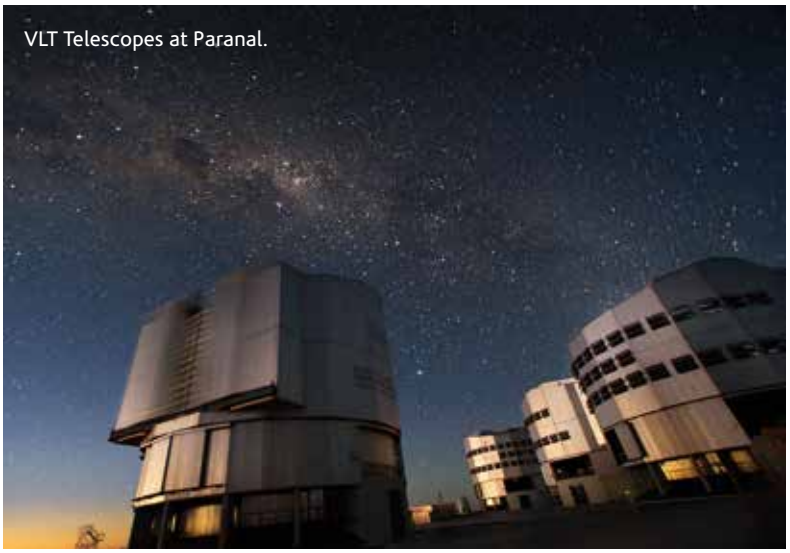
STFC ResearchFish 2015: Facilities



VLT Telescopes at Paranal.

Credit: Iztok Boncina/ESO

Facilities are a huge part of any research community and many of our grants help PIs access world-class large-scale research facilities, in the UK and other countries. Our grants ensure that the UK scientific community has access to the large facilities that will help it perform high quality, world leading research, now and in the future.

Facilities research could take place in any area of research, including:

- Lasers
- Accelerators
- Neutron and Muon Sources
- Synchrotron light sources & Free Electron Lasers
- Atmospheric and Space Science
- Scientific Computing

You may be surprised at the top three most frequently used facilities as reported by our PIs. They are the Very Large Telescope, the James Clerk Maxwell Telescope and DiRAC High Performance Computing Facility respectively. The number of PIs reporting at least one has risen dramatically since our 2012/13 submission (by 378%). We hope with increased reporting to see this rise again during the 2015/16 submission window.

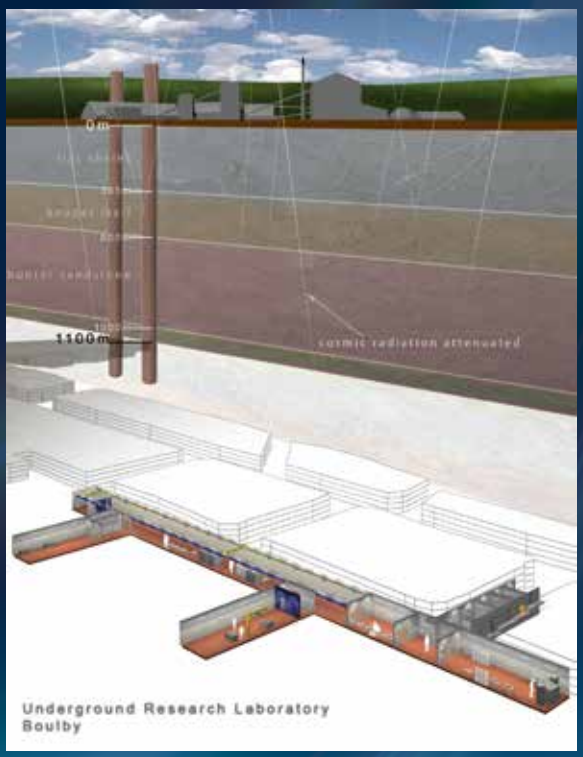
Boulby Underground Laboratory

We currently have three different STFC-funded researchers using Boulby Underground Laboratory, providing outputs on 24 grants.

The Boulby Underground Laboratory, the UK's deep underground science facility, is located 1100m below ground in Boulby Mine on the North East coast of England. Boulby is a working potash, polyhalite and rock-salt mine operated by Cleveland Potash Ltd. At 1100m deep, it is the deepest mine in Great Britain.

Boulby is one of just a handful of facilities world-wide suitable for hosting ultra-low background and deep underground science projects. Boulby is a special place for science - where studies can be carried out almost entirely free of interference from natural background radiation.

Studies underway at Boulby range from the search for Dark Matter in the Universe to studies of cosmic rays and climate, astrobiology and life in extreme environments, development of techniques for deep 3D geological monitoring, and studies of radioactivity in the environment.



Credit: STFC

Isaac Newton Group of Telescopes

The Isaac Newton Group of Telescopes have been used on over 70 different occasions with the use of STFC funding, this is across 13 different Universities in the UK.

The Isaac Newton Group of Telescopes (ING) operates the William Herschel Telescope, Isaac Newton Telescope and Jacobus Kapteyn Telescope. They are operated on behalf of the Science and Technology Facilities Council (STFC), the Nederlanse Organisatie voor Wetenschappelijk Onderzoek (NWO), and the Instituto de Astrofísica de Canarias (IAC).

The ING's aim is to develop collaboration between astronomers in the UK, the Netherlands and Spain and ensure that, through continual maintenance and development, these telescopes remain at the forefront of world astronomy.

The telescopes are located at Roque de los Muchachos Observatory on La Palma in the Canary Islands, meaning many of us will have seen them whilst on our holidays. The Observatorio del Roque de los Muchachos occupies an area of nearly 2 square kilometres approximately 2400 metres above sea-level on the highest peak of the Caldera de Taburiente. The location of this observatory was chosen after an intensive search for a site with all-year round clear, dark skies. All tests proved that the Observatorio del Roque de los Muchachos is one of the best astronomical sites in the world. The remoteness of the island and its lack of urban development ensure that the night sky at the observatory is free from artificial light pollution.

Credit: Bob Tubbs

The Isaac Newton Group of Telescopes.

Hubble Telescope

The Hubble telescope was launched in 1990, and this year marks its 25th anniversary. Hubble is a telescope that orbits Earth. Its position above the atmosphere, which distorts and blocks the light that reaches our planet, gives it a view of the universe that typically far surpasses that of ground-based telescopes. Hubble is one of NASA's most successful and long-lasting science missions. It has beamed hundreds of thousands of images back to Earth, shedding light on many of the great mysteries of astronomy. Its gaze has helped determine the age of the universe, the identity of quasars, and the existence of dark energy.

The Hubble is due to be replaced in October 2018 by the James Webb Space Telescope although many call it the successor. The capabilities of each are not identical. The James Webb will primarily look at the Universe in the infrared, while Hubble studies it primarily at optical and ultraviolet wavelengths. James Webb also has a much bigger mirror than Hubble. This larger light collecting area means that James Webb can peer farther back into time than Hubble is capable of doing. Hubble is in a very close orbit around the earth, while James Webb will be 1.5 million km away.

Hubble floating above Earth.

Credit: NASA & STSci

Since 2006 our PIs have reported usage at Hubble on 18 separate occasions. Usage has varied between provided observing time, optical and near infrared imaging and spectroscopic monitoring time. Figures show the main output from usage has been several highly cited papers, these can be seen in grants such as 'Environmental Drivers of Galaxy Evolution', 'Magnetic fields: the key to understanding the physics of stellar evolution and exoplanetary systems', 'Gamma-Ray Bursts: their Nature and use as Cosmological Probes'.

For more information on STFC and Researchfish please visit: www.stfc.ac.uk/1846.aspx