

Innovations

This issue: 1 Double dose of laser results could lead to improved medicines 3 Diversity award recognises that gender is no barrier to STFC science 5 Announcement of opportunity - Observations and modelling of the tropical tropopause layer 6 Tracking insects with a 'Big Dish' 7 STFC Innovations Partnership Scheme (IPS) Panel: Nominations 8 Call for applications for Project Research and Development (PRD) scheme

Double dose of laser results could lead to improved medicines

Two papers resulting from research using STFC's Central Laser Facility (CLF) provide information that could prove vital for designing medicines more effectively have been published in the journals *Nature* and *Science*. The results from a paper from University of Bristol scientists are in *Science* today (3 February 2011) and results from a paper by scientists from the University of Oxford are in the special International Year of Chemistry edition of *Nature* published last month.

Solving the solvent mystery for better drug design

Using the unique capabilities of STFC's ULTRA laser system, scientists from the University of Bristol have been able to watch a chemical reaction happening in solution with more detail than ever before. This could lead to improved drug design for medical therapies and catalysts for industrial processing, and pave the way for further applications in bio- and atmospheric chemistry. The results are due to be published in *Science Express* online today (Thursday 3 February).

The ULTRA experiments, which took place at STFC's Lasers for Science Facility (LSF) at the Rutherford Appleton Laboratory in Oxfordshire, will provide scientists with a unique insight into how liquid solvents affect chemical reactions at the molecular level. This can be in solution in liquids such as organic solvents or water.

Organic solvents are used in the chemical and pharmaceutical industries for a wide range of industrial processes such as the manufacture of drug molecules for medical therapies. Similarly, much of the chemistry in the cells of living organisms takes place in solution so understanding these chemical reactions on such a fundamental level is vital. [more](#)

Innovations
Club

Image: University of Bristol team in the ULTRA laser laboratory in the Research Complex at STFC RAL

Double dose of laser results could lead to improved medicines

Heading up the programme is Professor Andrew Orr-Ewing from the University of Bristol's School of Chemistry who said; "We are very excited by the results - especially as 2011 is International Year of Chemistry. Liquids have a disordered and rapidly changing structure, and collisions between molecules occur on timescales as fast as ten thousand billion collisions per second. It is now possible for us to examine chemical reactions within a solvent at unprecedented levels of detail on picosecond timescales (one thousand-billionths of a second). We wouldn't have been able to do this without the unique capability of the ULTRA laser."

The knowledge gathered during these experiments will be used to better inform computer models designed to simulate chemical reactions in liquids.

LSF is part of STFC's world leading Central Laser Facility (CLF) and is located in the new Research Complex at STFC's Rutherford Appleton Laboratory.

The full paper can be found on the Science website ([link opens in a new window](#)).



Sugar boost for scientists planning ahead for future medicines

Scientists continuing to investigate a 50 year mystery have discovered another vital clue that could help pave the way for improved medicines. The results feature in a special edition of Nature celebrating the International Year of Chemistry. The findings reveal an important insight into the way carbohydrates (sugars) bond and this will influence the way drugs are designed in the future.

Using specialist laser equipment from the EPSRC-funded Laser Loan Pool managed by STFC's Central Laser Facility, Professors John Simons and Ben Davis together with co-workers from the University of Oxford, have challenged long standing theories that have until now, been based on observations and experiments made in solution.

For the first time, the shapes of carbohydrates have been revealed, both when they are free from any external influence, and when they are interacting with neighbouring molecules, such as water, or protein fragments. This enables the two states to be compared. These experiments have demonstrated what happens to the sugars when they are manipulated in different ways - a crucial factor in drug design where scientists need to ensure they will be able to control the way drugs work within the body.

The sugar, was examined by computational chemistry and pulsed laser spectroscopy using an ultraviolet laser borrowed from the Laser Loan Pool. The new results, exploring sugar-protein interactions, provide the best insight so far into these crucial biological contacts.

More information about this story can be found on the Nature website ([link opens in a new window](#)).



Diversity award recognises that gender is no barrier to STFC science

World-leading research body, the Science and Technology Facilities Council (STFC) has been recognised nationally for its work in promoting and encouraging gender equality. The SET Fair Standard, awarded by the UKRC, recognises and celebrates progress in developing inclusive workplaces. The award was presented by Nicola Blackwood MP, during a visit to the STFC Rutherford Appleton Laboratory on 11 February 2011.

STFC has worked hard to improve the gender balance in its male-dominated science, engineering and technology workforce. It encourages greater diversity in its laboratories and workshops by implementing practical steps to make it easier for staff to combine stimulating professions in world-leading science with family commitments. Established work practices include flexitime, part-time and term-time working; enhanced maternity provision including the sharing of maternity leave entitlements between parents, and support for women returning to work after career breaks. Women's career progression is supported through a prestigious 'Women as Leaders' programme and a mentoring scheme.

Launched in 2009 by the UKRC, the SET Fair Standard is the UK's first high profile award that gives public recognition for excellence in gender equality across science, engineering and technology (SET) sectors.

Neil Geddes, STFC Director with responsibility for diversity said " *This award is a credit to the hard work that our management and staff have undertaken to ensure that STFC is an organisation where it is your ability to deliver great science and engineering that counts. We need to retain female scientists and*



Watched by members of the STFC Rutherford Appleton Laboratory's Women in Science, Engineering and Technology Group, Nicola Blackwood MP presents Rosie Sherry, Head of People Development, with STFC's SET Fair Award

engineers in the workforce - not just at STFC, but nationally – and flexible arrangements like the ones we have implemented at STFC have helped all our staff. [more](#)

Diversity award recognises that gender is no barrier to STFC science

Dr Sarah Beardsley is a space scientist and her husband Matt is an engineer - both work at the STFC Rutherford Appleton Laboratory. *"When our children were born in 2007 and 2009, we both wanted to spend time at home with them while they were babies. STFC agreed to let us split my maternity leave between us,"* explains Sarah. *"This had so many advantages; the children loved having their dad at home and these strong bonds have made them less dependent on me; and Matt and I have a much better understanding of each other's roles. As I was only away for three months, I found it much easier to transition back into work and, rather than STFC pay for someone to cover my maternity leave, junior members of the team were able to take on increased responsibilities and gain valuable career development experience. It was a low risk arrangement for STFC but hugely beneficial for our family."*

Jane Butcher, assistant director at the UKRC said: *"The UKRC believes that only a concerted effort by the SET industry will break down the gender barriers that exist in these traditionally male dominated environments and we want to be part of a new consensus which creates an inclusive working environment for women. Skills gaps can then be filled and these industries will continue to drive the UK economy forward."*

"STFC is demonstrating a modern approach to gender equality in the workplace and is a great example to other organisations. We're delighted to be able to recognise this work with the SET Fair Standard".

Nicola Blackwood, MP for Oxford West and Abingdon said *"The achievement of this award emphasises STFC's commitment to an inclusive workforce. Throughout my visit, I have met men and women, many of whom live in my own constituency, who are involved in technological breakthroughs that have the potential to improve and enhance our lives. Solving global challenges such as meeting our future energy needs requires talented individuals. The SET Fair Standard is working to ensure that there are no gender barriers."*



Nicola Blackwood MP presents Rosie Sherry, Head of People Development, with STFC's SET Fair Award

Announcement of opportunity - Observations and modelling of the tropical tropopause layer

Closing date - 19 May 2011

The STFC, through its Environment Futures Programme, is partnering with the Natural Environment Research Council to provide researchers with the opportunity to undertake exciting and high-impact unmanned aerial vehicle (UAV) enabled science in collaboration with NASA.

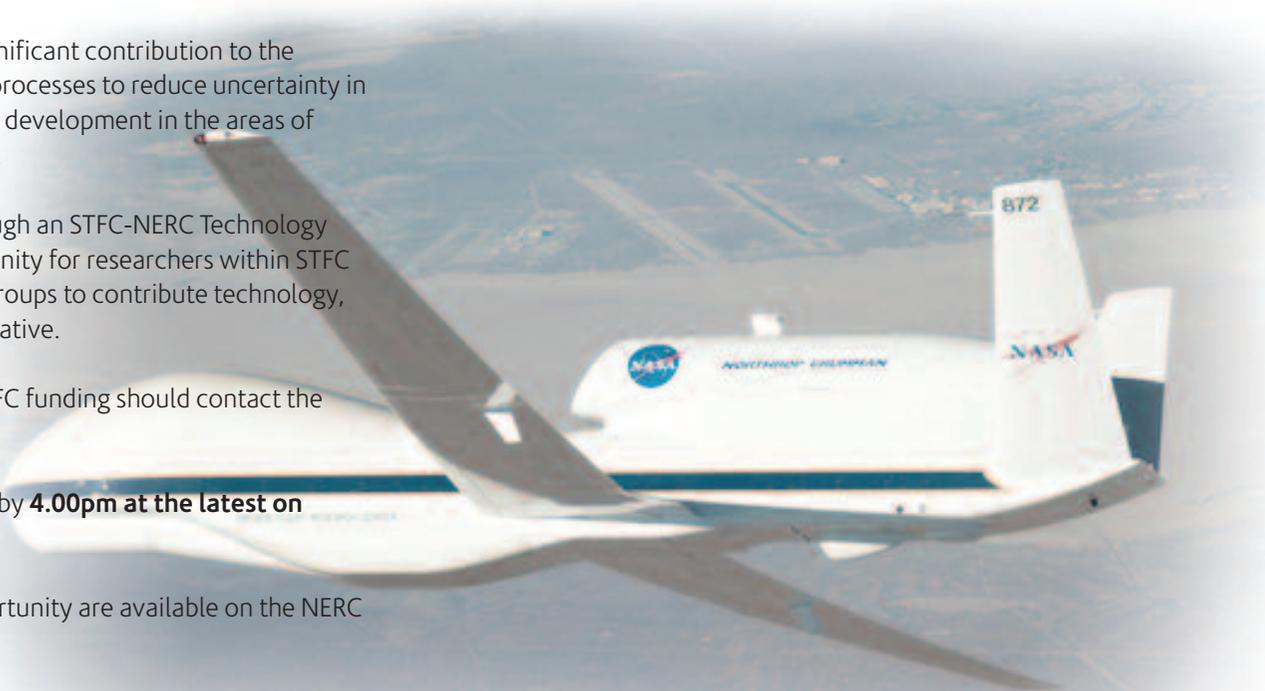
This programme is expected to make a significant contribution to the understanding of important atmospheric processes to reduce uncertainty in climate models, and stimulate technology development in the areas of atmospheric measurement and modelling.

Up to £600k is being made available through an STFC-NERC Technology Partnership Scheme to provide an opportunity for researchers within STFC laboratories and STFC-funded university groups to contribute technology, facilities and expertise to this exciting initiative.

Investigators interested in applying for STFC funding should contact the STFC co-ordinator Kevin Smith.

Proposals must be submitted to the NERC by **4.00pm at the latest on Thursday 19th May 2011.**

Full details of the Announcement of Opportunity are available on the NERC website.



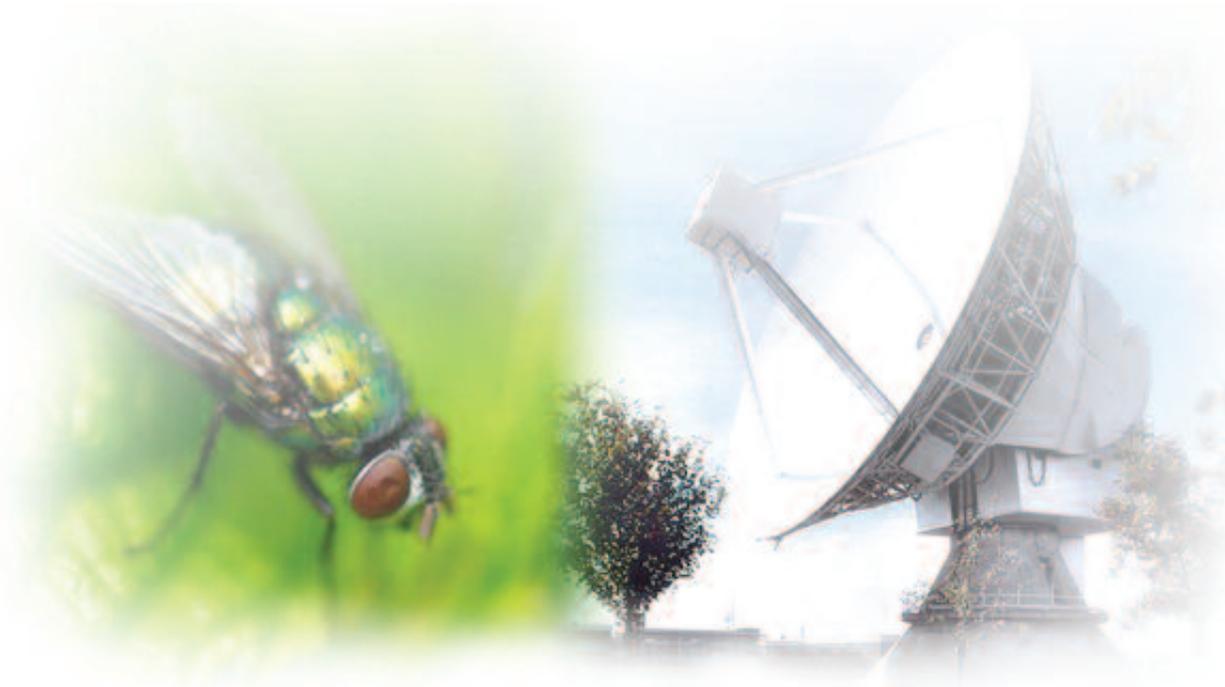
An unmanned aerial vehicle (UAV) (Credit: NASA)

Tracking insects with a 'Big Dish'

The huge Chilbolton Facility for Atmospheric and Radio Research was originally designed to be used by astronomers, it is home to the world's largest fully steerable meteorological radar. But now, the 'Big Dish' - as it's affectionately known among its users - is much more likely to be used by weather scientists.

The instrument can detect anything from aircraft to insects and, more pertinently, researchers can study the dynamic nature of clouds and rainfall at high resolution, as well as determine the shape and size of raindrops out to a range of 90 kilometres.

Set in the Hampshire countryside, the dish records detailed information about the height and depth of clouds, and whether they're clouds are made of ice or water. Only then can scientists say if the clouds are likely to cause huge storms.



Chilbolton's ability to track insects can help scientists forecast summer storms and floods

That's all very well if you want to know if there's a storm happening right now. But if you want to forecast the next summer deluge, it turns out that tracking insects is the way to go.

The research is funded by the NERC and is featured in the Planet Earth Podcast: how tracking insects can help scientists forecast summer storms and floods, and the role one of Europe's key satellite missions played in the recent floods in Queensland, Australia.

Sue Nelson meets some of the scientists ([link opens in a new window](#)) behind this research to find out more.

STFC Innovations Partnership Scheme (IPS) Panel: Nominations

Nominations are sought for two individuals to join the IPS Panel in September 2011. Panel members are drawn from the industrial community and the academic community with the latter representing the remit of the STFC science programme. On this occasion we are looking for two representatives, one from Industry and one from the academic community. The membership of the panel initially will be for the duration of 3 years.

Remit of the IPS Panel

The IPS panel is set up to make recommendations on grant applications received against the calls for IPS, Mini-IPS, Follow-on-Funding and IPS Fellowships. It will undertake this task having regard to the overall strategy and policy of Council and the Science Committee, and to the broad financial situation as advised by the executive.

Panel responsibilities:

The panel members are requested to:

- Serve on the panel initially for one term of 3 years
- Provide a summary of their expertise to facilitate allocation of Mini-IPS proposals for review
- With reference to the assessment criteria, review and make recommendations to the STFC executive on all grant applications to the above schemes
- Respond in a timely manner to review requests for Mini-IPS proposals
- Attend quarterly panel meetings

or

- If unable to attend panel members should submit written comments in a form that can be circulated to other panel members prior to the meeting
- To comment on and/or make recommendations regarding any other business or partnership applications as required

- To comment on and/or make recommendations regarding any other business or partnership applications as required
- To liaise with other bodies as necessary
- To report to the Science Committee and any other overseeing body as required

Nomination Process

Candidates may be nominated by Heads of Departments, by a colleague or by self-nomination. Please note that although not exclusively, STFC are looking for strength in the data handling and control – Image/signal analysis, pattern recognition area to complement the existing expertise within the Panel.

Information about nominees for the IPS Panel (not more than the equivalent of one side of A4) should include the following information:

- the nominee's scientific areas of research and interests;
- the nominees qualities, including academic/industrial background knowledge of the committees subject area;
- nominee's experience of serving on STFC (formerly PPARC) and non-STFC committees;
- any possible conflicts of interest;
- justification as to nominee's suitability to sit on the suggested committee.

Please also give contact details for the nominee, together with information on their current position and an indication of their status/seniority.

For more information on the approach that STFC takes to appointing Panel and Committee members, please visit

<http://www.scitech.ac.uk/SciProg/Plan/Plandocs/NomsProcessWeb3htm.aspx>
Information on STFC's honorarium and travel cost policy can be seen at <http://www.stfc.ac.uk/About/Struc/Council/honallowances.aspx>

Please submit nominations to Andi Kidd (andi.kidd@stfc.ac.uk) by close of business 18th April 2011



Call for applications for Project Research and Development (PRD) scheme

STFC has announced a call for applications to the Projects Research and Development scheme (PRD). The applications should be submitted by the deadline of May 3rd 2011 and will be reviewed at a meeting of the PPRP Panel on July 6/7 2011. STFC intends to allocate a total of around £1.5 Million, a large proportion of which will be for spend in the financial year 2011/12.

This PRD scheme is intended to develop the capabilities needed to underpin UK science and technology leadership in future STFC projects and gives industry the opportunity, in collaboration with approved research organisations, to apply directly to the STFC for funding for research and development.

The PRD scheme provides funding for research and development projects which enable STFC to deliver the science programme objectives in the areas of particle physics, particle astrophysics, nuclear physics and astronomy. Please note that proposals for project specific R&D, or small upgrades for space instruments and missions, fall within the remit of the UK Space Agency ([link opens in a new window](#)).

Find out more about the STFC PRD scheme, including an updated guide for applicants.

