Daresbury Open Week 2020

Free KS5 Masterclass events 29th and 30th June 2020

As part of the Sci-Tech Daresbury Open Week, we are dedicating two full days delivering activities for school children from upper primary school through to upper secondary school.

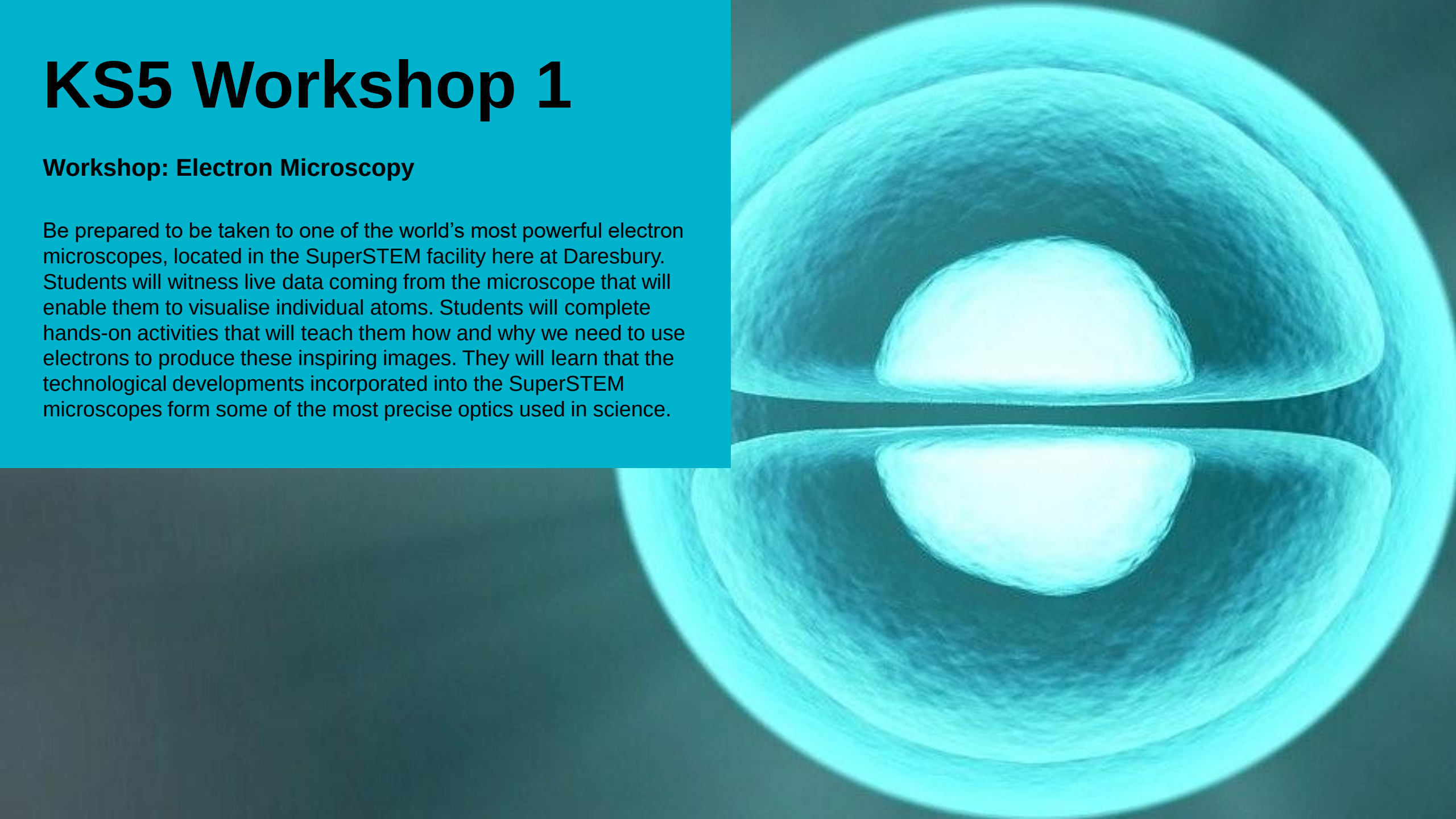
- Monday 29 June: Key Stage 2 & Key Stage 5
- Tuesday 30 June: Key Stage 3, Key Stage 4 & Key Stage 5

These exciting days of talks, tours and interactive workshops will fire your students' imagination and inspire them about cutting edge science and technology, as well as STEM career opportunities.

KS5 Workshop 1

Workshop: Electron Microscopy

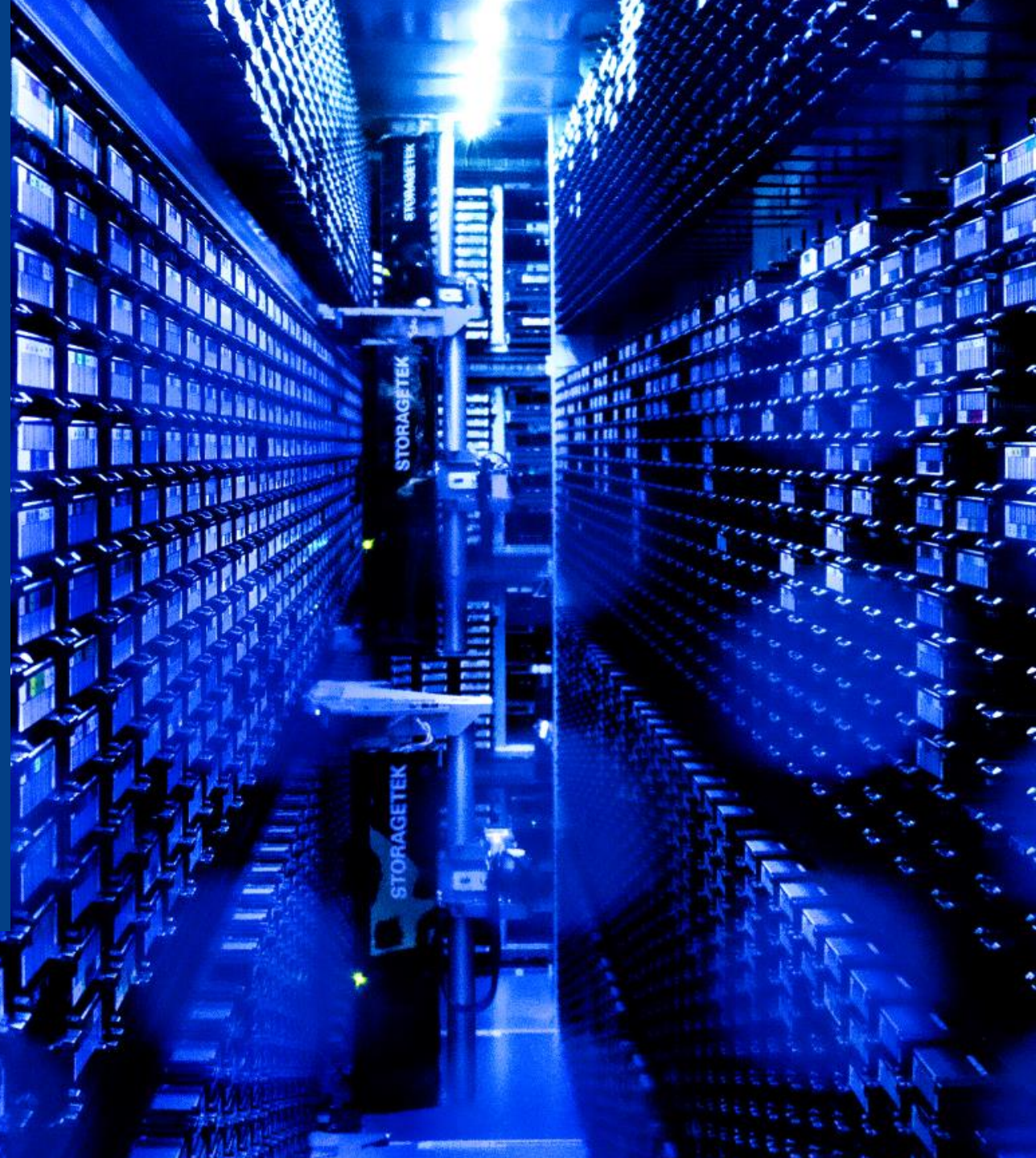
Be prepared to be taken to one of the world’s most powerful electron microscopes, located in the SuperSTEM facility here at Daresbury. Students will witness live data coming from the microscope that will enable them to visualise individual atoms. Students will complete hands-on activities that will teach them how and why we need to use electrons to produce these inspiring images. They will learn that the technological developments incorporated into the SuperSTEM microscopes form some of the most precise optics used in science.



KS5 Workshop 2

Workshop: Scientific Computing

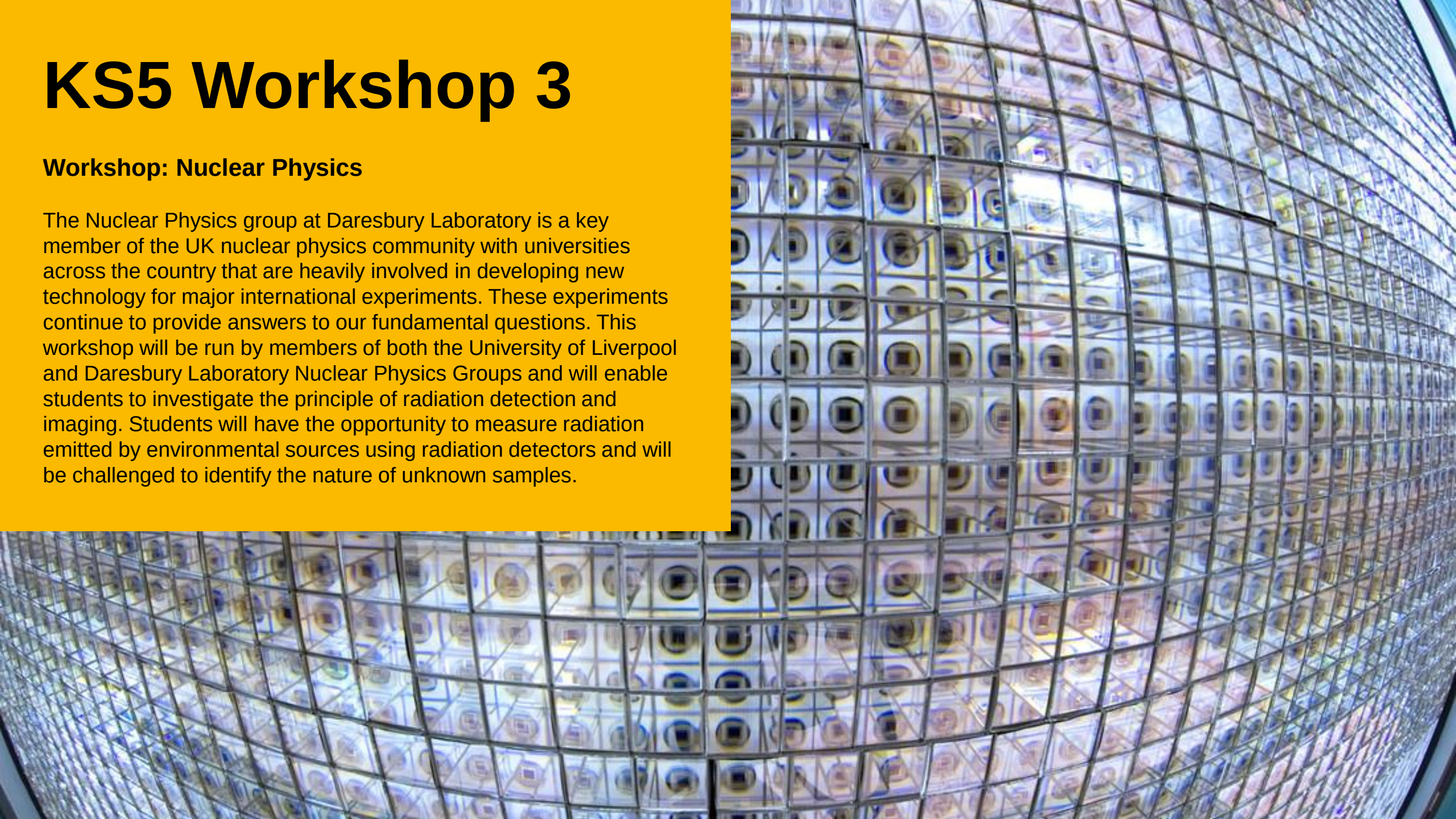
Did you know that computational science and engineering is vital for research into complex fields such as the origins of life, how medicines work in cells within the body, and designing new materials that could help us live on Mars? Did you also know, that computational science and engineering has contributed to the development of many everyday items such as cosmetics, tablets and vacuum cleaners? Although covering many different topics, computational science and engineering always follows the same procedure, whether it is being used to explore the air flow over a vehicle or looking at how molecules attach themselves to proteins within cells.
The aim of this workshop is to introduce students to that procedure, also known as ‘scientific modelling’. Students will become a computational scientist / engineer, whilst our real scientists and engineers guide them through the modelling methods required to explore the world of scientific simulations.



KS5 Workshop 3

Workshop: Nuclear Physics

The Nuclear Physics group at Daresbury Laboratory is a key member of the UK nuclear physics community with universities across the country that are heavily involved in developing new technology for major international experiments. These experiments continue to provide answers to our fundamental questions. This workshop will be run by members of both the University of Liverpool and Daresbury Laboratory Nuclear Physics Groups and will enable students to investigate the principle of radiation detection and imaging. Students will have the opportunity to measure radiation emitted by environmental sources using radiation detectors and will be challenged to identify the nature of unknown samples.



KS5 Workshop 4

Workshop: Accelerator Technology Centre (ASTeC) Demonstrations

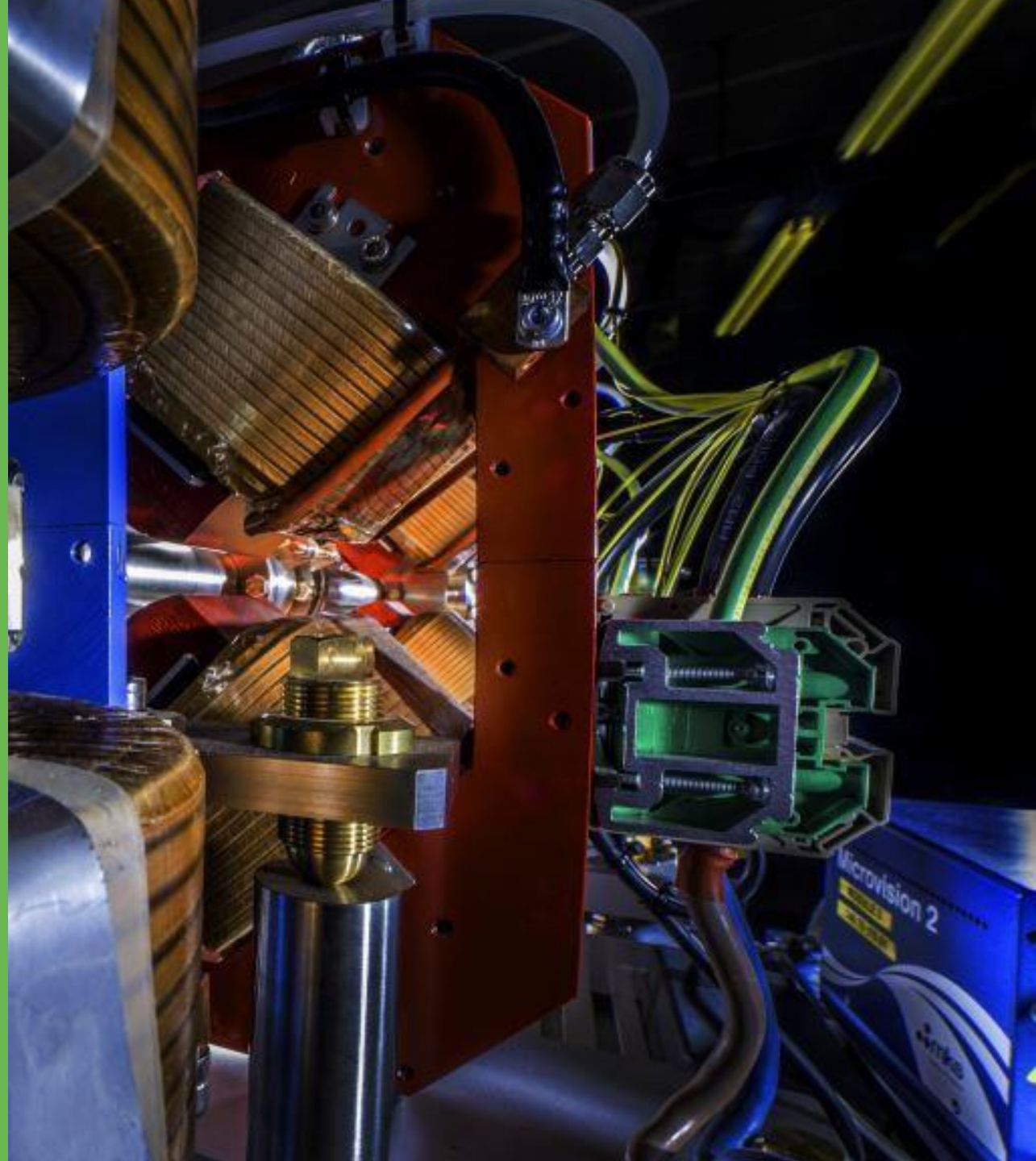
This workshop will be based in the Cockcroft Institute at Sci-Tech Daresbury, and we will show students how a particle accelerator works, using visual demonstrations. A Van de Graaff generator can not only make your hair stand on end, we show how we can use the same effect to accelerate a charged particle. Students will learn how superconductivity can make a train ‘float’ above a magnetic track, and will be shown why superconductivity is an important technology in particle accelerators. Our scientists and engineers will explain how magnets can be used to steer and focus particle beams, and show off some of the amazing properties of laser light, which plays a crucial role in particle accelerator technology. Students will leave with a greatly enhanced understanding of the underpinning physics behind particle accelerator technology, and the purpose of these great machines.

KS5 Tours

CLARA
Experts at Daresbury Laboratory are constructing CLARA (Compact Linear Accelerator for Research and Applications) which is a world first facility designed to develop, test and advance new technologies and techniques for the next generation of Free Electron Lasers. These machines have the potential to tackle global challenges from drug development to the production of hydrogen fuels by looking at the atomic scale with unprecedented speed.

DUNE
DUNE (the Deep Underground Neutrino Experiment) is a flagship international experiment run by the United States Department of Energy's Fermilab. It involves over 1000 scientists from 31 countries. Various elements of the experiment are under construction across the world, with the UK and Daresbury Laboratory taking a major role in contributing essential expertise and components to the experiment and facility. DUNE aims to advance our understanding of the origin and structure of the universe. One area of study is the behaviour of neutrino particles and their antimatter counterparts, antineutrinos. This could provide insight as to why we live in a matter-dominated universe and why the universe survived the Big Bang.

VISTA
VISTA is the Research and development lab for vacuum technologies and coatings. We produce thin films of materials and test their properties. We are looking to improve vacuum conditions in challenging chambers, electron emission from materials for photocathodes, and superconducting materials to accelerate particles. Research taking place in VISTA will be implemented into future accelerators around the world as well as existing particle accelerators such as the upgrades occurring at CERN in Geneva and the Diamond Light Source in Harwell.



Science Fair

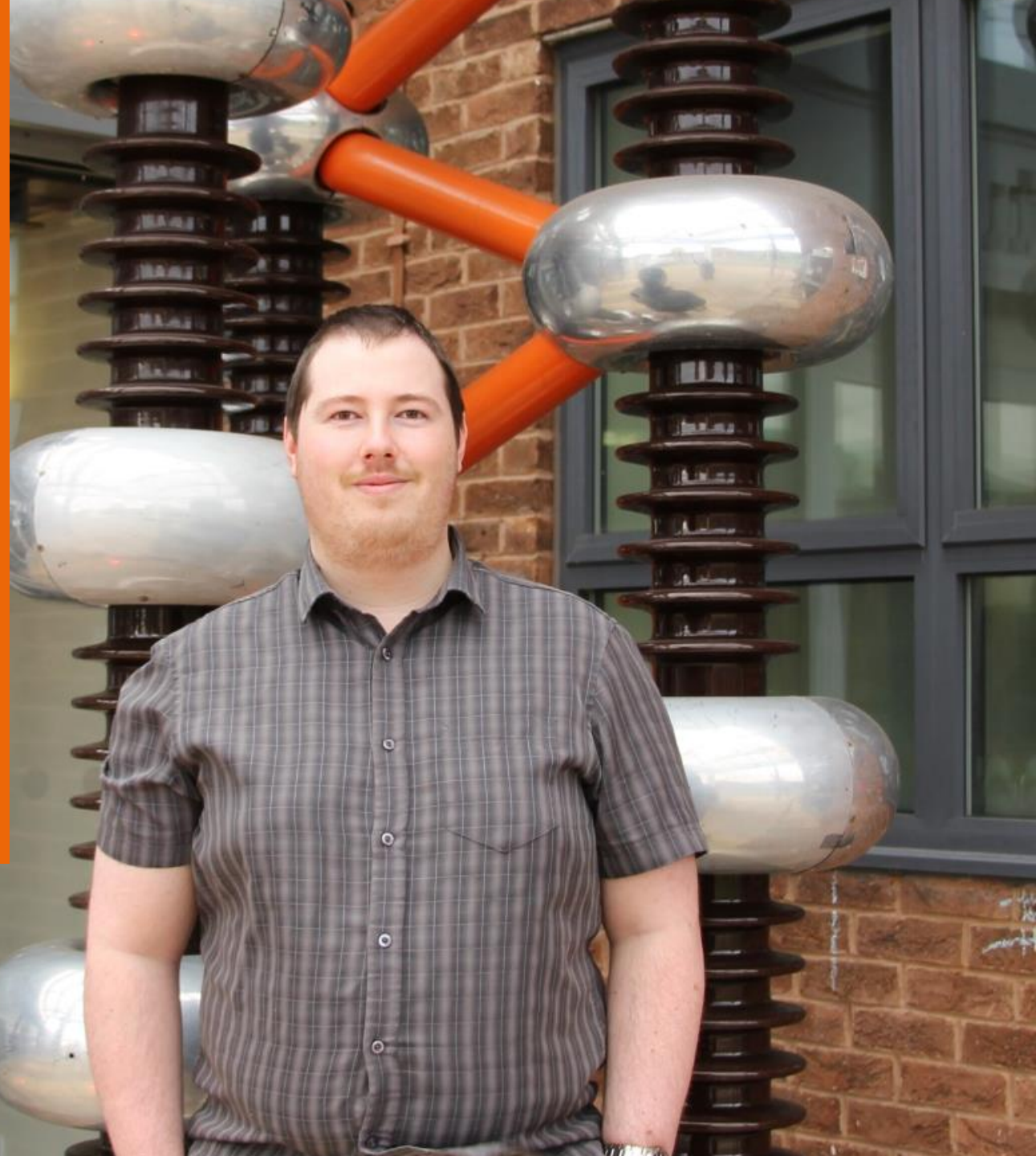
The Daresbury Open Week Science and Careers Fair will be a celebration of the Science and Technology being delivered both locally in the North West of England, Nationwide and Internationally. Many exhibitors (including local Universities, Science Discovery Centres, National Sci-Tech companies and National Laboratories) will be on hand to engage pupils in a variety of hands on activities and demonstrations, to showcase the excitement that comes from working within Science, Technology, Engineering and Maths.

KS5 Inspiring Talk

Dr Alex Bainbridge, Magnet Physicist & Outreach Lead

Title: “Particle accelerators: Shining light on the unseen world at Daresbury”

Particle Accelerators are some of the most powerful, versatile and impressive instruments of modern science. Daresbury Laboratory has been at the forefront of the development of these machines for over half a century, designing and building accelerators for purposes ranging from high energy particle physics to x-ray production for cancer treatment. This lecture delivered by Dr Alex Bainbridge of the Daresbury Laboratory Accelerator Science and Technology Centre (ASTeC) will explain the history behind the development of this technology at Daresbury Laboratory, with a particular bias towards using accelerators as light sources to produce synchrotron radiation. We will discuss the past, present and future of these incredible machines, how we build them, and most importantly, *why* we build them.



KS5 Timetable 29th & 30th June

Time	Group 1 (25 max)	Group 2 (25 max)	Group 3 (25 max)	Group 4 (25 max)	Group 5 (25 max)
08:45 - 09:30	Arrival				
09:30 - 09:45	General Introduction				
09:45 – 10:30	Electron Microscopy	Scientific Computing	Nuclear Physics	Tours	ASTeC Demonstrations
10:30 - 11:15	Scientific Computing	Nuclear Physics	Tours	ASTeC Demonstrations	Electron Microscopy
11:15 - 12:00	Nuclear Physics	Tours	ASTeC Demonstrations	Electron Microscopy	Scientific Computing
12:00 – 12:45	Tours	ASTeC Demonstrations	Electron Microscopy	Scientific Computing	Nuclear Physics
12:45 – 13:30	Lunch				
13:30 - 14:15	ASTeC Demonstrations	Electron Microscopy	Scientific Computing	Nuclear Physics	Tours
14:15 - 15:00	Science Fair				
15:00 – 16:00	Inspiring Science Talk				
16:00 – 16:45	Evaluation and Departure				

Registering your Interest

Registration for expressing an interest in attending is now open with registrations closing on **Friday 27 March 2020**.

All schools will be contacted by email by **Friday 3 April 2020** to confirm whether or not they have been selected.

Schools that opt to be placed on a waiting list will be contacted again should places become available.

If you want your pupils to find out how science and technology is changing the world, then please register your school's interest via the link below.
Register Now at https://www.smartsurvey.co.uk/s/LYMIU/

UKRI Science and Technology Facilities Council

Important information

1. Due to the vast amount of effort required for delivery, this is a special event delivered just once every four years
2. This event will involve over 100 staff including scientists, engineers and support staff based at Sci-Tech Daresbury and our partner organisations
3. This event will use public funds to enable schools to attend this event free of charge (this does not include transport costs)
4. Head Teachers from all selected schools will be required to give a written guarantee of attendance on behalf of their school
5. Schools will be required to arrange their own transport to and from Sci-Tech Daresbury
6. A separate registration form will need to be completed for each class that you would like to apply to bring, therefore schools wanting to register more than one class will need to complete multiple registration forms
7. Pupils, teachers and other accompanying adults will need to bring a packed lunch
8. A full information pack will be sent out to selected schools prior to the event

UKRI Science and Technology Facilities Council

Ask Wendy

Register your interest here.

If you have any questions that we have not answered, please contact Wendy Cotterill by email or call 01925 603408.

Please note: Although we do not intend to make any changes to the programme, we reserve the right to make changes should the need arise.

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