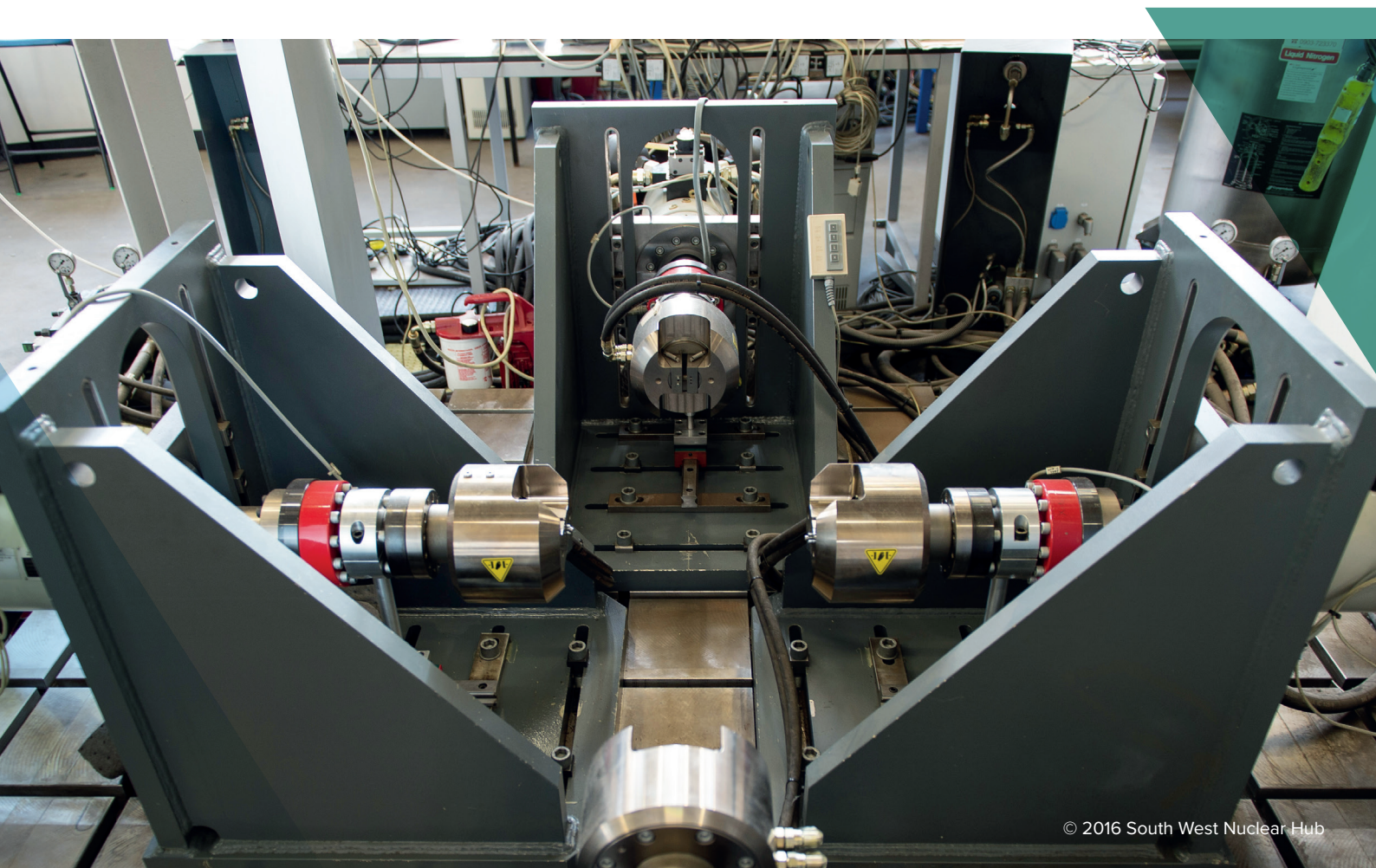


WORLD-CLASS NUCLEAR R&D ASSETS

The South West is at the forefront of research, which supports the safe and efficient operation of nuclear systems in the UK and around the world. These are just a few examples of the world-class R&D assets leading advances in the nuclear industry from the South West.

The University of Bristol is one of the leading UK institutions undertaking scientific and engineering research in support of nuclear energy. With a strong focus on industry collaboration, Bristol was ranked top

for the impact of its nuclear research in the Government's 2013 review of 'Universities and Growth'. The University draws together regional stakeholders and the industry to encourage a step-change in nuclear innovation.



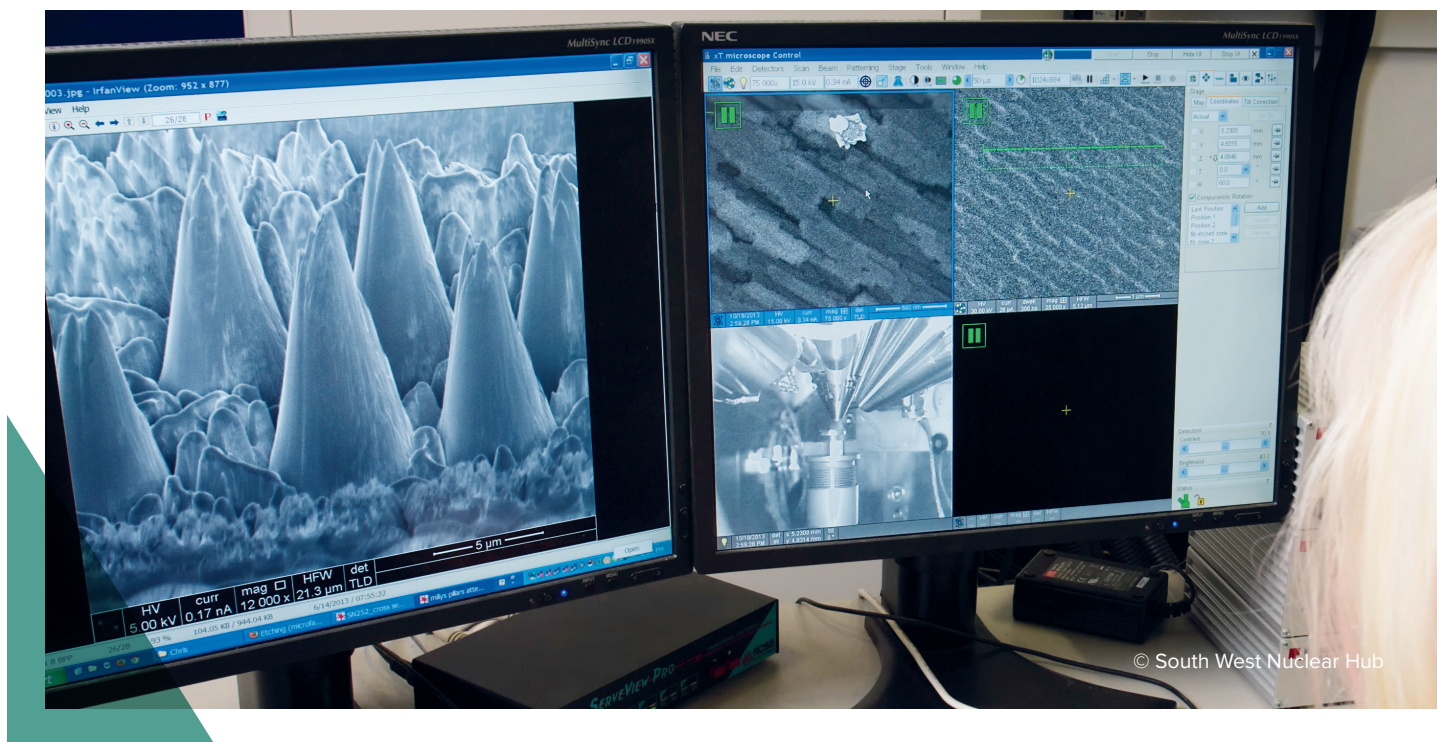
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Building on the established Bristol-Oxford Nuclear Research Centre and supported by Catalyst funding from the Higher Education Funding Council for England, **The University of Bristol** opened **The South West Nuclear Hub** in 2016. The Hub provides a focus for nuclear research and teaching in the South West of the UK and a space to facilitate greater collaboration between academia, industry and SMEs. The Hub also seeks to enhance the R&D facilities in the region, including a 'Nuclear Innovation Factory' (NUCLEATE) that will enable technologies to be developed to Higher Technology Readiness Levels before deployment onto nuclear licensed sites in the UK and around the world. The Hub brings together expertise from across the nuclear sector, connects it to related clusters of commercial enterprise such as the digital technology Enterprise Zone in Bristol's Temple Quarter and Somerset's National College for Nuclear, resulting in interdisciplinary research undertaken in cutting edge facilities at the regional universities.

The Bristol Robotics Laboratory is a collaboration between **The University of Bristol** and the **University of the West of England**. With a world-class reputation for service robotics, intelligent autonomous systems and bio-engineering, this capability is being increasingly applied to nuclear

energy, mainly in decommissioning. Robotic solutions offer opportunities to complete the decommissioning and legacy clean-up of power station and fuel cycle facilities faster, more cost effectively and with reduced risk to the workforce. On-going research includes the use of autonomous systems such as Unmanned Air Vehicles, pipe crawlers and under-water Remotely Operated Vehicles for nuclear applications, e.g. surveying and inspection in inaccessible areas, decontamination of plant and structures, radiation mapping and emergency response.

Through its Advanced Composites Collaboration for Innovation and Science, **The University of Bristol** is conducting research into novel composite materials relevant to nuclear applications, which include such diverse fields and advanced filtration systems for radioactive waste management to new materials that improve the seismic integrity of nuclear structures. **The National Composites Centre** provides manufacturing facilities at an industrial scale and rapid manufacturing processes capable of building prototypes to validate design concepts, which will link closely with the NUCLEATE innovation factory also planned for the Bristol and Bath Science Park.





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The University of Bath has a strong chemistry department, relevant to the design and operation of nuclear power plants, particularly the Light Water Fleet, including boiling water reactors such as the design proposed for the Horizon Nuclear Power Wylfa and Oldbury sites. The University collaborates with Bristol in the area of applied psychology to improve nuclear safety through a better understanding of, and improved techniques for human performance and complex systems.

Scientists from the **University of Exeter**, Exeter-based Cineon Productions and nuclear industry experts have created new immersive 360-degree virtual reality training, using technology such as eye-tracking and physiological-monitoring. This is used to help prevent accidents in 'safety-critical' industries like the NHS, aviation, the military and nuclear power.

Much of the technical capability relating to the design, operation and life extension of the Advanced Gas Cooled Reactor fleet resides at the headquarters of **EDF Energy Barnwood** (EDFE) in Gloucestershire. Many nuclear R&D collaborations occur between EDFE scientists and engineers, academic and research institutions and the National Nuclear Laboratory. A group of innovative supply chain companies cluster around Barnwood, which provides considerable specialist nuclear knowledge and capability including Atkins, Frazer-Nash and AMEC.

The National Nuclear Laboratory (NNL) is the lead organisation for co-ordinating nuclear energy research and operating some of the UK's major facilities, such as the radioactive labs at the Dalton-Cumbria facility close to Sellafield. The NNL has an R&D office at Stonehouse Gloucestershire, which focuses on station chemistry and corrosion and graphite technology.

Part of the Nuclear Decommissioning Authority, **Radioactive Waste Management (RWM)** is responsible for developing and operating a Geological Disposal Facility (GDF) for the UK high and intermediate level radioactive wastes. Based at Harwell in Oxfordshire, RWM commissions research locally for the GDF e.g. suitability of the UK geology, public engagement and consent.

The University of Plymouth is maximising performance and reliability of advanced structural materials in nuclear pressure vessels and steam turbine components, with strong links with the South African Energy Utility, Eskom.

The University of Cardiff has an established track record of research in support of the nuclear sector, principally through the School of Engineering, particularly geological radioactive waste disposal, mechanical testing, damage detection in structures and thermo-electric generators for space applications. Also based in Cardiff is the leading research group studying public perception of nuclear energy, including long term trends.



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