

Communication and outreach activities within the CLF

Ceri Brenner

Central Laser Facility, STFC Rutherford Appleton Laboratory, Didcot, Oxon OX11 0QX, UK

Email address: ceri.brenner@stfc.ac.uk Website: www.clf.stfc.ac.uk

Introduction

Public engagement encompasses outreach activities that inspire the next generation and raise the profile of our world-class research, as well as communication activities that offer a platform on which to demonstrate the high-impact and inspiring science that the Central Laser Facility (CLF) delivers. UNESCO established 2015 as the *International Year of Light and Light-based Technologies*, providing many additional platforms on which to engage and inspire new audiences. Opportunities for communication and engagement in the reporting period 2014-2015 have been diverse, reaching across the UK and even further beyond. They range from the STFC 'Power of Light' roadshow, to supernova science on Vulcan being highlighted by the Institute of Physics as a top 10 physics story for 2014, to a news story on CLF spinout Cobalt Light Systems reaching millions across global news media.



INTERNATIONAL
YEAR OF LIGHT
2015

International Year of Light

The CLF was involved in many public outreach events this year in celebration of the *International Year of Light and Light-based Technologies* (IYL 2015). The UK's first official event took place in early January 2015 with an evening of laser science talks, co-hosted by the CLF at the Ace Hotel in London. Photographs and a report of the event can be found on the IYL 2015 UK blog website: <http://light2015.org.uk/bringing-the-power-of-lasers-to-the-public/>.



Ceri Brenner demonstrating on the CLF exhibition stand at the Manchester Museum of Science and Industry

A CLF exhibition stand was the central feature of an IYL 2015 event hosted by the Photonics KTN at the Manchester Museum of Science and Industry (MOSI). Coverage of the day is featured heavily in the MOSI's promotional film for their public interaction days: <https://youtu.be/21JQIFGyqk>.

CLF director John Collier co-presented an IYL 2015-themed Talking Science public lecture, *The Light Fantastic*, in which the science explored at Diamond Light Source, CLF and RAL Space was presented to a packed lecture theatre at RAL.

A 'night sky laser' has been deployed by the CLF as an unusual and unique means of stimulating interest in science. The bright green beam swept across the Harwell Campus in the early evenings throughout 2015 and projected onto the side of the *Research Complex at Harwell* building.

STFC 'Incredible Power of Light' Roadshow

The CLF obtained funding for and built a roadshow, the 'Incredible Power of Light'. The roadshow tour began in February 2014, visiting Northern Ireland Science Festival in Belfast, the Big Bang Fair in Birmingham, and Stargazing Live in Leicester.

Further dates booked for the remainder of 2015 included visits to the Scottish and Welsh Parliaments, the 'Science Lates' event at the Science Museum, and the Winchester, Durham, and Dundee science festivals. The exhibition has visited a total of 10 venues, travelling 3,936 miles, and over 85 days captured the attention of around 64,309 people from all walks of life.



The roadshow in full swing during the busy schools days at the Big Bang Fair in the NEC arena in Birmingham.



Demonstrating how adaptive optics work to correct beam spots (top left); a life-size replica of the Vulcan laser amplifier is used to introduce how to align laser beams (top right); the roadshow installed in the foyer of the Scottish Parliament building in Edinburgh (bottom left); and the spatially offset Raman spectroscopy demonstration kit (bottom left), which allowed visitors to scan shampoo bottles and displayed live data.

The exhibition was kitted out with impressive demonstration pieces, developed by CLF staff. This included a Vulcan laser bay walk through, with a full-scale interactive amplifier set-up, and a SORS demo kit actively reading the contents of identical shampoo bottles coupled to an easy-to-follow computer interface displaying the extracted spectra. Also on show was a live demonstration of adaptive optics generating a perfect spot, laser trapping apparatus, and a laser communications demonstration beaming camera information above the exhibition to a readout screen several metres away.

Hitting the headlines

Press releases are a great tool for communicating CLF science as, if they are successfully picked up by news media, they can reach large audiences very quickly. This year has seen a boost in the number of press releases generated and published by the STFC press office, with a total of 14 press releases generated.

Several of these stories were picked up by many other news outlets. For example, a story on rickets in 16th century sailors

on the Mary Rose was given coverage by *BBC Breakfast news* (average 1.5M viewers), the *BBC website*, the *Daily Mail* (circulation 1.8M) and the *Telegraph* (circulation 545,000). The 'singing stars' story, on sound wave generation from hot dense laser plasmas, was covered in the *Mirror*, *Daily Mail*, *Washington Post* and 40 other outlets. Other stories were taken up by specialist trade media, such as a graphene computer chips story which appeared across nine specialist sites including *Electronics Weekly*.

The STFC media team achieved global media coverage for a story on CLF spinout company Cobalt Light Systems winning a prestigious engineering award. The story was covered by major broadcasters and newspapers across the world, including *BBC Breakfast news*, *Fox news*, *The Times*, *Daily Mail* and *The Independent*. Over five million people are estimated to have seen or read the story. Another popular press release came from an experiment carried out with the Vulcan laser to study the physics within supernova blast waves. The story was covered by *Daily Mail* online and was subsequently picked up by the *Discovery Channel*, who filmed within the Vulcan laser bay and Target Area West for an episode

of *How the Universe works*. The Institute of Physics named the supernova experiment paper in their top 10 list of physics news for 2014.

Our science was featured in specialist laser and physics news websites, including *The Engineer* (feature article on the laser for HiLase) and *Laserlab Forum* (double-page spread on graphene experiments at Artemis and several other articles).

Maintaining a close working relationship with the RAL press officers has been key to getting these press releases as accurate and clear as possible. Their advice to us, and the wider CLF user community, is that aligning the date of the press release with a paper publication or grant announcement is absolutely crucial to attract high impact coverage, so we would like to encourage our users to let us know as early as possible if your CLF-related work could be press release material. Contact ceri.brenner@stfc.ac.uk for any enquiries or further information.

We also regularly update the CLF website newsreel with science stories of experiments and related publications, as well as community announcements. The CLF website is designated as a scientific interaction site; therefore coverage can include more technical detail than in wider public news articles. We use this platform to communicate and celebrate CLF work that has made it into high impact journals such as *Physical Review Letters* or *Nature*, for example, and especially when results obtained at the CLF appear on journal front covers. Over the last year, the CLF published 38 news stories.

Visits and tours

The CLF continues to welcome visitors and host tours around the facility. Over the reporting period, 1,627 people have visited the CLF, an increase of more than 30% over last year's total. This included 10 relatively large, centrally-organised group visits to the CLF for Education and Public Access days, and 87 smaller, less formal groups of tours for stakeholders, campus partners, MPs, funding agencies, scientists, etc.

Great use has been made of the CLF Visitor Centre as a venue for hosting meetings and introductory talks, and as a starting point for group tours, which has enabled an increase in capacity for visitors. As well as promoting the CLF effectively, the Centre is reducing the number of interruptions to facility operations for lab tours.

Artist Research Residency

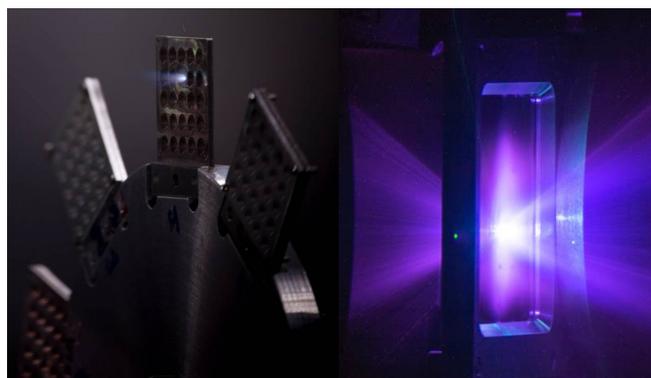
An artist research residency has been initiated this year, in collaboration with and funded by two renowned organisations in the artworld, ArtQuest and The Arts Catalyst. Over 60 applications from professional UK visual artists were received for the *Beamtime* residency, which supports the artist to visit the CLF for a period of 10 days spread over three months, to engage with both the science and the scientists in order to inspire their creative work. Coverage of Alistair McClymont's

residency has so far been documented on his blog page and in an interview with Vice magazine, in which he states *"My goal is to interpret and represent the beauty of the science here in some way. The perceived gulf between scientists and artists is completely false. In many ways, they are very similar kinds of people: we question the world around us, interpret, and present our results. The paradigms are normally quite different."*

Alistair engaged with research teams working on experiments with the Gemini and Vulcan lasers, and actively participated by aligning and triggering SLR cameras to photograph the laser-target interaction. His imaging diagnostic proved very useful in providing an additional viewpoint of the front surface interaction, as well as generating stunning plasma photos. A public talk event was held at Somerset House in London, during which Alistair and Ceri Brenner discussed the project and the engagement experience to an audience of Arts Catalyst followers. Alistair's blog, in which he captures thoughts and experiences during the residency, can be found here:

<http://studio.alistairmcclymont.com/tagged/beamtime>

Inspiring the next generation



Capturing the flash of a plasma from the Gemini laser (left) and the Vulcan laser (right). Credit: Alistair McClymont

A large part of public engagement is dedicated to inspiring the next generation into science, technology, engineering and maths (STEM) subjects, to ensure the UK has the skillset to continue its strong heritage in this area, as well as transfer these valuable skills into other sectors.

Work experience is a very effective way in which the CLF is able to reach out to young people interested in science and engineering. Normally occurring over the summer, sixth-form and undergraduate students are matched with a CLF supervisor to carry out a project lasting up to eight weeks. Over the reporting period, the CLF has hosted 21 school students in the facility, a 50% increase on last year, through the RAL work experience placement scheme. The feedback is very positive, with those answering 'How well were your tasks explained?' giving an average 4.4 out of 5, and over 80% indicating that the placement has influenced their career decision.

The CLF's plasma physics group hosted a number of eight-week summer and work experience students. PhD students studied parametric amplification in plasma, and worked on channelling and hole-boring for fusion energy research. First-year undergraduate students from the Universities of Manchester and Oxford ran super-computer models of laser-plasma interactions. They also gained experience with the computer program LabView for data acquisition and analysis. A returning under-graduate summer placement made strong headway in computer simulations of 10 PW laser-plasma interactions. They continue their university education invigorated by the experience of working in a cutting-edge research laboratory.

The CLF took part in the UK's first Conference for Undergraduate Women in Physics, by giving the keynote talk during their visit to RAL and with a panel member during the careers Q&A session.



Plasma physics group summer students alongside Alex Robinson and Raoul Trines.

There still remains much participation by CLF staff in the STEM ambassador scheme, which includes visits to local schools and career events. For example, Ceri Brenner gave the keynote talk during the University of Birmingham's 'Girls in STEM' day, with a talk titled 'STEM has impact for life'. She was also invited to a school in London to speak to the whole of year 9 and year 10 year groups on the subject 'Lasers and Super Exciting Research'.

The CLF continues to participate in the Engineering Education Scheme, run by the UK's Engineering Development Trust, which introduces sixth formers to the world of engineering via a programme of joint projects between participating schools and institutions.

Community engagement

Two CLF staff won major prizes this year. Prof Tony Bell was awarded the 2014 Hoyle medal and Prize by the Institute of Physics. Prof Pavel Matousek and spin-out company Cobalt Light Systems won the Royal Society of Engineering's MacRobert Prize. At least 16 CLF staff hold joint appointments or visiting positions with academic and industrial partners, or are Fellows of learned societies.

As well as making regular scientific presentations as part of the CLF's core science mission, facility staff are involved in the organization and direction of national and international scientific meetings. The CLF has been responsible for organising and hosting a number of conferences and user meetings throughout the year, including the Laserlab Foresight workshop 'Lasers for Life', hosted at the Royal Society in London, attended by almost 150 people.

The CLF continues to host the High Power Lasers (HPL) Community Meeting, and the HPL and Artemis user forums. CLF maintains links with the Culham Plasma Physics Summer School, and has organised for lectures to be hosted at RAL along with tours of the CLF for all of the 60 PhD students involved.

The CLF publishes its Annual Report covering all of the scientific and technical activity of the department over the year. This report is circulated to more than 500 recipients around the globe, as well as appearing online. To reduce publishing costs, the full articles are available to download from the CLF website, with a printed collection of article summaries.

Continuing the good work

If you would like to work with us to promote your research or any aspect of CLF work, then please get in touch with Ceri Brenner (ceri.brenner@stfc.ac.uk). Whether it be through outreach events and activities, or via press releases and website content, we welcome collaboration on communicating CLF science.

Acknowledgements

We would like to thank all members of facility staff and the user community who participate in public engagement activities to help promote the laser science and engineering work of the CLF.