How research at the University of Birmingham has changed the world

In 2014 the University of Birmingham undertook a piece of research to find out from staff, students and alumni who their research heroes were. Over 100 names were suggested, across all colleges and all areas of expertise. We’ve included the Top Ten finalists inside this booklet… look out for the coloured ‘Top Ten’ light bulbs to find out more.
A major study by Birmingham researchers proved that pulse oximetry (Pulseox) was a simple and safe test to help identify congenital heart disease in newborn babies, which contributes to 46% of deaths from congenital malformations and would otherwise go undetected.

Researchers at the University are using robots to improve social interaction and communication with autistic children in the classroom. The Aldebaran robots dance and play games to create a safe and motivating learning environment.
Professor Alan Rickinson

Alan Rickinson led the development of the Institute of Cancer Studies (now School of Cancer Sciences) at the University of Birmingham from 1983 to 2001, overseeing its expansion from a small non-clinical research department into a large research institute integrating basic work on cancer genetics, viral oncology and tumour immunology with translational studies in gene/immunotherapy and the activities of a large cancer clinical trials unit.

Since then, he has been fully committed to maintaining Birmingham’s position as an international centre of excellence for work on human tumour viruses, and continues to lead a large research group focusing on the Epstein–Barr virus and its associated malignancies.
The total area of the University of Birmingham’s campuses amounts to 276 acres, nearly five times the size of St James’s Park in London.

The University owns 21 listed buildings, all listed at Grade II or higher.

(Pictured: the Barber Institute of Fine Arts)
The University of Birmingham has produced two Prime Ministers of the United Kingdom: Stanley Baldwin (1923–1924, 1924–1929 and 1935–1937) and Neville Chamberlain (1937–1940); two of only eight Prime Ministers to study at a university outside Oxford or Cambridge.
Sir David Attenborough, Benjamin Zephaniah, Clive Anderson, Sir Trevor McDonald, Alistair Campbell, Jung Chang and Gyles Brandreth have all delivered the University’s annual Baggs Memorial Lecture on happiness.
Sir John Randall and Dr Harry Boot

In 1940 the cavity magnetron, the principal generator of high power centimetre-wavelength electromagnetic radiation used in radar and microwave ovens, was developed in the Physics Department at the University of Birmingham by physicists John Randall and Harry Boot. It was used to power airborne radar in World War Two.
Sir Peter Scott, a former University Chancellor (1973–1983), founded the Wildfowl and Wetlands Trust and was a founder of the World Wide Fund for Nature.

The University of Birmingham Observatory houses the largest optical telescope within easy reach of central Birmingham and the West Midlands region. Its mirror has a diameter of 50cm, and its high quality optical design matches that of professional research telescopes such as the Hubble Space Telescope.
The University’s Shakespeare Institute is located in Stratford-upon-Avon and contains a library of over 60,000 volumes including 3,000 early printed and rare books. The Institute is located in the novelist Marie Corelli’s former house.

The University owns over 2.7 million books and scholarly journals, and more than 16,000 electronic resources. Special Collections, housed in the Cadbury Research Library, holds over 200,000 pre-1900 books and over 3 million archives and manuscripts.
RESEARCHERS AT THE UNIVERSITY DISCOVERED A MAJOR CEREMONIAL MONUMENT LESS THAN ONE KILOMETRE AWAY FROM STONEHENGE, COMPLETELY CHANGING OUR UNDERSTANDING OF STONEHENGE AND ITS LANDSCAPE.

A team of archaeology experts, led by the University, discovered what is believed to be the world’s oldest ‘calendar’ in Aberdeenshire. The Mesolithic monument pre-dates the first formal time-measuring devices by nearly 5,000 years.

(Pictured: an artist’s impression of a fire burning in one of the pits at the monument)
COBUILD

COBUILD (Collins Birmingham University International Language Database) research has transformed the study of the English language internationally by a radical and highly innovative use of corpus-linguistic technologies to analyse computationally multi-million-word databases of the English language.

The COBUILD team’s original approach to the description of English in the 1980s influenced the design and use of dictionaries, grammars of English and course materials. Their research has subsequently led to revolutionary new approaches to linguistic theory and practice with numerous possibilities generated for interdisciplinary research activity.

The impact has been genuinely world-wide and there is no approach to English language description and use today that can ignore the profound and seminal effects of COBUILD research.
Lord Robert Cecil, 1st Viscount Cecil of Chelwood, was awarded the 1937 Nobel Peace Prize for his work as an architect of the League of Nations while he was Chancellor of the University.

5,000 INTERNATIONAL STUDENTS FROM 150 DIFFERENT COUNTRIES, MAKE BIRMINGHAM ONE OF THE LARGEST INTERNATIONAL STUDENT COMMUNITIES IN THE UK.
Our clock tower is known to students as either ‘Old Joe’ or ‘Big Joe’. At 100 metres, it is the tallest free-standing clock tower in the world. At 17 feet 3 inches across, it is possible to drive a double-decker bus through the clock-face of ‘Old Joe’.

Each year we recycle over 400m$^3$ of green waste.
ANDREW CARNEGIE (OF CARNEGIE HALL FAME) WAS AN EARLY BENEFACtor OF THE UNIVERSITY. HIS FORTUNE MAKES HIM THE SECOND-RICHEST MAN OF ALL TIME.

The University of Birmingham has been selected as the UK’s higher education Science, Technology, Engineering and Mathematics (STEM) centre.
Otto Frisch and Sir Rudolf Peierls

The Frisch and Peierls memorandum was the first technical exposition of a practical atomic weapon. Written by Otto Frisch and Rudolf Peierls while they were both working at the University of Birmingham, the memorandum contained new calculations about the size of the critical mass needed for an atomic bomb, and helped accelerate British and US efforts towards bomb development during World War Two.
Sir Edward Elgar was Professor of Music at Birmingham (1905–1908) – a musical heritage that continues today with state-of-the-art facilities in the Bramall Music Building and the installation of a bespoke pipe organ in 2014.

The University has its own botanic garden. Treasures that can be enjoyed here include a Japanese Tea House and the National Collection of the History of the European Rose.
THE UNIVERSITY IS WORTH £898 MILLION ANNUALLY TO THE BIRMINGHAM ECONOMY AND £1.072 BILLION TO THE WEST MIDLANDS REGION. THE UNIVERSITY'S ECONOMIC IMPACT IS ALMOST DOUBLE THE COMBINED VALUE-ADDED IMPACT OF THE EIGHT LARGEST FOOTBALL CLUBS* IN THE REGION!

* Aston Villa, Birmingham City, Coventry City, Shrewsbury Town, Stoke City, Walsall, West Bromwich Albion and Wolverhampton Wanderers
STUDENTS AT THE UNIVERSITY ONCE STUDIED BREWING – A FORMER CORE REGIONAL INDUSTRY.

The main entrance to the Aston Webb Building has a whispering gallery at its highest level.
Professor Frank Hahn

Frank Hahn was Lecturer, then Reader, in Economics in the Faculty of Commerce at the University of Birmingham from 1948 to 1959. His research incorporated money into the analysis of the growth and instability of economic systems. His examination of the share of wages in the national income anticipated the heated debate current today. His contribution to leading us to a better world was in reformulating and refining previous economic theory as the basis for decision making on public policy.
University physician Dr Richard Hill Norris was the first to describe the action of platelets in 1880. In 2009 our scientists made a promising discovery about the development of better medicines to prevent blood clots.

RESEARCHERS AT THE UNIVERSITY HAVE SUCCESSFULLY USED A HERPES VACCINE TO ATTACK AND KILL CANCER CELLS – A LEADING DEVELOPMENT FOR CANCER VACCINES.
WE ARE THE ONLY UNIVERSITY IN MAINLAND UK WITH ITS OWN RAILWAY STATION.

IN 1946 THE UNIVERSITY OF BIRMINGHAM BECAME THE FIRST UK UNIVERSITY TO OFFER A SPORTS-BASED DEGREE.
Fred Shotton, former Lapworth Professor of Geology, mapped the geology of the beaches of northern France prior to the D-Day landings.

Malcolm X

THE AMERICAN HUMAN RIGHTS ACTIVIST ADDRESSED THE UNIVERSITY DEBATINGSOCIETY IN 1965.
Sir Norman Haworth worked at the University of Birmingham for nearly 25 years. His Nobel Prize-winning work in Chemistry studying carbohydrates defined the basic features of starch, cellulose, glycogen, inulin and xylan, the knowledge of which has had broad impact far outside the remit of chemistry.

His pioneering work on vitamin C and carbohydrates was a key step in bringing the natural world within the realm of chemistry, significantly helping achieve advances in health and food production.
John Neville Marshall, a member of University staff, was awarded the Victoria Cross for his part in the attack on the Sambre–Oise Canal in World War One on 4 November 1918.

Honorary graduates of Birmingham include Dame Judi Dench, Jasper Carrott, Nigel Mansell, Benjamin Zephaniah and Sir David Attenborough.
The University has exchange agreements with 200 universities in Europe and agreements with 80 universities in Australasia, Africa and the Americas through our Erasmus and International Exchange programmes.

The University has offices in Guangzhou, China and New Delhi, India, and a permanent presence in Lagos, Nigeria and Shanghai, China.
The University owns the Mingana Collection; the largest collection of illuminated Middle Eastern manuscripts after those in the Vatican and the Bibliothèque nationale in France. The collection has recently been made publicly available to view online.

We have been providing social work education since 1908, when one of the first diplomas in social studies in the UK was established at the University.
There is a superstition that if you walk under the clock tower when the bell chimes you will fail your degree.

OUR MOTTO ‘PER ARDUA AD ALTA’ MEANS ‘THROUGH EFFORTS TO HIGH ACHIEVEMENTS’.
As Emeritus Professor of English Literature at the University of Birmingham for 27 years, David Lodge’s campus novels, together with those of his contemporary Malcolm Bradbury, broke new ground and helped to create a new genre of literature. His literary criticism has helped generations of students of literature to get to grips with new ideas, and his early novels are still relevant and engaging today. His later novels provide new enjoyment and new ideas.
The University owns the Cadbury Papers. The papers relate to the chocolate-making firm and mainly concern the cocoa trade in West Africa from 1900 to 1960.

The University owns the Noel Coward Collection of scripts, diaries, short stories, songs, music and photographs.
The University is home to works by leading sculptors such as Henry Pegram, Dame Barbara Hepworth, Bernard Sindall, Sir Anthony Caro, William James Bloye and Sir Jacob Epstein.

The University was established by Royal Charter on 5 May 1900. One hundred years later the current monarch visited our campus to mark this important anniversary.
Over-the-counter male fertility tests were first developed at the University of Birmingham to give couples trying to conceive an early warning of potential fertility problems.

In the 1960s our scientists developed pacemakers to treat the symptoms of heart disease.
The ceramic friezes above the entrance to the Aston Webb Building representing the industry of the Midlands were created by Robert Anning Bell. His work can also be seen in Westminster Cathedral and the Houses of Parliament.

Many great thinkers were considered but only nine were chosen to represent the greatest names in the sciences and humanities carved above the entrance to the Aston Webb Building at the heart of the University’s campus. Figures from left to right: Beethoven, Virgil, Michelangelo, Plato, Shakespeare, Newton, Watt, Faraday and Darwin.
Sir Peter Medawar CBE

Sir Peter Medawar was Professor of Zoology at the University of Birmingham between 1947 and 1951. His research was around tissue culture and why skin from one human being will not form a permanent graft on the skin of another person. He spent many years researching and analysing this phenomenon of tolerance and transplantation immunity.

His work on the subject led him to being elected as a Fellow of the Royal Society, which awarded him its Royal Medal in 1959. In the same year, he was Reith Lecturer for the BBC.

Sir Peter’s work on graft rejection and the co-discovery of acquired immune tolerance was fundamental to the practice of tissue and organ transplants. He was awarded a Nobel Prize for this work in 1960.
Professor Charlotte Anderson demonstrated that the gluten fraction of wheat was the cause of coeliac disease, which led to the introduction of gluten-free diets.

The Barber Institute of Fine Arts on the University's campus contains works by Degas, Magritte, Matisse, Monet, Van Gogh and Picasso.

(Pictured: The Church at Varengeville, Claude Monet)
A nest box has been placed at the top of the University clock tower where a pair of peregrine falcons nest every year.

The University of Birmingham has the longest established business school in the country. It was founded in 1902 as the Faculty of Commerce.
The prominent modern sculptor and artist Sir Eduardo Paolozzi created this sculpture *Faraday* for the University as a centenary gift in 2000.

**OUR PAOLOZZI SCULPTURE FARADAY IS INSCRIBED WITH A QUOTATION FROM T S ELIOT’S *FOUR QUARTETS*:**

‘YOU ARE NOT THE SAME PEOPLE WHO LEFT THAT STATION/OR WHO WILL ARRIVE AT ANY TERMINUS/ WHILE THE NARROWING RAILS SLIDE TOGETHER BEHIND YOU.’
In 1891 at the University, John Henry Poynting was the first scientist to successfully calculate the mean density of the Earth.

The University owns The Chamberlain Collection – the papers of Neville Chamberlain (Prime Minister 1937–1940); Joseph Chamberlain (founder of the University); and Austen Chamberlain, including letters describing Neville Chamberlain’s meeting with Hitler.
Professor David Charlton

Currently Professor of Particle Physics at the University of Birmingham, Dave Charlton took up the role of ‘spokesperson’, or scientific leader, of the ATLAS experiment at CERN’s Large Hadron Collider on 1 March 2013, having been voted into the role by the project’s 177 member institutions at the height of media interest over the discovery of the ‘God particle’.

Professor Charlton, who was deputy spokesperson at the time of the discovery, said his key task at the helm would be to achieve consensus, since all 3,000 physicists involved in the collaboration ‘basically have an equal say’ in how the project is conducted.

The continuing analysis of data gathered during ATLAS’s triumphant first run also needs to be optimised across the collaboration’s 100,000 global computers.
WE ARE THE FIRST UNIVERSITY IN THE UK TO RUN A FLEET OF HYDROGEN CARS, EXPLORING THIS NEW, SUSTAINABLE FUEL SOURCE.

Former student Professor Peter Bullock was awarded the 2007 Nobel Peace Prize for his role on the Intergovernmental Panel on Climate Change, which has spread greater knowledge about man-made climate change and laid the foundations for counteracting such change.
The University of Birmingham is a founding member of the **Russell Group** of research universities.

The University of Birmingham is a founding member of **Universitas 21** - a network of 27 research universities from 17 different countries.
Lisa Clayton, the first British woman to sail single-handedly around the world, studied at the University of Birmingham.

Professor Maurice Wilkins CBE was awarded the 1962 Nobel Prize in Physiology or Medicine for his discovery of the structure of DNA. He completed his PhD at the University.
Sir Paul Nurse

Known for his work on cell cycle regulation, Sir Paul Nurse received the Nobel Prize for Physiology or Medicine in 2001 for his seminal discoveries at the molecular level of cell cycles. He enabled the development of new treatments and medicines for cancer through his studies and management of research teams, and discovered the gene that controls cell division through his postgraduate experiments on yeast.

Sir Paul graduated from Birmingham in 1970 with a BSc in Biology and, after doing much of his pioneering research in the 1980s, he joined the Imperial Cancer Research Fund and became its Director General and Head of Cell Cycle Laboratory.

Sir Paul headed up the world’s largest volunteer-supported cancer research organisation, Cancer Research UK, when ICRF and the Cancer Research Fund joined forces. He moved to the United States in 2003 to become President of The Rockefeller University, and is currently President of the Royal Society.
OUR FORMER VICE-CHAELLOR RAYMOND PRIESTLEY TOOK PART IN THE ANTARCTIC EXPEDITIONS OF ERNEST SHACKLETON (1907–09) AND ROBERT SCOTT (1910–13).

The University offers a Masters programme in Dance, run in partnership with the Birmingham Royal Ballet.
Francis Aston, a student and researcher at the University, was awarded the 1922 Nobel Prize in Chemistry for creating the mass spectrograph and developing rules which formed the basis of how we now use nuclear energy.

Intellectual property from the University of Birmingham developed the world’s first point-of-care diagnostic device for multiple myeloma.
Sir Aston Webb, the University’s original architect, also designed the Victoria and Albert Museum’s entrance and redesigned the façade of Buckingham Palace and the Mall.

In 1900 the university had 189 undergraduates. In 2014 this figure has risen to 19,347.
The stained glass window in the Great Hall was donated to the University by Sir John Holder. It has 53 lights, contains six shields of the Midlands, the University shield, the arms of the city of Birmingham, the Calthorpe arms, Sir John Holder’s arms and the Chamberlain crest.

The Great Hall in the Aston Webb Building was converted into the 1st Southern General Hospital during World War One, with 520 beds and treated 125,000 injured servicemen.
Ban Ki-moon, the Secretary-General of the United Nations, delivered a speech at the University about the need for co-operation in tackling global issues in June 2009.

Wireless telegraphy, tank design and light alloys for aircraft were all developed here for the war effort during World War One.
The Right Honourable Joseph Chamberlain, the University’s founder and first Chancellor (1900–1914) also laid the basis for our modern education system, cleared the slums of Birmingham, brought its water and gas supply under municipal control and transformed it into the ‘best governed city in the world’.

The Aston Webb Building was opened on July 7 1909 by King Edward VII.
Neville Chamberlain ■ Tamsin Greig ■ Victoria Wood ■ Ben Shephard ■ Chris Tarrant ■ Professor Mick Aston ■ Lizo Mzimba ■ Francis Brett Young ■ David Gill ■ Tim Curry ■ Naomi Folkard ■ Ann Widdecombe ■ Stanley Baldwin ■ Chris Addison ■ Alison Curbishley ■ General Sir Mike Jackson ■ Phyllida Lloyd ■ Chrissie Wellington ■ Simon Thomas ■ Matthew Key ■ Adam Pengilly ■ Simon Halsey ■ James Clavell ■ Joey Barrington ■ Sir Paul Nurse

all studied here.