

# SCIENCE CITY BRISTOL

BRISTOL HAS BEEN DESIGNATED ONE OF BRITAIN'S SIX SCIENCE CITIES IN RECOGNITION OF ITS WORLD-CLASS SCIENTIFIC RESEARCH, INNOVATION AND DEVELOPMENT IN THE UNIVERSITY AND INDUSTRIAL SECTORS. THE BRISTOL CITY-REGION IS A PLACE WHERE ADVANCED KNOWLEDGE AND ITS PRACTICAL APPLICATION THROUGH THE SCIENCES, TECHNOLOGY, ENGINEERING AND NEW CREATIVE INDUSTRIES ARE DRIVING GLOBALLY SIGNIFICANT PROJECTS. IT ALSO HAS A DISTINGUISHED SCIENCE-RELATED HISTORY.

From medieval times Bristol's wealth was based on trade. This comprised the importing, exporting, processing and manufacture of raw materials and trading goods, activities that became increasingly specialist as the market grew more sophisticated. Scientific discoveries in the eighteenth and nineteenth centuries that were of commercial benefit to the city included new processes for producing high-quality spherical shot, and smelting zinc and copper, and the application of steam-driven technology in the mass-refining of sugar and soap.

Bristol's commercial prosperity came at the price of terrible environmental damage to the city: businesses in the heart of the nineteenth-century waterfront for example, included, in close proximity, an ammonia works, a tar works and a chemical company, each producing a barrage of noxious fumes. It is perhaps fitting then that Bristol is now recognised as the centre for so many green initiatives. Among these are the CREATE Centre, where a number of organisations are working in the field of sustainable development, and the Centre for Research in Environmental Sciences at the University of the West of England which brings together environmental scientists to research and find a remedy for the effects of pollution.

Bristol's original success in trade was dependent on the attractions of its harbour, one of the best-defended in medieval Britain. The excavation of a cut to divert the course of the River Frome in 1239 in order to increase the quay space and improve access to the docks was one of the outstanding engineering feats of the period. In the nineteenth century, Isambard Kingdom Brunel – one of Britain's most innovative engineers – made a significant contribution to the commercial life of the city by providing some practical solutions to the docks' on-going silting problems. The goods-laden merchant ships may have long gone from the heart of the city but today's regenerated Harbourside is thriving once more. Watershed Media Centre at the gateway to the Harbour is a hub for one of the most important sectors in the Bristol economy, the creative industries. These include natural history film making, animation and digital technology. Incidentally, Bristol-born photographer William Friese-Greene was experimenting using celluloid to record movement back



*View of dock at Bristol with a trader (1808) from the Braickenridge Collection (Bristol Libraries).*

*Cleaning the Floating Harbour, Thomas L Rowbotham (1828) (Bristol's Museums, Galleries and Archives). This drawing shows men with shovels loosening the silt along the side of the harbour having drained out the water by opening the lock gates. The ship is being used to channel the flow.*

in the 1880s, making him the precursor of modern cinematography. He also patented inventions involving photography, X-rays, printing and airships.

Bristol's waterfront has also long been associated with shipbuilding. Bristol seafarers were venturing far out across the Atlantic as early as the medieval period in their Bristol-built ships and the city continued to be known for the quality of its shipbuilding skills until well into the nineteenth century. Other forms of transport and travel that were pioneered in Bristol include John Loudon McAdam's revolutionary 'macadamised' highways, the quirky but impressive charvolant – a carriage powered by kites – of schoolteacher and evangelist George Pocock, Brunel's broad gauge railway which ran through Bristol from London to Penzance and, moving into the early twentieth century – the aeroplane.

Today the aerospace companies clustered north of the city provide an unrivalled source of knowledge and skills in engineering, transport and advanced technology. From Filton have also come advances in missile defence systems, including those tested at MBDA's UK electro-magnetic

compatibility facility. The Bristol city-region was once – regrettably – the centre of the British chemical warfare industry thanks to the 20 tons of mustard gas produced per day at Avonmouth during World War One. During World War Two, William Grey Walter was working on scanning radar technology and guided missiles at the Burden Neurological Institute in Bristol. He is best remembered for the work he began in the late 1940s at the Institute on mobile autonomous robots designed to investigate brain functions. This proved to be a landmark in the fields of both robotics and cybernetics.

A science city needs technology and it also needs thinkers. In the late eighteenth and early nineteenth century, Bristol was at the forefront of Enlightenment thinking. Visitors to Thomas Beddoes' Pneumatic Institution at Hotwells, who came to enjoy the recreational pleasures of the newly-discovered laughing gas with Humphry Davy, included the leaders of the Romantic movement, Samuel Coleridge, William Wordsworth and Robert Southey, and the philanthropic potter Josiah Wedgwood, member of the influential Lunar Society. Davy's brief association with the city ended in 1801 when he joined the Royal Institution in London.



Left: George Pocock (Bristol Libraries).

The physician Dr Thomas Beddoes (Bristol Libraries).

Below: 'Charvolants travelling in various directions with the same wind' and 'A boat race', illustrations from George Pocock's *The Aeropleustic Art, or Navigation in the Air by the use of Kites or Buoyant Sails* (1827) (Bristol Libraries).







In nearby Bath, the Bath Royal Literary and Scientific Institution, which is still active in the city, was founded in 1824 with the aim of furthering 'the advancement of literature, science and art'. One of the most famous of the city's scientists is Caroline Herschel who became the first woman astronomer to be elected to the Royal Society. Her brother William discovered Uranus in 1781 using a telescope of his own design. Today, the city-region is connected to the distant planets through the work of Bristol-born Professor Colin Pillinger, chief scientist of the Beagle 2 project.

Nobel-prize winning university alumni and staff from Bristol include the Bristol-born Paul Dirac, who graduated in electrical engineering and mathematics from the University of Bristol in the 1920s, physicists Cecil Frank Powell, Hans Albrecht Bethe and Sir Nevill Francis Mott, and chemist Sir William Ramsay. The Institute of Physics Publishing in Bristol, one of the largest and most dynamic publishers of physics information in the world, sponsored a public art work created in honour of Paul Dirac which is outside Explore At-Bristol. Dorothy Hodgkin, the University of Bristol's Chancellor from 1970-1988, won the 1964 Chemistry Nobel Prize for work on X-ray diffraction.

Today the research of the West of England universities is increasingly developed in collaboration with business and the industrial sector, finding practical applications for new discoveries. Complementing these initiatives, the Science Communication Unit at the University of the West of England and the Institute for Advanced Studies at the University of Bristol are among those actively engaging the public with science, while the South West Science and Industry Council, whose secretariat is based in Bristol, is promoting a stronger understanding of the contribution science and technology can make to the economy.



*Top left: Redcliffe Hill with the Shot Tower, Hugh O'Neill (1822) (Bristol's Museums, Galleries and Archives). William Watts, a local plumber, invented a new method of making lead-shot that involved dropping molten-lead through a sieve from a great height into water. His shot tower survived until the late 1960s when it was demolished during the widening of the road.*

*Top right: The Physics Building and Royal Fort Garden at the University of Bristol (University of Bristol).*

*Below: Cover of May 2007 edition of Physics World, published by the Institute of Physics Publishing in Bristol (IOP).*

