Cambridge, investigating how diseases spread through human and animal populations. He explains: "Over the past few decades, there has been a growing number of newly recognised infectious diseases originating from wildlife and affecting people, often with fatal consequences. Some of these diseases have the potential to cause epidemic or pandemic outbreaks, so there is a lot of concern to identify such diseases as they emerge and to understand how this happens so that preventative actions can be taken. Our project will demonstrate how we can use a combination of established and cutting edge technologies, such as next-generation sequencing, to identify which pathogens in wildlife might become the next HIV or pandemic influenza and how this might occur and, hence, be prevented."

*Learn about the important relationship between bats and people at the 2011 Summer Science Exhibition*

Olivier and Andrew join over 200 scientists involved in this year's exhibition, which offers a unique opportunity for visitors to question and investigate exciting areas in science that are changing our understanding of the world. This year's exhibition programme will have even greater reach, with an extended programme of events taking place at the Society including lectures, talks, family workshops and cafés scientifiques.

You can find out more about the exhibition, watch interviews with the scientists taking part and read about their research on the exhibition website: [royalsociety.org/sciencelive](http://royalsociety.org/sciencelive)



A map of constellations as found in the book 'Jihannuma'

## Surrounding events

The extended programme of events includes two panel discussions, taking place in the Dining Room at 6.30 pm:

### Neuroscience of Emotion – Tuesday 5 July

Experts will discuss questions such as: Does emotion serve a particular function? How important is emotion in artistic expression? Professor Ray Dolan FRS will chair a panel of experts from the literary world and visual arts including novelist and screenwriter Ian McEwan.

### Is Biodiversity going the way of the Dodo? – Friday 8 July

Climate change is predicted to become a major threat to biodiversity in the 21st century, a panel will discuss whether it could be a trigger for mass extinction.



Discussions are free to attend but pre-registration online is essential, they will also be available to view on [royalsociety.tv](http://royalsociety.tv) after the event.

# Arabick Roots

## New exhibition unravels old connections

*Arabick Roots* (the 17th century spelling of the word) is the astonishing, never before told, tale of the early history of the Royal Society and its close connections to Arabic science. Fresh materials, painstakingly uncovered from the historic archives of the society, will be displayed in an exhibition hosted by the Royal Society this summer. Visitors will get to view Arabic books, astronomical tools, scripts in the journal *Philosophical Transactions* of the Royal Society, portraits of Arabic fellows and numerous references to Arabic

science and astronomy in Fellows' correspondences. The exhibition also features the work of various Fellows who devoted their lives to the language, seeing it as the key to unlocking the wealth of knowledge of the east, one such Fellow even inscribed his memorial stones in Arabic.

Dr Rim Turkmani, a Royal Society Dorothy Hodgkin Fellow at Imperial College London and curator of the exhibition, explained:

"The exhibition will not only show these rare materials but also answer questions about how these translated into the knowledge used to solve open scientific questions. For example some of these works helped Edmund Halley ponder the acceleration of the moon and Robert Boyle learn all about substances like Sal ammoniac."

*Arabick Roots*, opens in mid-June and will last for six months. It is supported by the Qatar Foundation and the Foundation for Science Technology and Civilisation and designed and managed by Cultural Innovations.



Arabic grammar book discovered in the Society's archives

## Discussion meetings

12-13 September 2011

**The new science of oxide interfaces**

*Organised by* Professor Mark Blamire, Professor Dave Blank and Professor Judith Driscoll

14-15 September 2011

**Superconductivity at oxide interfaces\***

*Organised by* Professor Mark Blamire, Professor Dave Blank and Professor Judith Driscoll

19-20 September 2011

**Non-protein-coding RNAs – the DNA–RNA dialogue in shaping the transcriptome\***

*Organised by* Dr Andreas Werner, Professor Denise Barlow and Professor Kevin Morris

For further details about Royal Society events, contact us:

[royalsociety.org/events](http://royalsociety.org/events)  
[events@royalsociety.org](mailto:events@royalsociety.org)

Events take place at: The Royal Society, 6-9 Carlton House Terrace, London, SW1Y 5AG

\* *These events take place at: The Kavli Royal Society International Centre, Chicheley Hall, Newport Pagnell, Buckinghamshire, MK16 9JJ*

We are working to achieve five strategic priorities:

- **Invest** in future scientific leaders and in innovation
- **Influence** policymaking with the best scientific advice
- **Invigorate** science and mathematics education
- **Increase** access to the best science internationally
- **Inspire** an interest in the joy, wonder and excitement of scientific discovery

*Inside Science* is designed to reflect those goals.

Editor: Jason Codrington



## Rewarding excellence

### New Fellows 2011

44 scientists have been recognised for their exceptional contributions to science by election to the Fellowship of the Royal Society. Sir Paul Nurse, President of the Royal Society said:

“It is a pleasure to welcome this year’s new Fellows to the Royal Society. They join the ranks of the UK and Commonwealth’s leading scientists, counting themselves among early Fellows such as Isaac Newton, Robert Boyle and Charles Darwin. The Society aims to expand the frontiers of knowledge by championing the development and use of science, mathematics, engineering and medicine for the benefit of humanity and the good of the planet. It is the contribution of excellent individuals such as these which makes this possible.”

The Council of the Royal Society has also agreed to nominate Professor Martyn Poliakoff CBE FRS to be the new Foreign Secretary of the Royal Society.

### Other awards

The Royal Society has been awarded the prestigious **Prince of Asturias Award for Communication and Humanities**. The award is among the most important in Spain and is given in recognition of a contribution to encouraging and promoting the scientific, cultural and humanistic values that form part of mankind’s universal heritage.

**Professor Adrian Bird CBE FRS** receives the 2011 Canada Gairdner International Award (with Drs Howard Cedar and Aharon Razin of the Hebrew University in Israel) *for their pioneering discoveries on DNA methylation and its role in gene expression*. He joins 40 other Fellows of the Royal Society who have won this prestigious award.

**Professor John V McCanny CBE FRS** has been awarded the Cunningham Medal, The Royal Irish Academy’s premier award, for his outstanding contribution to scholarship and the objectives of the Academy.