

SCIENCE
MUSEUM
GROUP

QUEEN HERALDS GLORIOUS FUTURE

ANNUAL REVIEW 2014–15



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EXTRAORDINARY FIND ACQUIRED BY THE NATIONAL RAILWAY MUSEUM

Willington 'waggonway', c. 1780s

Buried for nearly two centuries, this wooden 'waggonway' unearthed during redevelopments on Tyneside in 2013 is the most significant survivor yet of the pre-steam railway. With some components made of timber recovered from ships of the time, it tells a remarkable story of industry and innovation from the 1780s but, as part of the oldest surviving

standard-gauge track in the world, also points back to the earliest railways in Britain from 1603 onwards. Currently under specialist conservation to stabilise the timber after centuries below ground, some of the track is being considered for display as part of the NRM Masterplan.

Photograph by Bob Gwynne

“ We are backing the Science Museum Group’s pop-up festivals as they take important messages to the streets of Manchester and Bradford

GREG CLARK SCIENCE MINISTER,
ANNOUNCING £300,000 FOR FESTIVALS

“ The universe cannot wish for a more perceptive eye than the Science Museum

PROFESSOR ROBBERT DIJKGRAAF
DIRECTOR AND LEON LEVY PROFESSOR AT THE
INSTITUTE FOR ADVANCED STUDY IN PRINCETON

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Cover picture In October 2014 Her Majesty The Queen was invited to send her first tweet as a contemporary way to open an ambitious new exhibition space at the Science Museum. *Information Age: Six Networks That Changed Our World* is the first gallery in the UK dedicated to the history of information and communication technology. At its heart stand the mighty tuning coils from what was the world’s most powerful radio transmitter when it opened at Rugby in 1926. Photograph by Kira Zumkley © Science Museum

“ A new world-class interactive gallery will open at the National Media Museum in 2016 and our IMAX theatre is going digital; the threat of closure is past, the future could not be more exciting

LORD GRADE SMG TRUSTEE AND CHAIR,
NATIONAL MEDIA MUSEUM ADVISORY BOARD

OUR FIVE WORLD-BEATING MUSEUMS

Science Museum, London (SM)
Museum of Science & Industry, Manchester (MSI)
National Railway Museum, York (NRM)
National Media Museum, Bradford (NMeM)
National Railway Museum, Shildon (NRM)

THE YEAR’S HIGHLIGHTS

The Science Museum Group attracted a total of 5,337,000 visits during the past year, among which 595,000 people visited in booked education groups.

The Science Museum attracted 3,348,000 visits, and welcomed 452,000 visitors in education groups, of which a record-breaking 388,000 were children and young people.

The Museum of Science & Industry created the innovative *Pi Platform for Investigation* as a monthly laboratory where 14,000 visitors of all ages participated in live scientific experiments.

The National Railway Museum (York and Shildon) achieved a total of 894,000 visits during the year. At NRM Shildon 6000 visitors celebrated its tenth-anniversary steam gala.

At the National Media Museum the annual Bradford Animation Festival attracted more than 9000 students, industry figures and family visitors.

SUPPORT THE WAY OUR MUSEUMS CHANGE

Your donation will help us make the most of our unrivalled collections, acquire new objects, create innovative exhibitions and galleries, and develop the world’s best learning programmes for all ages. Visit sciencemuseum.org.uk/donate or for corporate membership and patrons see page 69.

FIVE MUSEUMS WITH ONE UNIQUE SELLING POINT

We welcome Dame Mary Archer, the distinguished chemist, to the chairmanship of the Science Museum Group. Here she relishes the challenge



Joining the Science Museum Group as Chairman, some 15 years after I stepped down as a Trustee, I’ve been struck anew by our iconic collections and the stories they tell of inspiration, discovery and invention. The richness of our holdings, our cultural memory and the breadth of our offering to the public make us a leader among the world’s science museums.

The Group stands today at an exciting confluence of success, opportunity and challenge. The achievements of Director Ian Blatchford and his team are palpable everywhere – in *Information Age*, the Science Museum’s stunning new gallery; in the Museum of Science & Industry’s showcasing of Manchester’s contributions to science and technology over three centuries; in *Drawn by Light*, curated from the exquisite Royal Photographic Society Collection at the National Media Museum; and in Churchill’s funeral train, beautifully

restored and displayed at the National Railway Museum. I would also like warmly to acknowledge my predecessor Dr Douglas Gurr and Dr Gill Samuels, who took the helm as Chairman in the months before my arrival.

Great opportunities lie within our grasp. The country’s economy depends on the understanding and application of science, technology, engineering and mathematics. Yet Britain is desperately short of engineers, only 13% of young people in the UK study maths beyond the age of 16, and more than 80% of postgraduate STEM students at UK universities come from outside the EU.

Among its 5.7 million visits last year, the Group welcomed half a million 16- to 24-year-olds and nearly 1.8 million children. Thus we are uniquely positioned to increase the country’s science capital and to create a workforce fit for our time. But we must develop our nationwide STEM activity in the face of steadily falling Grant in Aid from the Department of Culture, Media and Sport, and with scant recognition in public funding terms that we are an integral part of the nation’s science base.

New capital is needed to invest in galleries and exhibitions, to deliver the Group’s strategic plans and shift the focus of our attention towards the North. The Government has backed our plans for Manchester, and we will develop further compelling projects to fire the imagination of charitable foundations, business and major philanthropists.

So there’s plenty for the new Board of Trustees to do. Given the Group’s remarkable progress in recent years, I am confident that the best is yet to come.

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What the Cravings exhibition does is reveal how the food we eat shapes our appetite throughout our life

PROFESSOR DAME SALLY DAVIES CHIEF MEDICAL OFFICER FOR ENGLAND

The Science Museum Group is playing a really important role in getting young people excited about science and engineering

TERRY MORGAN CHAIRMAN OF CROSSRAIL, SPEAKING TO SMG STAFF



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“ Ambitious programming and creative marketing have been key to our record visit numbers. This requires investment – so I’m afraid the ‘boom’ would vanish like the morning dew if there were major funding cuts in 2015

IAN BLATCHFORD

WE’RE MAKING WAVES – WHY STOP NOW?

Initiative and progress characterise Ian Blatchford’s tenure as Director and Chief Executive of the Science Museum Group but he argues that even more could be done if the Group’s vital role in the science base were acknowledged and rewarded

As I embark on my fifth year as Director, I am ever more convinced of the urgency and utility of the Science Museum Group’s place in the cultural life of this country. And whilst there is much to celebrate in this Annual Review, I harbour a deep frustration that our Government funding position fails to recognise that we are a *fundamental* part of the UK science base.

This Review reports energy, innovation and progress across all five of our museums – brand-new galleries, better visitor amenities and renewed impetus for our scholarly output. With such momentum it is essential that we secure the public and private funding to deliver the full impact of our work. Our museums will help secure the next generation of scientists and engineers, and so create a richer and more diverse society. With so much already achieved and further ambitions about to be expressed in the crucial areas of medicine, interactive exhibits and maths, we are in no mood

to slow down. We have relied on our own wits to ride out a loss of Government aid to the tune of 30% in real terms since 2010. Why squander our investment in human capital? Why stop now?

The case is simple. The Group should be funded to the same extent enjoyed by the science base to attest to its role as a key player in the UK science ecosystem. Whilst Britain needs its world-class university science, research councils, innovation hubs and learned scientific and engineering societies, it also needs the Science Museum Group as much as any of them. It is one system.

The importance of STEM education and careers is a major national issue. The concern in Whitehall and business is understandable, but the peril of new initiatives remains. We need action that is informed by the experience of the best existing players and partnerships, and robust research into impact – all of which

we possess in spades, given that 600,000 people visit our museums in booked education groups each year.

The Group has a pioneering learning team, reaching more schoolchildren and teachers than any other national museum. We are deadly serious about the best research too. We are in our second year of the Enterprising Science project, with our partners BP and King’s College London. We are encouraged by the concept of ‘science capital’ and the degree to which we can find the right ‘tipping points’ at which large cohorts of young people feel empowered – as much by their parents as by their teachers – to work in STEM fields.

One brilliant collaboration was the creation of the *Engineer Your Future* exhibition. Too often STEM projects are both too muddled and reach too few young people to have a lasting impact. Our excellent partners have been razor

sharp about messages and the problems that need to be solved. By adapting games scenarios, the exhibition tests wit and initiative in the language most familiar to digital natives, and aims to intrigue thousands of young visitors about careers in engineering. It is not a magic bullet, but is certainly a valuable contribution. The exhibition enjoyed 127,000 visits in its first three months alone and it shows great potential for national touring.

There was no better way to bang the drum for science and engineering than the new *Information Age* gallery which Her Majesty The Queen opened in October 2014. The event was a major international story and a celebration of this country’s outstanding and continuing contribution to communications technology. The gallery combines fundamental physics, technology and vivid personalities, all wrapped into a cultural landscape.

STEM impact and cultural confidence

are vital, but so too is impact across the country. I said last year that the Group will shift its centre of gravity northwards, and so it was a huge boost in December 2014 when the Chancellor announced further Government capital funding for the new exhibition space at the Museum of Science & Industry in Manchester. The announcement was great both for the museum and for the European City of Science in 2016.

I want to end by recalling the speech of the year: the words of Jim Lovelock in April 2014 at the opening of the Science Museum exhibition that reviewed his scientific life and celebrated our acquisition of his archive. Jim recalled the crucial impact of visiting the museum in 1926 and how this led to many decades of ground-breaking research. Despite his 95 years he retains boundless curiosity about how the world works. It is what makes scientists so admirable. There is so much we still need to understand, so why stop now?



Opposite: The Chancellor of the Exchequer announces a further £3 million investment for the Museum of Science & Industry... In Manchester for the news, left to right, Sally MacDonald, Director of MSI, the Rt Hon. George Osborne, Professor Brian Cox and Ian Blatchford



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SMG IS THE PLACE TO BE

Other pages record how SMG's Manchester museum hub has become a platform for announcing 'northern powerhouse' ambitions, while York sets the pace as a forum for discussing the future of railways. And Her Majesty The Queen paid us the greatest honour by opening a major new addition to London's gallery scene. Of course, all our museums have again proved themselves magnets for celebrities who accept that science is chic these days...



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HUGE CASH BOOST FOR MANCHESTER

Platform 5 Architects' concept for the new exhibition hall in the 1830 Warehouse at the Museum of Science & Industry



The Chancellor George Osborne's decision to award the Museum of Science & Industry £3 million towards the creation of a new special exhibitions gallery chimed perfectly with Manchester's rising reputation as a city of science. It had just been selected to host the 2016 EuroScience Open Forum – Europe's

largest general scientific conference – and given the accolade of European City of Science. The £3 million investment comes in addition to an earlier Treasury award of £800,000 to kick-start the development of plans to turn the vaulted arches of the 1830 Warehouse into a bespoke facility, suitable for housing major science exhibitions. In another great vote of confidence, the Wellcome Trust has since awarded us £1.8 million.

Building on the success of the *Brains: The Mind as Matter* and *Collider* exhibitions, seen collectively by 116,000 people, MSI intends to host touring exhibitions, as well as curating ground-breaking events of its own. Visitors will explore and interact with real science that highlights our internationally significant collections. By telling the stories of Manchester's scientific endeavours that had and still have a global impact we will fulfil our aspiration to inspire

future generations of scientists and engineers.

The announcement follows the Government's vision to create a 'northern powerhouse' around this science city. Where better to realise that ambition than in the place where science met industry and the modern world began?

“ This invaluable financial support means we can feed the enormous passion for science in the Northwest

SALLY MACDONALD MSI DIRECTOR



Ian Blatchford joins George Osborne at MSI in Manchester for the launch of the 'northern powerhouse'



“ Let's hope this will inspire further transformational philanthropy

IAN BLATCHFORD DIRECTOR, SCIENCE MUSEUM

A STARRY COUP FOR MATHS

If there is a single announcement from 2014 that epitomises the current revolution at the Science Museum Group, it is surely the unveiling of the team behind our new maths gallery. The Science Museum has assembled a world-leading architect, a philanthropist without equal in our history and an award-winning curator.

Zaha Hadid Architects won the competition to design the world's foremost gallery of mathematics with an approach that, as the architect herself puts it, transforms 'seemingly abstract mathematical concepts into an exciting interactive experience'. Anchored by the mathematical thinking that permeates these designs, this permanent gallery will explore how mathematicians, their tools and ideas have helped to shape the world from the turn of the 17th century to the present.

It is being curated by David Rooney, who led the delivery of our *Codebreaker* exhibition about Alan Turing.

The startling ambition of the mathematics project has been made possible by the generosity of long-standing supporters of science David and Claudia Harding, whose foundation has provided the largest individual donation ever made to the museum. Director Ian Blatchford describes their £5 million gift as 'game-changing', adding 'Let's hope that this will inspire further transformational philanthropy.'

Secretary of State for Culture, Media and Sport Sajid Javid said: 'Mathematics is an absolutely vital part of a rounded education. So it is great news that the Science Museum is to have a new gallery, helping to bring it alive and make it meaningful for everyone.'



Architect Zaha Hadid with donor David Harding launching plans for the new David and Claudia Harding Mathematics Gallery at the Science Museum
Top: Zaha Hadid Architects' concept for the gallery



HM The Queen has a long relationship with the Science Museum and first visited in March 1938, as a princess, soon after we launched our pioneering interactive *Children's Gallery*...
2014: Science Museum Director Ian Blatchford escorts Her Majesty through the Energy Hall



NEW DAWN FOR A NEW AGE

History was made at the Science Museum on 24 October 2014 when Her Majesty Queen Elizabeth II sent her first tweet to formally open the magnificent new Information Age gallery, part of our ambitious Masterplan

HEART OF THE MUSEUM REJUVENATED

The first tweet by a reigning British monarch read: 'It is a pleasure to open the *Information Age* exhibition today at the Science Museum and I hope people will enjoy visiting. Elizabeth R.' The news quickly spread around the world, highlighting both the Science Museum and the opening of its largest new permanent gallery in more than a decade.

Information Age: Six Networks That Changed Our World explores many of the remarkable innovations in communication technology that have transformed lives over the past 200 years, from the dramatic story of the laying of the first transatlantic telegraph cable to the birth of the modern smartphone. It shows off 800 important gems not only from our own world-beating collections but also substantial additional artefacts donated by its partners and funders.

At the opening ceremony Ian Blatchford, Science Museum Director, welcomed the Queen, the Duke of Edinburgh and an audience of 600 patrons, funders, communications entrepreneurs, authors and experts, and described *Information Age* as 'the beginning of a renaissance



for the museum'. They were treated to a performance of John Adams's 'A Short Ride in a Fast Machine' by the Philharmonia concert band.

Following the royal visit, a panel of leading thinkers and entrepreneurs took to the stage in our IMAX auditorium to share their unique insights into the big moments in the history of communication technology. In debating what the future may hold, chair Tom Standage, Digital Editor of the *Economist*, was joined by venture capitalist Hermann Hauser, author James Gleick and

entrepreneurs Baroness Martha Lane Fox and Mo Ibrahim.

Two further high-profile events introduced *Information Age* to distinguished academic and parliamentary audiences. At the Science Museum 100 attendees from around the world joined the three-day 'Interpreting the Information Age' conference to discuss how the history and material culture of information can be made relevant for today's audiences. And in Westminster, parliamentarians listened to Sir Tim Berners-Lee talk about the importance of innovation at a reception hosted by POST, the Parliamentary Office for Science and Technology, to celebrate the gallery's opening.

The 1600-square-metre gallery, designed by Universal Design Studio, has already become an essential part of any trip to the Science Museum, and attracted 300,000 visitors in the first four months alone.

During her tour of *Information Age* the Queen is shown principal exhibits by Ian Blatchford and Lead Curator Tilly Blyth... Clockwise, we see the Cameroon telephone kiosk... The Cable network... Rafael Lozano-Hemmer showing his interactive app for *Fiducial Voice Beacons* to Patricia Harris of Bloomberg Philanthropies... Parts of 2LO, London's first radio station from 1922, being moved into the *Information Age* gallery... Eurostar satellite in The Constellation





“As the largest single gallery inside the Science Museum, *Information Age* is one of our most ambitious projects ever, which will reinvigorate the heart of the museum

IAN BLATCHFORD DIRECTOR, SCIENCE MUSEUM

Clockwise: Panel discussion with entrepreneurs Hermann Hauser, Baroness Martha Lane Fox, Mo Ibrahim, James Gleick and Tom Standage... The Queen discusses her coronation with SMG Chairman Gill Samuels in *The Broadcast* network... Tim Berners-Lee on video in *The Web*... Telephony in *The Exchange*... Model of Brunel's *Great Eastern* cable-laying ship in *The Cable*



WHO'S WHO BEHIND INFORMATION AGE

An important family of funders who have supported *Information Age* includes the Heritage Lottery Fund, Garfield Weston Foundation, Wolfson Foundation and leading organisations in business and technology. Our corporate funders, including BT, ARM, Bloomberg Philanthropies and Google, continue to help us promote the project and will be a vital part of the life of the gallery for years to come.

At the royal opening senior representatives from leading funders voiced their proud support for the gallery in front of the six-metre-high



Rafael Lozano-Hemmer's new digital and interactive artwork in the gallery. *Information Age* was, she said, a 'perfect fit' for Bloomberg's support.

Google has contributed a number of objects including an early corkboard server and Brian McClendon, VP Engineering and the founder of Google Earth, endorsed the museum's ambition to inspire the next generation.

Carole Souter CBE, Chief Executive of the Heritage Lottery Fund, emphasised the importance of collaboration between public and private donors and HLF's £6.3 million grant towards the gallery. She said: 'This is an essential destination for visitors who want to learn more about our rapidly changing world.'

Our supporters have shared in the global media attention around *Information Age* with, for example, announcements displayed atop London's BT Tower, the hosting of international business leaders and technology experts for the inaugural ARM Forum, and the inclusion of the gallery digital experiences as part of the global Bloomberg Connects programme.

Speakers at the royal opening, top: Gavin Patterson, Chief Executive, BT Group, Simon Segars, CEO of ARM Holdings, Patricia Harris, CEO Bloomberg Philanthropies, and Brian McClendon, VP Engineering at Google... Other pictures show Brian McClendon with Ian Blatchford... Gavin Patterson and family check the first computer with a mouse... Carole Souter, CEO of Heritage Lottery Fund, speaking to guests... Patricia Harris beside the 1989 Bloomberg Trackball keyboard

aerial inductance coil from Rugby Radio Station – newly restored and one among BT's generous donation of 80 objects. Gavin Patterson, CEO of BT Group, Lead Principal Sponsor of the gallery, spoke of triumphs from BT's history of pioneering new communication technologies, from the first electric telegram to the first transatlantic telephone call. He said that the 'spirit of the information age creates a future of endless possibilities'.

Simon Segars, CEO of ARM, Principal Sponsor, stressed the growing need for more young people to take up careers in engineering, which he described as 'vital to the future prosperity of the UK'. The relationship between the arts and science was the focus of Patricia E Harris's speech as CEO of Bloomberg Philanthropies, while she praised

LIFE-CHANGING STORIES IN INFORMATION AGE

Tilly Blyth, Keeper of Technologies and Engineering and Lead Curator on *Information Age*, says: 'It has been a huge team effort to create this new gallery. It marks a step change in the way we have worked to uncover the personal stories behind our rich collections.'

'*Information Age* shows that in the past, as today, innovation didn't just come from a few pioneers, but from the users of technology. Eight hundred unique objects from our collections as well as state-of-the-art interactive displays help us tell the remarkable personal stories of those whose lives were changed by each new wave of technology.'

'We have worked closely with communities in the UK and overseas to identify these fascinating user stories, from the application of mobile technology by entrepreneurs in Cameroon, to private telegrams donated by British families and from the women who operated early telephone exchanges.'



Clockwise: Morten Tyldum, director of the film *The Imitation Game*, with members of Alan Turing's family and one of the exhibition's three-ring Enigma cipher machines... Lead Curator Tilly Blyth gives one of many TV interviews... An actor re-creates Claude Shannon, the American mathematician and electronic engineer known as 'the father of information theory'... Visitors using the *InfoAge+* app in the gallery...

The first UK gallery dedicated to the history of information and communication technologies is divided into these six 'network' zones



CABLE

Thomson's mirror galvanometer, 1858. Detected the first message sent between Europe and the USA via the original transatlantic telegraph cable. This cable demonstrated for the first time that it was possible to communicate between the continents in less than a day rather than wait a few weeks for a letter to arrive.



EXCHANGE

Wall telephone No. 1. The invention of the telephone shifted electrical communication from a practical tool for transmitting the written word, to a personal tool that brought voices directly into the home.



BROADCAST

Bush TV22, 1950. Queen Elizabeth II's coronation broadcast encouraged many people to buy their first television set and for many viewers the inexpensive Bush TV22 was the ideal choice. For 2 million people the highlight of the day was witnessing a live television broadcast of the ceremony.



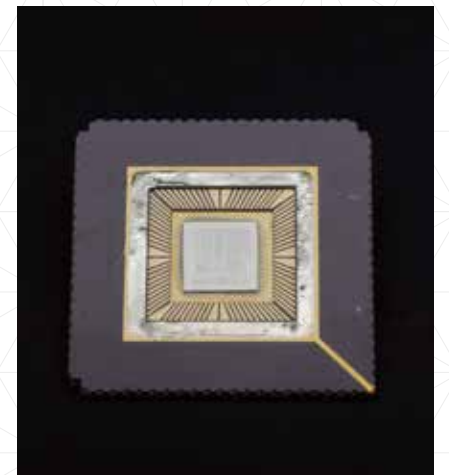
CONSTELLATION

Bound copy of the script for *Our World*, the first live global TV programme, transmitted on 25 June 1967. For two hours viewers travelled the world in real time, flying across time zones, taking in eclectic sights and sounds.



WEB

Tim Berners-Lee's NeXT computer, made in 1988. This is the original computer used at CERN by Berners-Lee in 1990 to write the code for the World Wide Web, alongside his server bearing a warning 'Do not power it down!!'



CELL

The ARM 1 RISC processor may be the smallest object in the gallery, but this low-powered microprocessor – made by Acorn Computers in 1985 – fuelled the development of the smartphone.

VIEW THIS
sciencemuseum.org.uk/animations



NEW LEADER, NEW ROLE, NEW PARTNERS

The Director of MSI has faced a hectic year establishing a brilliant future for our Manchester museum

When Sally MacDonald was named the new Director of the Museum of Science & Industry, she could not wait to usher in a new era at the Manchester attraction. 'The opportunity to return to my home city to lead an organisation with such outstanding collections, buildings and people is an extraordinary honour,' she said.

After 100 days in the role she talked about what excited her most about the iconic museum: fascinating research on the history of its site, and of the 'Revolutionary Railroad'; the work of its 'amazing volunteers'; the beautiful juxtaposition of *3D: Printing the Future* within the 1830 Warehouse; and the 'huge buzz' created by the Manchester Science Festival. She added: 'I saw science really come to life in a way it never did for me when I was growing up in Manchester.'

Our museum has also become a prime venue for ministerial visits. The industrial setting of the Power Hall was a fitting

backdrop for Chancellor George Osborne to announce that Manchester, along with other cities in the North, is to become a 'northern powerhouse' to rival London. Prime Minister David Cameron at the same time held a private meeting elsewhere in the museum with business leaders, local politicians and SMG Director Ian Blatchford to discuss the Government's proposal for an HS3 railway.

Six months later the Chancellor returned to launch the European City of Science 2016, when he announced a further £3 million investment towards MSI's new gallery [see page 8].

These funds kick-start transformational plans for the entire site and its listed buildings. To tell more of its story, University of Manchester PhD student Erin Beeston is uncovering the operation of Liverpool Road as a rail terminus up until 1975. Today it forms an integral part of the museum and she is seeking

past employees to relate their experiences and aid redevelopment of the station halls.

The announcement of a three-year deal with Siemens as headline sponsor for Manchester Science Festival coincided with Siemens also partnering with the museum to create the innovative *Pi Platform for Investigation* – a monthly laboratory and playground that has enabled 14,000 visitors of all ages to participate in live scientific experiments.

This year has seen a greater range of organisations than ever coming to MSI to collaborate on a vibrant programme of events which have included *Collider Lates*, *#Hooked at Museums at Night*, the Asia Triennial and a Sexology Season with the Wellcome Collection. Most significantly, a Memorandum of Understanding confirmed the intent of the Wellcome Collection and MSI to collaborate on an exciting series of exhibitions over the next five years, starting with *The Body Electric* in 2016.

*See page 35 for rest of the year's activity

Clockwise: Prime Minister David Cameron hosts a meeting at MSI with Chancellor George Osborne to discuss the proposed HS3 railway... *Brain Attack* show at MSI's *Pi Platform for Investigation*, sponsored by Siemens... Erin Beeston conducting a tour of MSI's Station Building... Director Sally MacDonald with Marcus Coates at his installation *The Sounds of Others*: *A Biophonic Line*... Curators Sarah Baines and Deborah Kell at *3D: Printing the Future* plus a printed heart sourced locally



“ Our visitors adored 3D Printing the Future. We're still in the early days of sharing across the Group but already we're seeing the enormous value of pooling our intellectual and physical assets

SALLY MACDONALD MSI DIRECTOR

MAKING FRIENDS IN ACADEMIA AND THE ARTS

Creativity and industry expertise drive the agenda at NRM

The National Railway Museum embarked on a series of creative, artistic and academic collaborations that will raise the game for partnership working with heritage organisations. The touring *Open for Business* exhibition showcased Magnum photographer Mark Power, whose stunning images of Bombardier in Derby and Nissan in Sunderland demonstrate that the UK's transport industry is still thriving.

As centrepiece to its *Trainspotting* season the museum took the bold step of commissioning the contemporary artwork *Parallel Tracks* from the acclaimed artist Andrew Cross [see page 32]. A blend of film and curated archives explored the camaraderie of train-watching and encouraged visitors to linger significantly longer in our changing gallery space. The season was supplemented with an opening weekend Great York Shed Bash, curatorial talks, live theatre performances, cab access and craft activities.

Yorkshire poet and broadcaster Ian McMillan waxed lyrical on 'epic encounters on days wreathed with steam' in his touching ode to trainspotting, 'Love

Me Tender', and 40 Spotters' Stories were selected from 300 submitted after a public appeal.

The museum's annual Locos in a Different Light event, part of the Illuminating York festival, featured in the city's successful bid for UNESCO City of Media Arts status. Kersten England, Chief Executive of City of York Council, said: 'The designation flies the flag for York's bid to be the first port of call for media arts in the UK and indeed one of the most creative cities in the world.'

The luxury Pullman carriage, *Topaz*, was opened to the public for the first time, as we made the collection even more accessible so visitors can experience what rail travel was like for different classes of passengers.

As part of its commitment to curatorial excellence NRM appointed Andrew McLean as Head Curator to continue vital scholarship and research into the collection. We cemented our long-standing academic partnership with the University of York through the relaunch of the Institute of Railway Studies.



Colin Mellors, the university's Pro Vice Chancellor (Business and Community), said: 'York is extremely fortunate to have such a tremendous international asset as NRM located in the city.' Key leaders and strategists from the rail industry attended the 2014 Annual Dinner which launched our new Future Forum: Thought Leadership at the National Railway Museum, sponsored by Thales and Bombardier. Lord Adonis was the key speaker on the theme of 'Where do railways fit into a wider transport policy?' and further forum events continue to address challenges facing the industry.



“This year has been a real game-changer. We've set the bar high for curatorial excellence and have positioned ourselves at the very heart of contemporary debate about the future of railways

PAUL KIRKMAN NRM DIRECTOR



Clockwise, above: Public access to the luxury Pullman carriage *Topaz*... The Director with Lord Adonis, who launched our Thought Leadership forum... Head of Public Programme Tobias Lumb and the Director show off the Heritage Railway Association excellence award for last year's *Mallard 75* celebrations... Poet Ian McMillan inspired by trainspotting... The Great York Shed Bash

Opposite: Professor Colin Mellors and NRM Director Paul Kirkman sign an understanding to relaunch the Institute of Railway Studies, witnessed by Professor Mark Ormrod and Head Curator Andrew McLean



MAGICAL MILESTONES FOR BRADFORD

Serious investments help to realise our ambition to investigate the science behind sound and vision

Whilst the National Media Museum has a global outlook and world-leading core collections of the still and moving image, it has always been rooted deeply in Bradford and its region. That connection has been strengthened by a significant £1 million investment from Bradford City Council in the future of the museum's learning programme. SMG confirmed a further £1 million for the creation of a new hands-on interactive gallery in which visitors will explore light and sound.

The museum's Director, Jo Quinton-Tulloch, says: 'These investments signal the key roles the museum plays in

supporting the school curriculum. They will help us to build careers in STEM that can take young people to the most extraordinary places – from the depths of the oceans to the new frontiers of space travel.'

A commercial cinema partnership was also launched – Picturehouse at National Media Museum – which saw the national cinema chain taking over the operation of the three screens at the museum, in the heart of UNESCO's first City of Film. These are the 300-seat Pictureville (which is able to screen most historic formats and which producer Lord Puttnam describes as the 'best cinema in the world'), the 100-seat Cubby Broccoli Cinema and Europe's first IMAX auditorium, currently being re-equipped with a state-of-the-art digital projector and new screen, thanks to a loan from DCMS.

The new Picturehouse partnership was launched with the northern premiere of *Hockney*, a feature-length documentary about the life of artist David Hockney, attended by the director, Randall Wright, and members of the artist's family. His sister Margaret revealed her surprising influence on David's recent work: 'I gave him a boost to use a computer and to get into the digital world. I was using Photoshop and I showed him it was a lot quicker than when he'd tried it years ago.' The museum's partnerships have included the Bradford Science Festival



The National Media Museum is an incredibly important part of cinema geography and heritage in the UK and we will make sure that continues

LYN GOLEBY MANAGING DIRECTOR OF PICTUREHOUSE CINEMAS



and the internationally significant health research project Born in Bradford [see page 37]. Our exhibitions programme has continued to bring the best of the still and moving image to our audiences. Highlights this year include the two Media Space exhibitions [see page 58] and the summer exhibition *Nature Camera Action!* – about the secrets of making incredible wildlife films – which brought in 37,000 visitors.

Topical displays connecting major national events to our unique photography collections included *Landscapes of Le Grand Départ*, as part of last summer's Tour de Cinema and the Yorkshire Festival. This year we released 15 extraordinary 'unseen' images of Winston Churchill's life from our *Daily Herald* archive [see page 43].

Clockwise: Launch of the museum's collaboration with Picturehouse Bradford, when David Hockney's family joined the director Randall Wright (front left) for the northern premiere of *Hockney...* RPS President Derek Birch with Director of the National Media Museum Jo Quinton-Tulloch at *Drawn by Light*'s opening... Science magic show by Dr Matt Pritchard at Lates... Children participating in the *Nature Camera Action!* season of wildlife films, during which CBeebies broadcaster Andy Day also performed

EXPERIENCE TOMORROW'S WORLD TODAY

Experimental events and exhibitions of contemporary science are the lifeblood of the Science Museum Group



To herald the day when people are routinely enhanced with powerful prosthetics, brain-boosting devices and superhero-style senses, the Science Museum's contemporary science team (Antenna) organised a four-day festival titled *You Have Been Upgraded*. Here, 4000 visitors found themselves in a fictional but probable future created by Unlimited Theatre, in collaboration with leading scientists, artists and designers. The ambitious company Unlimited Enhancement Technologies (UNET) had elevated biotechnologists to star status. The challenge posed to the audience was: How do you feel about having your brain and body upgraded, just as we do with computers?

David Robertson, Content Developer, said: 'This was our most ambitious festival yet. This remarkable collaboration created a spectacular show that saw scientists showcasing provocative research – from the Sackler Centre for Consciousness Science, from Oxford University and Imperial College London.'

Another hot topic was enjoyed by 1.4 million visitors to the Science Museum. This was *3D: Printing the Future*, an

exhibition which later transferred to the Museum of Science & Industry as part of the Manchester Science Festival, where the format was adapted by drawing on locally sourced examples of this new technology. One visitor remarked: 'Up until now I've only associated 3D printing with the art world, whereas it actually

has the potential to save lives.' The *Make. Hack. Do.* festival invited 6000 visitors to the Science Museum to create electronic instruments from vegetables, to build and program their own robots and try their own 3D printing in fun 'playshops'. Its Content Developer, Pippa Hough, said: 'We brought together



makers, hackers and innovators who want nothing more than to help people get hands on with hi-tech equipment and release their creative genius.'

At the Science Museum alone, the contemporary science team created 37 presentations this year – 2 festivals, 10 Topic Zone updates, 7 Live Science displays in the *Who Am I?* gallery, 5 Antenna Lives, 12 adult dialogues, plus daily news blogs.

This tally included a mouth-watering exhibition dedicated to appetite research. *Cravings: Can Your Food Control You?* reveals how the brain, gut-brain and gut bacteria work together to control our desires, with insights from experts,

patients and the chef Heston Blumenthal. During her opening speech Professor Dame Sally Davies, Chief Medical Officer for England, described the exhibition as 'wonderful'. Media interest was widespread. BBC *Breakfast* broadcast live from the exhibition, finding much mileage in a food's flavour being influenced by the spoon you use (its colour and material prove to be crucial).

In *Antenna* quick-turnround displays and demonstrations respond to the latest science news. These included a set of sea drones from the National Oceanography Centre, and the unveiling of the Drayson racer – the fastest lightweight electric car in the world. One Live Science experiment saw

visitors using eye-tracking glasses while a Topic Zone featured the Rosetta mission that landed a probe on a comet.

VIEW THIS
antenna.sciencemuseum.org.uk
blog.sciencemuseum.org.uk

Opposite: A workshop during *Make. Hack. Do....* Bristol and Sheffield University engineers demonstrate their swarm of tiny robots that could one day aid agriculture

This page: Professor Dame Sally Davies, Chief Medical Officer for England, with Jean Franczyk, Deputy Director of the Science Museum, and Ling Lee, Content Developer, at the opening of *Cravings* in London... Professor Bob Rastall and researchers from University of Reading with the artificial gut displayed in *Cravings...* Exploring biotechnologists' visions of the future at the *You Have Been Upgraded* festival ... Visitors help researchers from UCL investigate What Makes You Laugh and Cry?



EXPERIENCE TOMORROW'S WORLD TODAY



The Dana Centre has been the home of experimental science dialogue since its launch in 2003 and its final programme went out on a high with the aptly named Best Festival Ever, a collaboration with Australian theatre company Boho Interactive.

In 2011, the University College London Environment Institute gave Boho the challenge of creating a theatre show which tackled climate science. To explore the related science of complex systems at the Dana, before it was redeveloped into the research centre which opens this autumn, Science Museum visitors were asked if they had what it takes to create a music festival in an event that was part theatre, part performance lecture and part board game. 'It was terrific!' said Professor Yvonne Rydin of UCL, one of the expert contributors.

Dana activities such as panel discussions will be absorbed into the SM programme to continue airing pertinent policy issues. One recent debate in partnership with the Government Office for Science explored risk and synthetic biology. Professor Paul Freemont of Imperial College, one of the speakers, said: 'The event was excellent.

It is really very important that we – the research and commercial community – are out there telling everyone what we are.'

Collaborations enrich our programme in the *Who Am I?* gallery. Particularly powerful perspectives were conveyed in a display about HIV research, co-created with a group of young people living with HIV and produced in collaboration with the National Children's Bureau. One participant commented: 'It was a great experience working with you and the others so thank you for that opportunity. I've learnt so much in just a couple of weeks.'

Pop culture drew big audiences with 'Mathematical Secrets of *The Simpsons* and *Futurama*'. This sold-out talk, featuring exclusive screen footage, headlined British science author Simon Singh talking with Al Jean and David X Cohen, world-renowned writers from those animated phenomena.

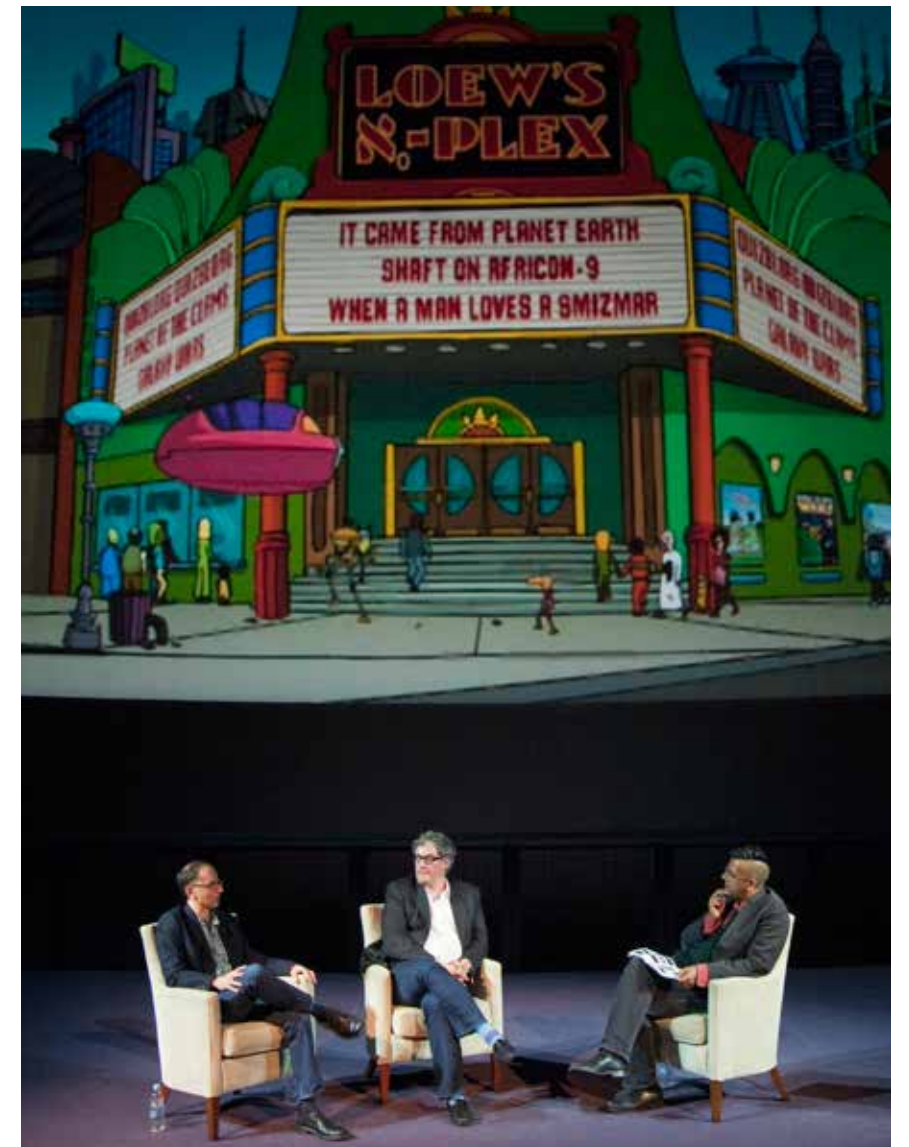
In Manchester, the Museum of Science & Industry promoted a fresh way to showcase the latest science. Under the title *Pi Platform for Investigation*, leading

experts conduct live experiments and hands-on workshops in an informal environment. More than 900 visitors took part in a nuclear power event and 1000 visited another on chemistry.

At the National Media Museum a new partnership was forged with the internationally significant health research project Born in Bradford, as its new-look Family Festival was launched at both the museum and Bradford's City Park. More than 3000 visitors attended over a weekend to take part in science, health and community-focused activities. Born in Bradford is the study of 13,500 children born at Bradford Royal Infirmary between March 2007 and December 2010, whose health is being tracked from pregnancy through childhood and into adult life. It is the largest study into health and well-being of its kind.

Opposite: Insights into family health drew 3000 visitors to the National Media Museum during the long-term NHS research project Born in Bradford

This page: TV producers David X Cohen and Al Jean in conversation with maths guru Simon Singh during the event 'Uncovering the Mathematical Secrets of *The Simpsons* and *Futurama*'... A Pedal Power participatory experiment for the *Pi Platform for Investigation*



Live Science is a unique opportunity for researchers. As well as acquiring an incredible number of data, this experience forced me to seriously think about the relevance of my research

ANITA MONTAGNA KING'S COLLEGE LONDON

VIEW THIS
tinyurl.com/lubypk2

ONE STARTLING GIFT SETS THE TONE

Fundraising is the oxygen of our museum group



Our Group is determined to be recognised as the world's leading centre of excellence for engagement with science. Such an ambition must be matched by energetic fundraising to ensure continued investment in our work. Accordingly, we created the Science Museum Foundation, chaired by film producer and former SMG Trustee Michael G Wilson, to build more relationships with individuals. Last year yielded our largest ever individual philanthropist's gift of £5 million towards a new maths gallery, from David and Claudia Harding. The Hardings joined the renowned architect Dame Zaha Hadid and Culture Secretary Sajid Javid, when our Director, Ian Blatchford, announced the news [see page 9].

An impressive collaboration of funders and corporate partners made possible last October's opening of *Information Age* by Her Majesty The Queen. This is

the biggest single gallery in the Science Museum, and we are grateful for our supporters' confidence in us [read more on page 14].

Group Director of Development Sue Fisher says: 'Funders such as David Harding, ARM, BT and Bloomberg genuinely want to increase science literacy and help us to find exciting ways to achieve this. I find working with our many funders inspirational; they are as passionate about science and engineering as we are and want their investment to be a true partnership.'

Generous initiatives proved crucial to funding plans for new exhibitions, such as the Media Space programme and *Cosmonauts* which is scheduled to open in 2015. Funders have also supported research into our collections and engagement with diverse communities and school-age students [see page 39].

We continue to look to new partnerships to develop SMG's core priorities and enable us to fuel the public's passion for science.

We celebrated our indebtedness to key supporters and advocates at the Science Museum's Annual Dinner last May, where the eminent mathematical physicist and string theorist Professor Robbert Dijkgraaf addressed distinguished guests who included Lord Rees, the Astronomer Royal, the Culture Secretary, Sajid Javid, Betty Jackson and Charles Simonyi. Outgoing SMG Chairman Dr Douglas Gurr was appointed a Science Museum Fellow and Trustee Howard Covington praised his 'enthusiasm, energy and sheer hard work'.

The success of the Great Gathering and Great Goodbye, sponsored by Hornby, at the National Railway Museum has spurred increased support from the corporate sector, especially new



I find working with our many funders inspirational; they are as passionate about science and engineering as we are and want their investment to be a true partnership

SUE FISHER SMG DIRECTOR OF DEVELOPMENT



members and a growth in patronage. At the NRM Annual Dinner in York transport minister Stephen Hammond addressed key strategists from the rail industry.

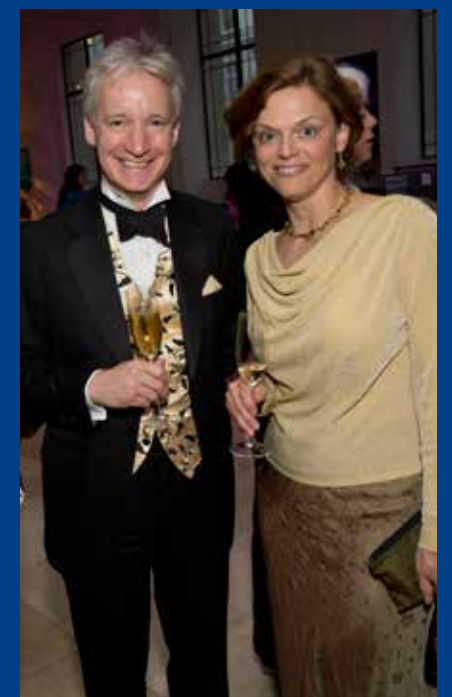
Our visitors across each of the Group's museums continue to astound us with their generosity. From the visitors who come through our doors, we have received more than £2 million in support of our work.

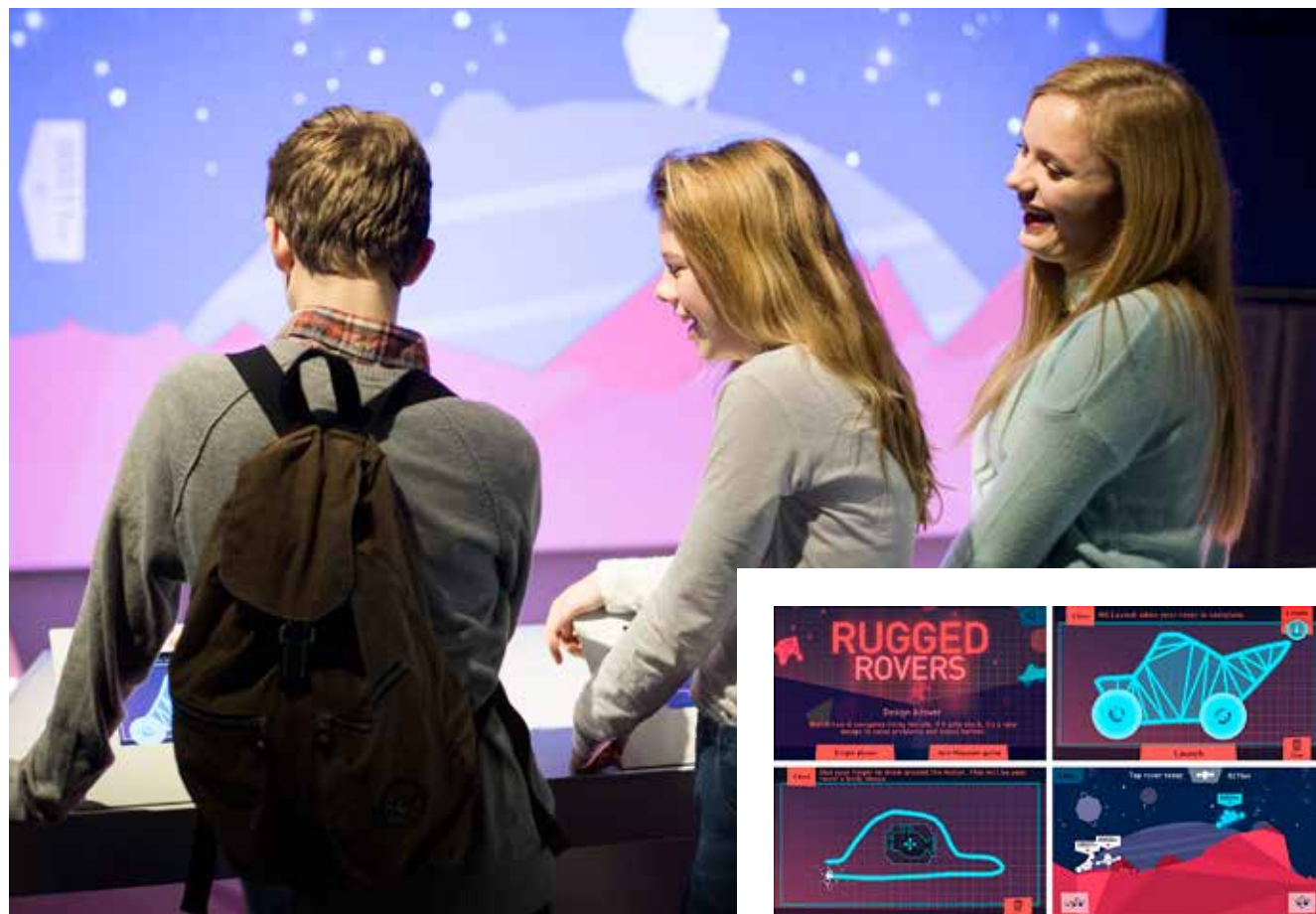
For full acknowledgment of all our wonderful donors, please see listings on page 68

Celebrating maths, opposite: David Harding, Zaha Hadid, Sajid Javid, Ian Blatchford and Claudia Harding

Science Museum Annual Dinner, above: Speaker Robbert Dijkgraaf and, beneath, Michael G Wilson, Lord Rees, Lady Elise and Sir Martin Smith, Veronika and Howard Covington... **Far right:** Douglas Gurr and Jean Franczyk

Right: Paul Kirkman presents Hornby's Nat Southworth with the NRM Arts and Business Award... Stephen Hammond speaks at the NRM Annual Dinner





PLAYING UP TO THE DIGITAL NATIVE

SMG's digital transformation is every bit as extraordinary as the ambitious physical changes at our museums

Even before the *Engineer Your Future* gallery had been opened by HRH The Prince of Wales, police conducting the royal security sweep of the Science Museum were spotted there avidly competing in *Rugged Rovers*, where the objective is to design a vehicle that can navigate farthest across a tricky alien landscape. In its first four months, 79,000 people had downloaded the game.

The exhibition, which runs for three years and aims to inspire the next generation of engineers, is a vivid testament to what digital can offer museums. Visitors can explore a cityscape projected onto a 3D printed set, known as *FutureVille*. Another interactive game uses a baggage handling system, power grid and a railway network to enable players to design complex delivery systems.

Appropriately enough, the biggest digital event of the year concerned the opening of *Information Age* by Her Majesty The Queen. Her historic first tweet was retweeted more than 43,000 times, and favourited a further 47,000 times. Among the *Information Age* apps, *Transmission* had been downloaded 30,000 times in its first three months. November's Lates



celebrated the opening with many events, from soldering circuits to creating Raspberry Pi robots, and the Wikimedia UK team helped visitors to photograph the gallery and share objects (the Science Museum has also signed an agreement with Google for Street View).

With the help of Facebook, a Science Museum event about the mathematical influences on the creators of *The Simpsons* and *Futurama* had 25,000 views within a day. The museum's twitter account broke the 450,000 barrier and the museum started testing a new Wi-Fi login page and iBeacon technology, developed with the company Purple Seven, so we may better serve visitors.

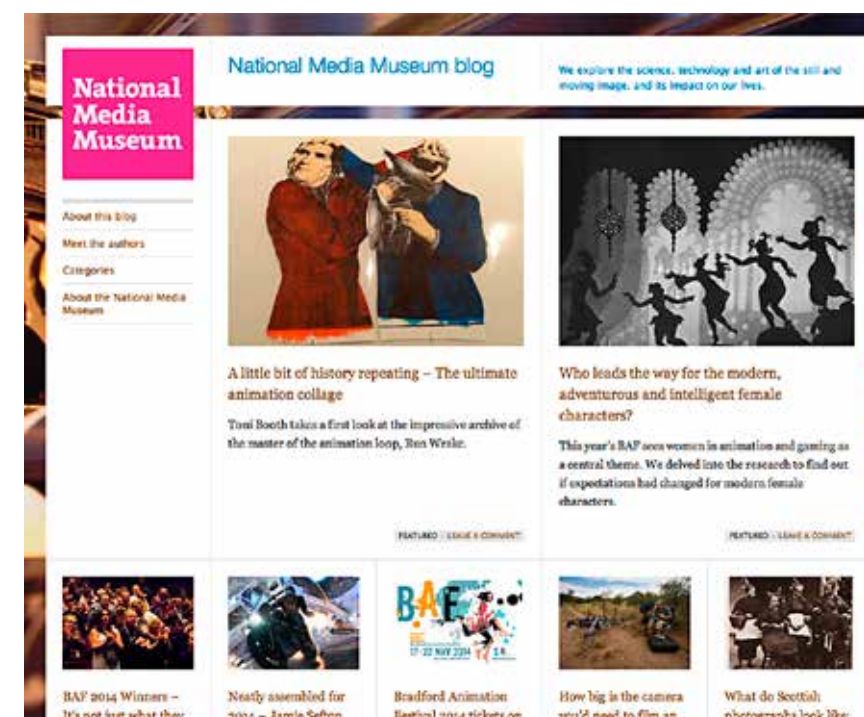
At the Museum of Science & Industry, Manchester, an innovative online citizen science project to investigate the secret of catchy songs, with the University of Amsterdam, garnered an extraordinary response. By February it had recruited 175,000 players across 199 countries.

For *Nature Camera Action!* – the National Media Museum's summer exhibition about the secrets of wildlife film-making – we asked visitors to upload their own wildlife photos onto Flickr and 500 were then added to screens on gallery. More than 10,000 images and objects were digitised as part of a project to take the National Photography Collection beyond the walls of the museum.

To expand our virtual audience for serious science, SMG blogs have been integrated more deeply into each museum's website. Finally, in acknowledgment of the importance of digital, John Stack joined the Group as its first Digital Director.

Opposite: Playing *Rugged Rovers* in *Engineer Your Future*, also downloadable as an SMG app, as is the *Transmission* game

Clockwise from left: During the *Nature Camera Action!* season visitor Tim Garlick uploaded this image of a nut weevil to Flickr... Simon Singh's *The Simpsons and Their Mathematical Secrets* event featured on Facebook... Newly digitised classic photograph of Victorian royalty by Roger Fenton... A National Media Museum blog expands the audience for serious science



VIEW THIS
youtube.com/user/sciencemuseum
youtube.com/user/mosimanchester
youtube.com/user/NatRailwayMuseum
youtube.com/user/nationalmediamuseum
sciencemuseum.org.uk/games
blog.nationalmediamuseum.org.uk



CHERISHING THE ART OF SCIENCE

Our museums are committed to working with contemporary artists who challenge cultural boundaries in personal ways

Science Museum, London

The UK's largest ever audio loudspeaker, a full-size reconstruction of the gigantic 'Denman horn' from the 1930s, was the centrepiece of a new installation by Aleksander Kolkowski in the Virgin Media Studio. He explored the 27-foot audio dinosaur with a 7-foot-square horn mouth and its quest for audio perfection through music and the spoken word. 'Our modern ears may have become accustomed to high-fidelity audio and surround sound, but the exponential horn still holds an immersive power of its own,' he said.

Another artist, Joshua Sofaer, invited visitors to collect, sort, photograph and

document the rubbish generated by the museum's visitors and staff over 30 days in his unique *Rubbish Collection*. As a visual archive of things we daily throw away, it found value and beauty in waste – and resulted in novel recycling bins throughout the museum.

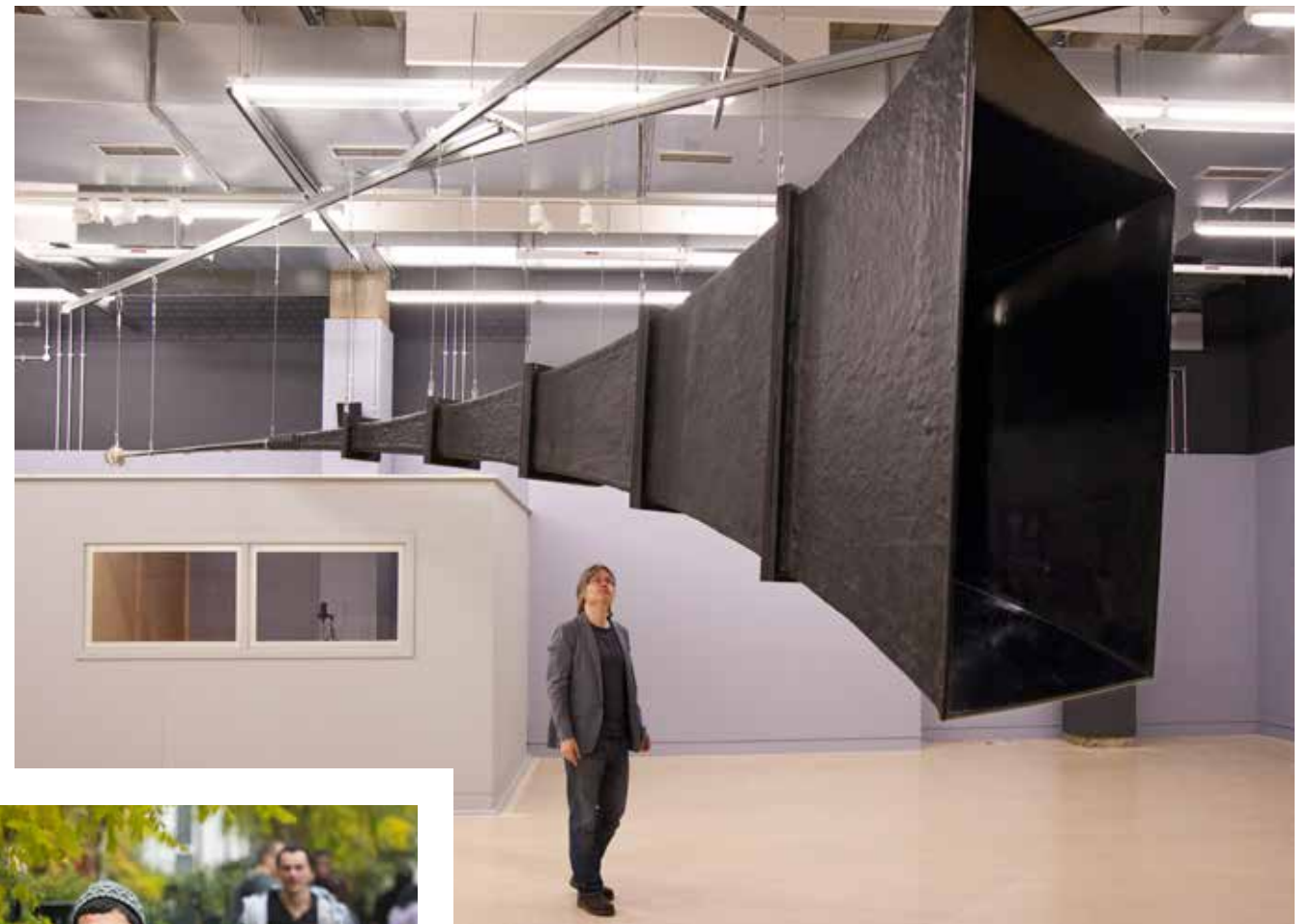
Museum of Science & Industry, Manchester

New artworks went on show in the Asia Triennial Manchester 2014 – a city-wide festival of visual culture celebrating Manchester's diverse communities and featuring contemporary artists from mainland China, Taiwan and Hong Kong. Outdoors at MSI an artificial sun was

created from Manchester street lamps [see rear inside cover] while indoors a single rose disintegrated under 24 lamps and a four-screen video studied Taiwan's first leprosy hospital.

National Railway Museum

The first *Music on Rails* festival proved to be a 'musical mystery tour', in partnership with MOR Music. Acts including Beth McCarthy, of BBC's *The Voice*, and the Littlemores played in the atmospheric Station Hall, as well as a moving railway carriage. The focus of NRM's *Trainspotting* season was the acclaimed artist Andrew Cross whose installation *Parallel Tracks* surveyed this



much misunderstood hobby. A fascination with safety on the railways led historian Dr Mike Esbester of the University of Portsmouth to explore the museum's archives. Lucky charms, leaping tigers and bikini-clad women all played a part in the story of railway safety – as told in the new online exhibition *Caution! Railway Safety Since 1913*.

National Media Museum

The week-long Media and Conflict

collaboration with Bradford University featured a range of contemporary film screenings, after which discussions dealt with such themes as an Afghan teenager's refugee status and the 1984 miners' strike.

Nine leading Magnum photographers provided a powerful survey of UK manufacturing in *Open for Business*. Featuring workers from local Bradford weavers to modern laboratory researchers, the exhibition launched at our Bradford museum, then locally relevant sections toured to each of the other museums in the Group.



Opposite: The first MOR Music festival at NRM saw Plumhall playing in *The Director's Carriage...* Artist Andrew Cross presented a film exploring trainspotting across the globe

This page, from top: Sound Artist in Residence Aleksander Kolkowski testing his reconstructed Denman exponential horn from 1929 before it gave daily demonstrations in the Science Museum's Virgin Media Studio... Omar the Afghan teenager in Bruce Goodison's film *Leave to Remain*, screened during Bradford's Media and Conflict event... NRM 4-4-0 locomotive No. 563, built in 1893, on loan to the London production of *The Railway Children*

NEW LIFE FOR OLD MASTERS

The original 1855 sundial from the oldest surviving passenger railway station in the world was one of the more remarkable objects that came to the attention of our conservation team, who favour preservation over restoration to maintain the historical integrity of our objects.

The sundial at the Museum of Science & Industry had suffered from extensive weathering and excessive polishing. Conservator Fran Keating said: 'It was a time-consuming process to dislodge the accumulated build-up of brass polish, but I was able to reveal the original layer of black paint of the numbers on the dial as well as some really lovely engraved detailing.'

On the beautiful globe showing undersea cable routes, now in *Information Age* [see page 10], the cable routes themselves were invisible. The Wroughton conservators were trained by a specialist to delicately remove the old discoloured varnish. Kirsten Strachan from the Wroughton team said: 'It was invaluable to gain specialist training for a large object containing varnished paper, a material we don't normally work with.'



Benjamin Regel treating a 30-inch terrestrial globe showing telegraph cable routes, made by W & A K Johnston Ltd, 1865–1920... Right, the cleaned object



Before and after conservation: Oil painting by Sir Francis Grant, 1845, of George Carr Glyn, first Lord Wolverton, Chairman of the London & Birmingham Railway

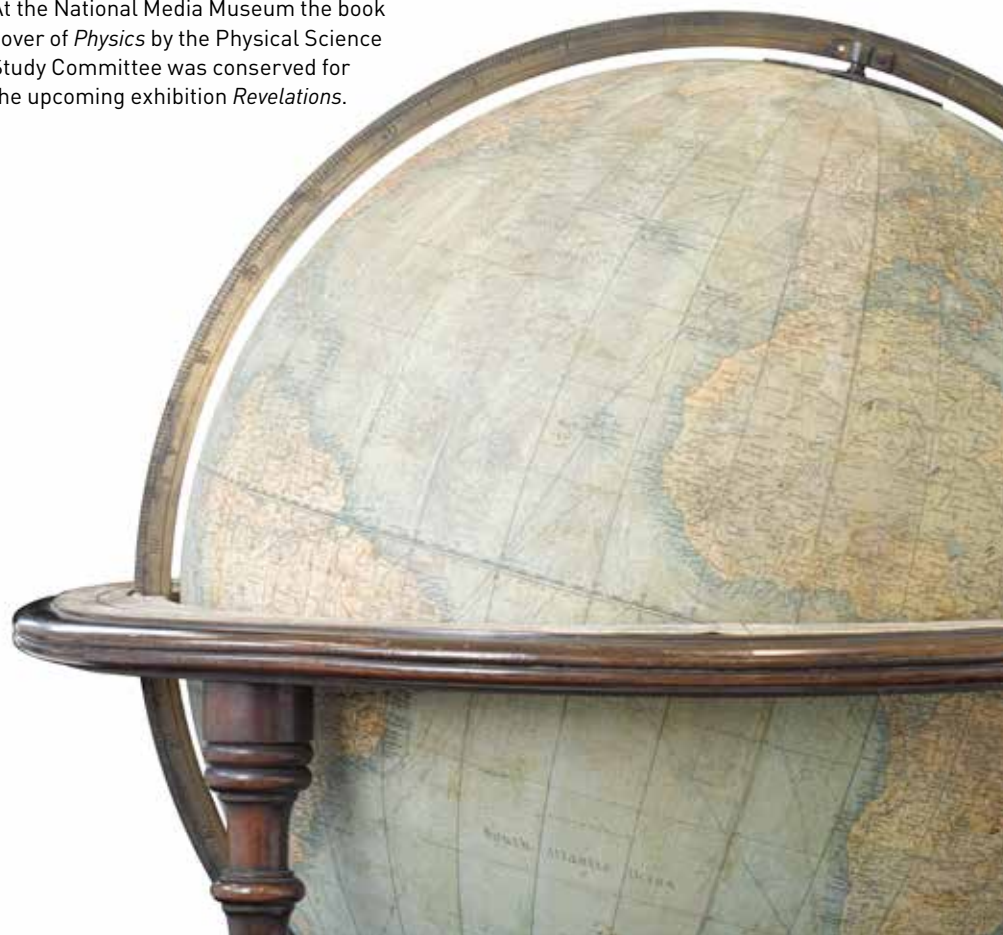


Two portraits in the National Railway Museum collection were conserved by external contractors using funds raised at the museum's Annual Dinner. Hubert Herkomer's 1869 painting of railway manager William Cawkwell was conserved by David Everingham. The treatment included eliminating distortions. Francis Downing treated a large portrait of the LNWR Chairman George Carr Glyn, painted by Sir Francis Grant in 1845, which involved removing unsympathetic overpainting.

At the National Media Museum the book cover of *Physics* by the Physical Science Study Committee was conserved for the upcoming exhibition *Revelations*.

The 'Bouncing Ball' image by Berenice Abbott was covered by the residue from a gummed label that had been partly removed in the past. This residue was very delicately removed to reveal the book cover image.

SMG contributes to research into new conservation methods and materials, and the treatment of objects aims to remove or stabilise the effects of physical or chemical degradation, as well as guarding against deterioration.



MANCUNIAN TO THE FORE!



It started with a 3D printed bust of Happy Mondays icon Bez and a live DJ set by Manchester band Elbow. Never before in its eight-year history has the Manchester Science Festival, proudly produced by the Museum of Science & Industry, been so trendy. And scientific, too. Complete with industry experts, comedy, workshops, debates and movies, 140 unique events across Greater Manchester attracted 98,000 visitors. For 11 days cultural boundaries merged, from Marcus Coates's premiere of his audiovisual installation *The Sounds of Others: A Biophonic Line*, to an exhibition on dust and artist Lucy Burscough's creative exploration of vision.

Museums at Night is an addition to our Lates programme aimed at adults, as we experiment with evening opening. One of the most popular proved to be a

Sexology Season event, partnered by the Wellcome Collection. Large enthusiastic crowds of adults were enticed by offers of tongue-tingling aphrodisiacs and the science behind speed dating.

The year's other major attractions included *Pedal Power*, showcasing Manchester as the home of British cycling on the 20th anniversary of its velodrome, and deploying dynamic display methods to generate a sense of motion. Eight historically important bicycles from our collection were revived by the conservation team, while 100,000 visitors could pit themselves against Olympic greats on the static time-trial bike.

Singing spaceman and YouTube sensation Chris Hadfield wowed a Year 10 audience, explaining how he



grew by 4 cm whilst circling the Earth and expressing surprise as a Canadian that the correct term for the people of Manchester is Mancunian: 'That sounds like an alien to me!'

This spring saw the opening of *The Innovation Race: Manchester's Makers Join the First World War*. Drawing from extensive company archives, the curatorial team created a family-friendly exhibition about the role of Mancunian innovation in securing victory on the Western Front.

VIEW THIS
manchestersciencefestival.com

From top: MSI hosted Marcus Coates and his *Biophonic Line* art commission during the Manchester Science Festival... The Wellcome Collection Sexology Late... Astronaut Chris Hadfield obliged with a selfie during his Radio 5 broadcast... Painter Lucy Burscough's exhibition celebrated 200 years of research into vision



WE'VE CHANGED LIVES IN RECORD NUMBERS

The Science Museum Group strives to be a national and international centre of excellence for informal science learning. The work of our talented explainer and outreach teams continues to attract record numbers of young people, their families and teachers to our museums and events

Visitors to the Museum of Science & Industry participating in a physics experiment at the newly created *Pi Platform for Investigation* series of events. This unique lab and playground space enables scientists to share their experiences of science with a diverse audience of all ages



INSPIRATIONAL NEW SHOWS AND FESTIVALS

This year 109,000 people attended shows or workshops delivered by the SMG outreach team at schools and festivals across the country and the globe. And our talented explainers make sure that learning is fun for each of the 595,000 people who visited our museums as part of booked education groups. This includes a new UK museum record in London with the Science Museum welcoming 452,000 people in school and educational group visits.

Exciting new explainer shows at the Museum of Science & Industry explore topics as varied as UV and fluorescent

light, electric power and the manufacture of First World War munitions. At the National Railway Museum new interactive workshops have been a big hit with primary school groups, exploring the history and science behind the success of Stephenson's locomotive *Rocket* as well as the engineering challenge of railway-track construction.

During the summer holidays at the National Media Museum 21,000 visitors enjoyed a special series of STEM-focused workshops, talks and demonstrations developed by the learning team to accompany the popular *Nature Camera*



Action! exhibition. In October the museum also hosted the Born in Bradford family festival, welcoming 3500 visitors. The learning team coordinated a weekend of activities to highlight some of the themes of this important medical research study.

VIEW THIS
mosi.org.uk/ambassadors

From above: A Building Bridges family event weekend at the Science Museum aimed at raising students' science literacy... *The Danger, High Voltage!* show demonstrating electricity and magnetism



HRH The Prince of Wales meeting Industrial Cadets at the opening of *Engineer Your Future*, the Science Museum's latest interactive exhibition...

Below: Tasting chillies in an Enterprising Science family event

TACKLING THE SKILLS GAP

In December, HRH The Prince of Wales visited the Science Museum to officially open the *Engineer Your Future* exhibition, which aims to inspire hundreds of thousands of 11- to 15-year-olds to discover their potential to shape the world we live in. Visitors are challenged to take on a series of interactive games that test some of the skills engineers use every day. The exhibition has been a huge hit, welcoming 127,000 visits in the first three months alone. It is part of the Science Museum's pledge to support the industry-led Your Life campaign, launched in the museum last year, to boost the number of young people studying STEM subjects. Business Secretary Vince Cable said: 'From designing the latest smartphones to building the next Mars rover, there are many exciting career opportunities for a 21st-century engineer. That's what this exhibition at the Science Museum is all about and ... I hope that this inspires more talented young people to take up a career in engineering.'



“ King's is delighted to be partnering with the Science Museum Group on the Enterprising Science project. The collaboration is developing new ways to address an age-old problem – namely how to improve young people's engagement with science

PROFESSOR LOUISE ARCHER ENTERPRISING SCIENCE PROJECT DIRECTOR, KING'S COLLEGE LONDON

INFORMAL SCIENCE LEARNING DELIVERS SERIOUS RESULTS

In partnership with academic researchers at King's College London and Sheffield Hallam University, the Science Museum Group is leading the field in developing the most effective ways to have a lasting positive influence on the attitude and aspirations of young people towards science learning and careers.

As part of the five-year Enterprising Science research partnership with King's College London and BP, the SMG learning team is working with disadvantaged social groups and schools across the UK to evidence the most effective ways that museum visits and learning experiences can improve the science knowledge, skills and contacts, or 'science capital', of young people. Enterprising Science was the focus of a research seminar hosted by the Science Museum last July

Award-winning STEMNET team

It has been an award-winning year for the learning team at the Museum of Science & Industry (pictured right), who run the largest Science, Technology, Engineering and Mathematics Network (STEMNET) Ambassador programme outside London, with more than 1000 inspirational Ambassadors across northwest England. Two of our talented team of volunteers won coveted national STEMNET awards for their hard work and achievements.



with an international panel of speakers, including Professor Mike Savage (LSE), Professor Jonathan Osborne (Stanford), Professor Kevin Crowley (Pittsburgh), and Professor Irene Rahm (Montreal).

Enterprising Science is also shaping the development of new course modules and resources for the highly successful Talk Science teacher CPD courses that continue to be delivered nationwide by our learning team from each of our SMG sites and other national science centres. Within the past year Talk Science training has been delivered to 516 teachers nationally and internationally.

Evaluation conducted to date by Sheffield Hallam University within the Building Bridges research project reveals that school outreach activities, museum visits and family science events can have a really positive impact on students' interest in science and development of scientific literacy. Over the past year the SMG learning team has worked with nearly 600 students and their families as part of Building Bridges, with a further 4000 students taking part in the project at schools in Reading and five London partner boroughs.

Above: The Science Museum outreach team staging *It Takes Guts* in Hong Kong to explore the digestive system



LATES BECOME A NATIONAL EVENT



The monthly Lates evenings at the Science Museum this year attracted 45,000 young adults who enjoy the wide variety of topical science entertainment, events and talks. Among event themes that included physics, psychology, informatics and engineering, it was the science of sexuality that drew the biggest crowds.

So popular are these events in London that we have introduced similar evenings across the North. The National Media Museum hosted its first Lates evening as part of a packed programme of activities for the 'Let's Get Digital'-themed Bradford Science Festival in October, and at the Museum of



Science & Industry there was a special #HookedonMusic Lates disco as part of Manchester Science Festival.

Three sold-out Lates took place during the Manchester run of *Collider*, aimed at adults with a penchant for particles. Professor Jeff Forshaw enthralled visitors on his latest book, and acclaimed

stand-up Robin Ince entertained a packed crowd whilst being 'In and Out of His Mind'.

VIEW THIS
sciencemuseum.org.uk/educators
sciencemuseum.org.uk/online-science

From above: Ribald fun at MSI's Wellcome Collection Sexology Lates event... At the National Media Museum the Lates theme is 'Let's Get Digital'



Early Birds

In trying to be a truly accessible museum, we run Early Birds events for families with children on the autistic spectrum and these have so far attracted a thousand visitors in the hour before the Science Museum officially opens. The SIGNtific programme for hearing-impaired or deaf visitors grows in popularity and we have also created events for families with members who are visually impaired or blind – an interactive astronaut training session, 'Backpacking to Mars', revealed what it would take to get there. The *Information Age* gallery has also introduced regular object handling sessions.

CHURCHILL'S CURIOUS OBSESSION

The 50th anniversary of Sir Winston Churchill's death prompted intriguing responses across the Science Museum Group



In London, the Science Museum celebrated Britain's great Second World War leader with *Churchill's Scientists*, an exhibition that explores his little-known enthusiasm for science. Rarely seen significant objects and archive material reveal surprising insights about his enormous wartime R&D programme, powered by 20-odd hand-picked 'boffins'. Their efforts on, for instance, radar, nuclear weapons and nutrition spurred a scientific renaissance to give Britain the winning edge on the battlefield. Later they kick-started postwar successes in fields from molecular biology to radio astronomy. Churchill was also the Prime Minister who appointed Frederick Lindemann as the UK's first chief scientific adviser.

At the opening event Sir Nicholas Soames, Churchill's grandson, praised this 'exceptional and important' exhibition. SMG Chairman Dame Mary Archer paid tribute to the scholars and

historians who had collaborated with the museum, adding 'a very special mention in despatches for Allen Packwood and his team at the Churchill College Archives'.

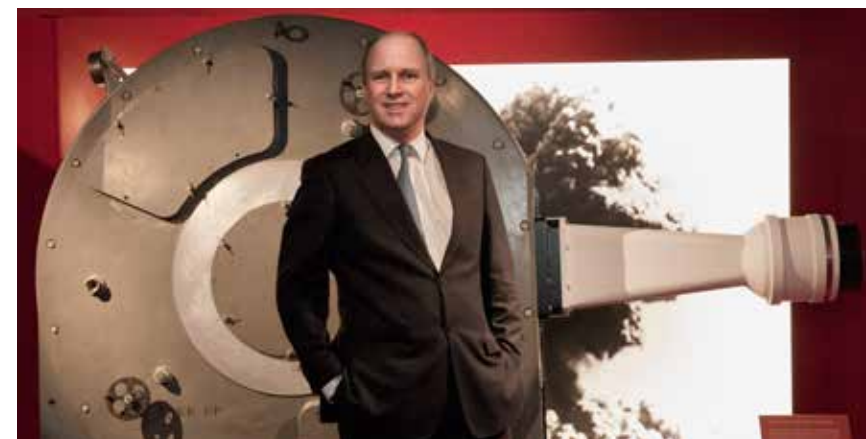
To mark the 50th anniversary of Churchill's state funeral, SMG Director Ian Blatchford and Dame Mary attended a private Churchill family memorial service at Westminster Abbey, along with the Prime Minister and the Leader of the Opposition.

At 08.00 on the same morning, Churchill's train from the state funeral was unveiled at the National Railway Museum in York. Before a crowd of media and project supporters, *Churchill's Final Journey* was completed with the reunion of the newly restored Battle of Britain class steam locomotive No. 34051 *Winston Churchill* with the restored parcel van that carried the coffin, plus luxury Pullman carriage *Lydia*, repainted in its original shade of umber and cream. In 1965 the train had taken the family from Waterloo station

to Hanborough in Oxfordshire, close to Churchill's final resting place. Jim Lester, the fireman who stoked the boiler that day in 1965 said: 'We have great history, railway history, and this is part of that railway history.' [See back cover]

In Bradford, the National Media Museum released some rarely seen photographs of Churchill from the *Daily Herald* newspaper archive. Comprising 3 million photographs, the archive is a fascinating photographic record of national and international events spanning half the 20th century. An online display offers insight into many aspects of Churchill's life, from his days in the military, including the highs and lows of his political career, family pictures, his fondness for animals, and even boyhood portraits collected retrospectively for his obituary.

VIEW THIS
sciencemuseum.org.uk/churchill
nationalmediamuseum.org.uk/unseen-churchill



Science isn't a word most people associate with my great-grandfather but it was a passion

RANDOLPH CHURCHILL
 SPEAKING AT THE EXHIBITION PREVIEW



Opposite: The funeral train reassembled at York for the *Churchill's Final Journey* exhibition

This page: Great-grandson Randolph Churchill with the rotating-mirror high-speed camera that filmed atomic-bomb tests... From left at the opening of *Churchill's Scientists*, historian Sir David Cannadine, Project Curator Andrew Nahum, SMG Chairman Dame Mary Archer, Churchill's grandson Sir Nicholas Soames and Science Museum Director Ian Blatchford... Vintage photograph of Churchill from the *Daily Herald* collection... Science Museum display showing John Kendrew's 1957 rod model of myoglobin, the first protein resolved by X-ray crystallography; alongside, a brain-scan monitor inspired by wartime radar



COUNTING ON VOLUNTEER HOURS

Helping out at a museum can bring surprisingly personal benefits

Volunteering is crucial to the Science Museum Group as we rely on hundreds of people who dedicate thousands of hours of their time to improving the visitor experience. After seven years at the National Railway Museum, Matthew Hick has taken up the role of Group-wide Volunteer Development Manager and he will be implementing standards and systems to ensure consistency across our volunteer workforce.

Matthew has also become chair of the Heritage Volunteering Group and York's



Centre for Voluntary Service, which means the NRM plays a key role in volunteering nationally. The provision of tours and a partnership with York Theatre Royal has grown the total number of hours volunteered to 34,000, of which 4000 come from home-based volunteers who live as far afield as Australia and America.

David Thomas, a volunteer with 35 years' service who was awarded a British Empire Medal, said modestly: 'I feel as though it's more than I deserve because

an awful lot of other people spend a lot of time here.' Gordon Reed was awarded the *RailStaff* Lifetime Achievement Award in recognition of his 65 years on the railways – 25 of which have been volunteering at NRM.

At the Science Museum in London, the number of volunteers who greet our visitors has increased to 800 with the opening of the *Information Age* gallery, where for the first time we offer object handling sessions. A bespoke station invites visitors to get hands on with



selected objects such as a Morse telegraph sounder, a collection of real telegraphs and fibreoptic cable.

Volunteer Amit Patel observed how visitors walk away with a real sense of connection with the stories that inspired the gallery's creation, and said: 'For us as volunteers, it opens our eyes to see how the objects on display have transformed people's lives.'

In Manchester, the Museum of Science & Industry collaborates in Inspiring Futures, a regional volunteer training programme. The course, developed for those at risk of social exclusion, uses MSI's unique collection as a stimulus for developing interpersonal and customer service skills. As a result, new volunteer-led object handling roles have been created. Thomas Litherland said: 'It has been a challenge for me to overcome my shyness with meeting people. I've gained valuable work experience and confidence in sharing.'

Volunteers in Bradford document and digitise parts of the National Media Museum archive and enhance access to the collection of media-related materials.

Members of the Royal Photographic Society have teamed up to check data and create much-needed records for the thousands of photographs in the collection, as well as scanning images from the 1800s to the present day.

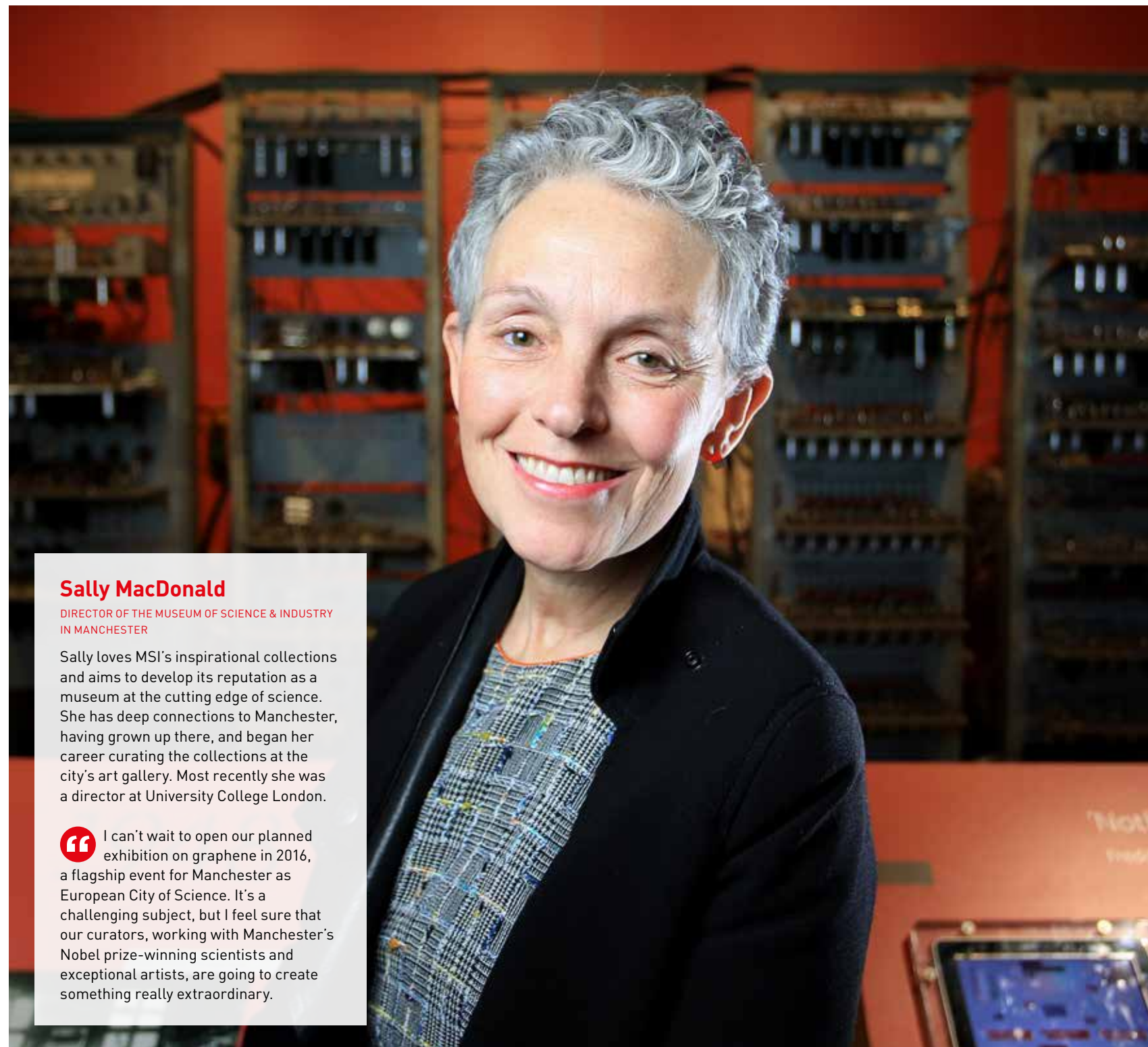
Michael Terwey, Head of Collections and Exhibitions at the museum, said: 'Volunteers are very much part of everyday life in many different departments here, including collections, exhibitions and learning.' During the Bradford Animation Festival they look after special guests and answer queries from film-goers. Volunteers also help deliver the family programme during school holidays, some of the museum's busiest times of year.

VIEW THIS
nrm.org.uk/volunteer
blog.nrm.org.uk

Clockwise: Cataloguing in the Gandolfi Room at the National Media Museum... Science Museum volunteer Alexandra Russell giving visitors a tour of the *Flight* gallery... At Shildon, a steam driver experience with volunteers Fred Ramshaw and Peter Shields... MSI volunteer Gloria Harter ready to advise... Awards went to NRM volunteers David Thomas and boilermaker Gordon Reed, here aboard *City of Truro*

WELCOME TO OUR NEW FACES

Five newcomers have been appointed to key roles within the Group.
We asked each: What's the one thing you can't wait to do?



Sally MacDonald

DIRECTOR OF THE MUSEUM OF SCIENCE & INDUSTRY
IN MANCHESTER

Sally loves MSI's inspirational collections and aims to develop its reputation as a museum at the cutting edge of science. She has deep connections to Manchester, having grown up there, and began her career curating the collections at the city's art gallery. Most recently she was a director at University College London.

“ I can't wait to open our planned exhibition on graphene in 2016, a flagship event for Manchester as European City of Science. It's a challenging subject, but I feel sure that our curators, working with Manchester's Nobel prize-winning scientists and exceptional artists, are going to create something really extraordinary.

“ We have a massive renewal programme aimed at getting more of our collection on display. New installations will cover medicine, agriculture, aviation and space

IAN BLATCHFORD DIRECTOR, SMG



Kate Bush

HEAD OF PHOTOGRAPHY,
SCIENCE MUSEUM GROUP

In a newly created role Kate is leading a programme of photography exhibitions for Media Space at the Science Museum and the National Media Museum and is developing a touring programme. Kate has curated successful exhibitions at the Barbican and judged leading competitions such as the Turner Prize and the Hasselblad Award.

“ The opportunity to develop a major new destination for photography lovers in the heart of this vibrant museum is a once-in-a-lifetime opportunity and I can't wait to start work on the next major show – a retrospective of the award-winning American photographer Alec Soth, opening 6 October.

WELCOME TO OUR NEW FACES



John Stack

DIGITAL DIRECTOR,
SCIENCE MUSEUM GROUP

As the first Digital Director at the Group, John will ensure SMG websites and games harness creative and technological developments in digital media. John joins us after ten years at Tate where he was responsible for setting and delivering the digital strategy and overseeing its well-known website.

“Digital technologies are transforming our audiences. We will increasingly engage with our visitors through smartphones, games, websites, multimedia and more. With 3 billion people globally now online, the potential to extend the reach and impact of our world-class collections and learning programmes is now vast.



Tom O'Leary

DIRECTOR OF LEARNING,
SCIENCE MUSEUM GROUP

Tom will lead the Group's plans to bring science alive for the next generation of innovators in thrall to science and technology. He was previously Head of Public Engagement and Learning at the Houses of Parliament, where he drove a significant expansion in learning provision.

“The extent and quality of the learning activity created by the Science Museum Group is impressive. What I intend to focus on straight away is to ensure that informal learning establishes an increased profile and presence to reflect not only the existing achievements, which are unrivalled in the UK, but also huge further potential.



Andrew McLean

HEAD CURATOR,
NATIONAL RAILWAY MUSEUM, YORK

In a new role, Andrew is responsible for managing the museum's diverse collection, which includes high-profile locomotives such as *Mallard* and *Flying Scotsman*. Andrew has 20 years' experience among a diverse range of historic collections, many of international significance, and has had a keen interest in railways from an early age.

“The rise of railways changed the world, harmonising time and facilitating football leagues across the nation. I relish harnessing the potential of the world's finest collection to impact on our visitors and inspire the next generation of engineers at a time when Britain's railways are undergoing a remarkable renaissance.



“The exhibition team has done a great job of capturing the excitement, awe and wonder of the LHC and physics

PROFESSOR BRIAN COX ON COLLIDER

SMG HITS THE ROAD

Our new Blueprint Pack will enable SMG exhibitions to be replicated across the world

From smashing particles to smashing visitor target numbers, all expectations have been exceeded by the tour of *Collider*, our bespoke exhibition evoking the Large Hadron Collider at CERN. Following its transfer from the Science Museum to the Museum of Science & Industry in Manchester where nearly 16,000 people came through the doors, *Collider* moved on to Paris and attracted an audience of 190,000 in the first half of its run at the Palais de la découverte. In Liverpool, the tour of *Only in England* at the Walker Art Gallery was projected to reach 60,000 visitors during its four-month run.

The world seems to be clamouring for science-rich exhibitions and this new touring strategy derives from our cross-

Group ambition to share expertise. So rather than waiting for our London exhibition *3D: Printing the Future* to close, we shared all of the digital files with our Manchester museum, from basic content schemes to full exhibition scripts, graphics and fabrication drawings. The northern team then sourced all the physical elements for the exhibition, by printing these themselves and also by building partnerships with local industry and sponsors.

SMG is building on this success by creating a Blueprint Pack of the *3D* exhibition for venues outside the Group, believed to be the first of its kind. Blueprints for our contemporary science exhibitions will include design files, content scheme, script, teacher resources, press and marketing materials and more. Venues will be able to choose to replicate the original display, depart from the original, or scale it up as space allows. The Blueprint Pack concept will enable our meticulously researched intellectual property to be developed in new directions.

Touring Exhibitions Manager Gemma Levett says: ‘Our touring programme is about making partnerships across the world. It’s about getting our science out to a wide audience, and highlighting SMG as an international brand.’



Top: The *Collider* exhibition opening in Paris with President of Universcience and former astronaut Claudie Haigneré, Director General of UNESCO Irina Bokova and SMG Director Ian Blatchford... The blueprint brochure

AWARDS FOR WOMEN IN ANIMATION



Clockwise: At the 21st Bradford Animation Festival, celebrity guests Joanna Quinn and Claire Jennings... Charles Cecil talking in Pictureville... Aardman’s Peter Lord

Since 1995 Bradford Animation Festival (BAF) has been attracting the biggest and brightest talent from the worlds of animation, video games and special effects, and this year was no exception. TV favourite *Morph* made one of the star appearances at the 21st festival at the National Media Museum. *Morph*, alongside his creator Peter Lord, co-founder of Aardman Animations (*Wallace & Gromit*, *Chicken Run* and *Arthur Christmas*) treated a packed-out Pictureville Cinema to a behind-the-scenes look at the award-winning studio and the team behind some of the UK’s best-loved animated film and television productions.

The festival also welcomed Charles Cecil MBE (founder of Revolution Games and creator of the *Broken Sword* series); Colin Graham from global games developer Ubisoft’s Montreal studio (animation director for last year’s record-breaking *Watch_Dogs* game); Vivien Halas, daughter of Joy Batchelor and John Halas, the directing team behind the UK’s first animated feature, *Animal Farm* (1954); and the celebrated award-winning French director and writer Michel Ocelot.

BAF 2014 focused on discussions led by women working in animation and video games. The independent producer Claire Jennings received a tribute and the

Lifetime Achievement award. Claire has produced acclaimed animated titles such as the BAFTA award-winning feature film *Wallace & Gromit: The Curse of the Were-Rabbit* (2005).

The six-day festival attracted more than 9000 students, industry figures and family visitors. As always, it culminated in the BAF awards, celebrating the best in new animated films from around the world, with 114 international titles in competition.

VIEW THIS
nationalmediamuseum.org.uk/baf
nationalmediamuseum.org.uk/biff
nationalmediamuseum.org.uk/widescreen



A PASSIONATE COMMITMENT TO RESEARCH

The Group's diverse collection of 7.3 million objects is an open invitation for serious scholarship

The subtle relationships between music and science was one of the topics explored recently by our Research & Public History Department to advance understanding and provide future exhibitions with scholarly support.

The award of an Arts & Humanities Research Council (AHRC) grant on 'Music, Noise and Silence' enabled us to run a series of three workshops bringing together scholars from across the world to explore the interrelationships of music, science and technology since the 18th century. This project also illustrates our remit to foster academic research, in this case on the complex interrelations of science, technology and the arts.

In parallel, the Science Museum arranged a series of musical events. The latest of these, in April 2015, was a staging of Steve Reich's rarely seen work *Three Tales*, in conjunction with Dr Robert Bud's AHRC-funded fellowship on the theme of applied science. Reich's video opera ponders the Hindenburg disaster, the Bikini Atoll atom-bomb tests and Dolly the cloned sheep.

Connecting research and communities
Representatives from across SMG and other major UK museums, galleries, libraries, archives and heritage organisations gathered at the museum in February for a special workshop funded by the AHRC. Organised in conjunction with Professor Keri Facer of Bristol University, the day-long event explored the special role of museums as places to explore community engagement with heritage. Several heritage organisations, including SMG, have benefited from funding under the AHRC's 'Connected Communities' funding stream led by Professor Facer.

SMG has been an active partner in 'Pararchive', one of the projects funded to develop digital aspects of the 'Connected Communities' theme. Under this project, led by Dr Simon Popple (University of Leeds), a web portal is being developed with the help of several community heritage groups. This portal will enable amateur historians to build online narratives expressing their passion for history. The site is cleverly designed to include images and excerpts from

archive television programmes whilst these digital files remain on their owners' sites, thus avoiding costly negotiations over rights.

Tim Boon, Head of the Research & Public History Department, has also been one of the project team led by Dr Helen Graham (University of Leeds) asking 'How should decisions about heritage be made? Co-designing a research project'. In this study of democratic heritage, the Science Museum hosted an investigation into participatory collecting of musical instruments. The project culminated in 'Synth Bingo' at a Lates evening, and the presentation of proposals to the Museum's Collecting Board.



“ While conventional conferences usually have crowded schedules, we had time to even... think!

PROFESSOR KARIN BIJSTERVELD
UNIVERSITY OF MAASTRICHT, KEY PARTICIPANT
IN RECENT WORKSHOPS

Opposite: 'Pararchive' project led by Simon Popple
This page, from top: David Toop presenting a Music and Silence workshop at the Royal College of Music... Gallery view of noise abatement exhibition in the Science Museum, June 1935... 'Synth Bingo' Lates event... 'Connected Communities' workshop facilitated by Keri Facer and Helen Graham



A PASSIONATE COMMITMENT TO RESEARCH



The well-trodden search for longitude remains ripe with controversy, as issue two of the new *Science Museum Group Journal* confirms. The historian Professor Simon Schaffer assesses the five-year Cambridge University/ National Maritime Museum study re-evaluating the whole enterprise. The tension between horology and astronomy is examined separately by Professor Jim Bennett in his analysis of the relationship between 18th-century instrument-makers John Harrison and James Short.

Enjoying fully open access and peer review, our e-journal reached 2000 readers in its first year, and a high standard for online scholarship has been maintained through publication of high-quality images, as well as sound and video. The authors are a mix of established academics, bright young students and museum professionals such as Science Museum curators Ali Boyle and Harry Cliff who expand on the use of theatre in our mould-breaking exhibition about CERN.

Editor Kate Steiner says: 'Our ambition to be a new voice in conversations

about the history, communication and presentation of science has been achieved.'

The past year has also seen the publication of new books by our staff: Ben Russell's *James Watt: Making the World Anew* and Peter Morris's *The Matter Factory: A History of the Chemistry Laboratory*. Tilly Blyth edited *Information Age*, the catalogue to our prestigious new gallery.

A nationwide resource for research

Each of the Group's museums has a dedicated facility to help researchers explore our collections. The Archives Centre at the Museum of Science & Industry has particularly rich holdings representing the scientific and industrial heritage of Manchester and the Northwest.

Who was Mr Green? Where did he live? Why was he so important to the site? These are some of the questions our doctoral student Erin Beeston is asking as part of her research into the history of Liverpool Road station, now the site of MSI. Her research is constantly unearthing new material to illuminate the site's crucial role during the Industrial

This page: In Bradford, the Archives 2.0 conference explored ways of saving the past... Thomas Spain at NRM where he is researching food transport distribution in Britain

Opposite, clockwise: The SMG e-journal's second issue... Recently published books by Tilly Blyth, Ben Russell and Peter Morris... Jacob Ward and Rachel Boon, doctoral students exploring the history of the GPO Research Stations... NRM curator Alison Kay at Making the Connection... Doctoral student Alison Rees, who is exploring 20th-century train interiors in Britain

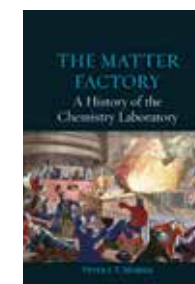
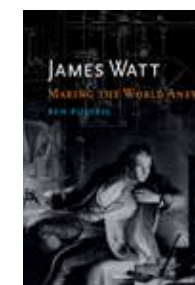


[VIEW THIS
journal.sciencemuseum.ac.uk](http://journal.sciencemuseum.ac.uk)



Revolution. Along with her supervisor James Sumner, Erin curated a bespoke tour for the Manchester Science Festival 2014, focusing on the area's relevance to the world's first recognisable inter-city railway.

The Archives 2.0 conference at the National Media Museum in November explored the challenges posed by the acquisition of visual archives by cultural institutions. An audience exceeding 100 delegates enjoyed presentations by international speakers visiting from Poland, Estonia, Portugal and elsewhere.



Last September, NRM joined in Researchers' Night, a Europe-wide celebration of the power of research. A team of our doctoral students and staff gave after-hours access to the museum, with special presentations on their fields of enquiry, from ambulance trains in the First World War to the Victorian fascination with illustrations of railway tunnels, by way of the railways' fascinating role in food transport.





“Thanks so much for making last night’s screening go so smoothly. You are all true professionals and it showed in the choreography

EAN CARR VISUAL EFFECTS SOCIETY



involving a partnership with Picturehouse to deliver the film programme. In London we introduced a trial period of evening screenings in the IMAX at the Science Museum, showing the blockbuster film *Interstellar*. The 70mm film was seen by 18,000 people and exceeded its target by 250%. London hosted other special guests throughout the year including the RAF Reds, who launched a new film in the Red Arrows 3D experience to celebrate their 50th display season.

The new Dining Car Restaurant and other cafés at the National Railway Museum in York continued to gain positive attention in national awards. With the launch of the stunning *Countess of York*, offering afternoon tea and private fine dining in a beautifully re-created railway restaurant carriage, plus a new outdoor terrace behind the Deep Blue Diner in London, there’s hope for even more awards for SMG’s catering experiences.

Being entrepreneurial is about seizing opportunities when they arise. A chance

encounter by a member of the events team led to a conversation about hiring secure runways, which SMG happens to have at our Wroughton airfield; more than £300,000 of income has been generated to date, with profits invested back into the Group.

The Energy Show from Science Museum Live performed to sell-out audiences in London and then toured for the first time to 35 places across England and Wales. The show earned the *Mail on Sunday*’s Critic’s Choice, with the claim ‘This is what science lessons should be like: a blast!’

Enterprises found new audiences with our first pop-up retail store at Bluewater in Kent. By bringing the Group’s brands to the UK’s fourth-largest shopping centre, the store served almost 15,000 customers during Christmas, generating sales of £250,000. At the Museum of Science & Industry, Manchester, the refurbished shop enjoyed a significant uplift in sales from many new ranges including the I Love Manchester bespoke design line. This financial year also saw record online sales across the Group, up 20%.

Nevertheless, Mason stresses: ‘Nothing Enterprises does is solely about making money. If we can have great cafés, shops, films and other experiences we can also have a lot of fun enhancing a visit to our great museums.’

Opposite: The *Countess of York* restaurant car at NRM in York... A Science Museum IMAX screening of *Interstellar* was launched by an exclusive talk with Oliver James, Eugénie von Tunzelmann, Oscar-winner Paul Franklin and Roger Highfield

This page: Science Museum pop-up shop at Bluewater shopping centre... *The Energy Show*... RAF Red Arrows pilots launch a new cockpit-viewpoint 3D film in London’s Fly Zone

SEIZE THE DAY AND HAVE FUN

Prestige attractions and entrepreneurial flair have set new commercial records

After two record-breaking years of effort to make the Group more entrepreneurial in the face of Government cutbacks, new projects and partnerships have been added to our portfolio by Enterprises, the Group’s commercial wing. ‘We have and will continue to develop new commercial ventures,’ explained Sam Mason, Commercial Director. ‘Some have done very well, although not every plan has come to fruition in the way that we expected. That is the very nature of being entrepreneurial, where the risks are high but so are the rewards, of which there have been many in a packed year.’

Our cinema offer at the National Media Museum underwent radical changes



A MECCA FOR PHOTOGRAPHY

The Group boasts an unrivalled world-class collection that is making ever bigger headlines

As a medium, photography is indispensable for communicating ideas about science, technology and industry, as is increasingly evident in our displays and publications. It is affirmed by the appointment of Kate Bush as the Group's first Head of Photography [more on page 47], who says: 'We have an extraordinary collection which demands to be better known.' The age-old tension between aesthetic beauty and techniques developed for scientific study has culminated in the Media Space exhibition *Revelations: Experiments in Photography*, which contrasts rare images from the 19th-century pioneers with contemporary art practitioners' work.

The elegant Media Space gallery was created at the Science Museum to provide London with a 525-square-metre showcase for gems from the national collections housed in Bradford's National Media Museum (NMeM). The successful inaugural exhibition featuring Tony Ray-Jones and Martin Parr, *Only in England*, transferred to Bradford last spring, while the second Media Space exhibition,

Joan Fontcuberta: *Stranger Than Fiction* was named one of the *Guardian's* top ten photography exhibitions of 2014 internationally. In a collaboration with the Museo Nacional d'Art de Catalunya, Barcelona, the Catalan photographer's fantasies proved a truly intriguing proposition for our adult audiences and during their three-month transfer to Bradford continued to receive positive coverage in the national media.

The Virgin Media Studio is a separate, intimate gallery at Media Space where, following a 40-year embargo, we were pleased to display Nick Hedges' photographs from our collection and commissioned by Shelter. This hard-hitting exhibition, *Make Life Worth Living*, was extended after proving a crowd-puller.

This year's unique experience of a lifetime has been *Drawn by Light*, an unparalleled selection of 200 magnificent works from the Royal Photographic Society archives held by the NMeM, introduced by three of the world's oldest images dating from 1827, made by



Below: Kate Bush, Head of Photography, and Dame Mary Archer, Chairman of SMG, at the opening of *Revelations* in Media Space

Clockwise: Talbot 'mousetrap' cameras in *Drawn by Light*... Trustee Lord Grade and curator Greg Hobson with Joan Fontcuberta at his exhibition *Stranger Than Fiction*... Mark Power at the *Open for Business* exhibition in York... Nick Hedges at *Make Life Worth Living* in the Virgin Media Space... Ori Gersht with his work at *Revelations: Experiments in Photography*



Niépcé. Again shown in both London and Bradford, this compelling exhibition also travels to Mannheim, Germany, in 2017.

To mark the 150th anniversary of arguably Manchester's most famous engineer, Sebastian de Ferranti, the Museum of Science & Industry released unseen images from its archive of a young Ferranti and his family.

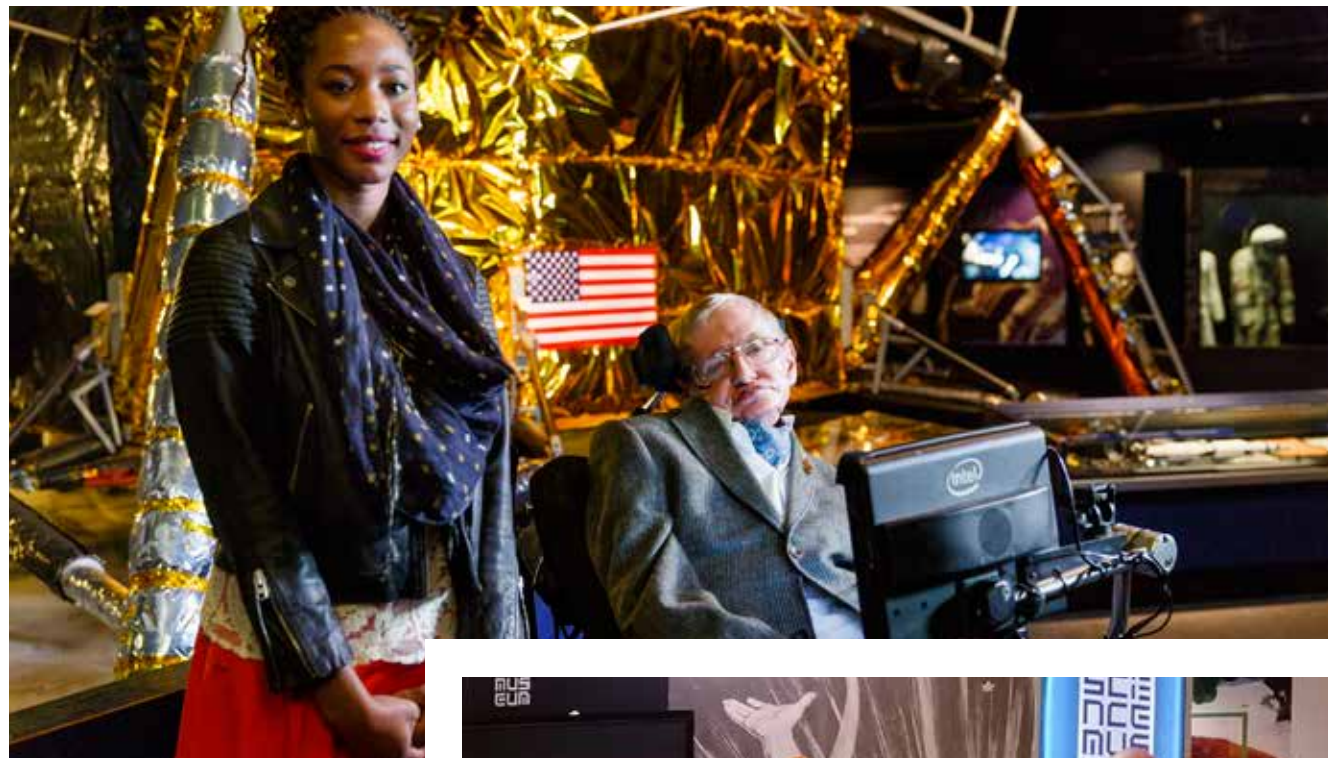
MSI confirmed its role as the northern home to the annual Wellcome Image Awards, which celebrate scientific wonders in breathtaking detail. BBC

medical correspondent Fergus Walsh said the 2014 entries were 'both technically brilliant and visually striking' and the 2015 awards have received similarly impressive reviews.

This year the National Media Museum acquired 104 photographs by acclaimed Irish photographer Bob Carlos Clarke for the National Photography Collection, including iconic images of Keith Richards, Marco Pierre White and Rachel Weisz [see page 65].

To strengthen a spirit of collaboration,

the exhibition *Open for Business* threw fresh light on the vibrancy of British manufacturing through the eyes of nine photographers from the renowned Magnum agency. The full exhibition opened at the National Media Museum before other Group museums received selected displays which capture workplaces as diverse as foundries, shipyards, assembly lines, milliners, animation studios and research laboratories. The UK photographers included Stuart Franklin, David Hurn, Peter Marlow, Martin Parr, Mark Power and Chris Steele-Perkins.



SMG'S GLOBAL REACH

Extending our influence internationally is central to the new dynamism of the Science Museum Group. Here's a cross section of our worldwide activity

One sign of our increasing international reach came when the Science Museum was placed at the heart of a major campaign to market London to the rest of the world. Among other significant cultural attractions, it was invited by London & Partners to offer a once-in-a-lifetime experience to a Guest of Honour selected in an international competition.

The world's best-known scientist, Stephen Hawking, gave a tour of the museum to the winner, Adaeze Uyanwah, a Californian schoolteacher. The promotional video featuring them



both in the museum has been used in a multi-million-pound campaign designed to reach 250 million people in the United States, France and Germany.

As the reach of our brand grows, so too does the strength of our strategic relationship with countries such as Brazil and France. The most tangible example of SMG's more expansive approach came when our *Collider* exhibition transferred from MSI in Manchester to the Palais de la découverte in Paris, at the start of a three-year tour to Europe, Asia and Australia.

SMG sites hosted representatives from 40 organisations in Asia, Australia, Europe and North and South America; staff represented us at ten conferences in Asia, Europe and North America; and we hosted international conferences, including the European Association of Museums of the History of Medical

Sciences General Assembly at the Science Museum (co-hosted with the Royal College of Surgeons and the Wellcome Collection).

SMG's world-class outreach team travelled to Ireland, Italy, Gibraltar and Hong Kong, delivering STEM shows and workshops to children as well as teacher training. These reached 15,000 people at schools, community groups, museums and festivals overseas.

The Science Museum also starred in the Government's campaign to showcase the creative industries of the UK by taking part in the GREAT Festival in Istanbul.

Clockwise: The Cambridge University cosmologist Stephen Hawking gives American teacher Adaeze Uyanwah a tour of the Science Museum in a Visit London promotion... SMG Director Ian Blatchford at the Intermuseum Conference in Moscow



A PARTY WITH STEAM ENGINES

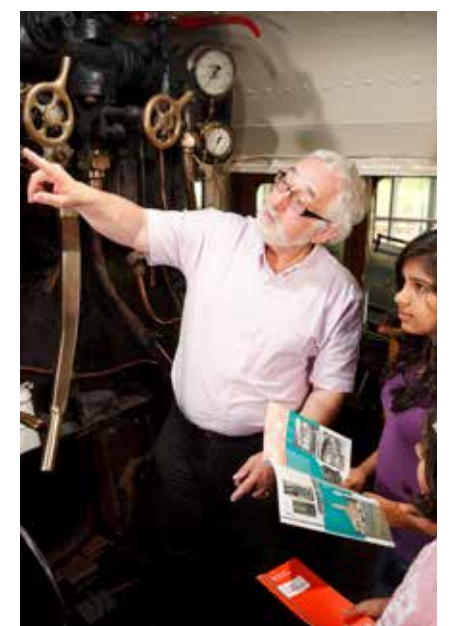
In September 2014 the National Railway Museum at Shildon celebrated the tenth anniversary of its opening as County Durham's only national museum. A special steam gala brought together locomotives representing 100 years of railway history and attracted 6000 visitors. Anthony Coulls, Senior Curator of Rail Vehicles, who has worked at the museum since it opened, described the event as 'a birthday party with steam engines'. He added: 'I remember when the museum was being built. People were sceptical and convinced that it wouldn't be a success, but it is.'

NRM has long been a centre of excellence for heritage restoration, with overhauls shared between the two museums. An important recent transformation at Shildon centred on the parcel van for the *Churchill's Final Journey* display [see page 42]. 'The structural work on the vehicle carried



out by our team of staff, trainees and volunteers has been comprehensive,' said Richard Pearson, the Workshop and Rail Operation Manager who supervised the delicate restoration over three months. 'We had hoped to retain some of the original timber, but unfortunately we had to start afresh to make sure the coach looked its best for display.'

We also bade farewell to George Muirhead as Museum Manager, who retired after 11 highly successful years at Shildon, to return to his research on the history of the Northeast. He saw visitor numbers grow from a target of 63,000 in 2004 to a yearly average exceeding 200,000, and his key achievements include bringing Furness No. 20, the world's oldest operating steam locomotive, to be a resident in 2009. George's retirement followed a record-breaking year for visitors to Shildon.



From top: Rides to the Hackworth Workshop terminus... Shildon's birthday steam gala showing five locomotives in steam... Cab-It footplate tours

TWO-FOLD PURPOSE BEHIND COLLECTING



Hadrian Ellory-van Dekker, Science Museum Head of Collections, writes:
The Rugby tuning coils stand now as the spectacular centrepiece of the Science Museum's *Information Age* gallery – a wonderful outcome to what was a challenging, necessary and significant acquisition but somewhat speculative when we made it in 2005. We continue, across the Science Museum Group, to develop the nation's collection through generous donation and purchase. Scanning the horizon and always thinking ahead, we remain committed to securing and preserving the very best of the unique and important and the representative to support our exhibitions and research programmes. Here's a selection of the past year's acquisitions.



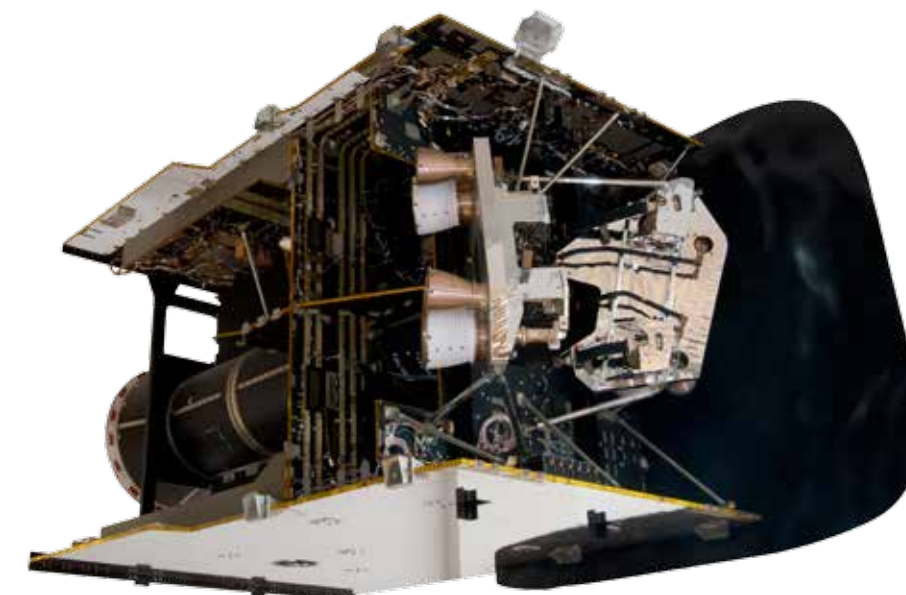
Above: Large Object Store 1 at the Museum of Science & Industry – on the floor the giant red lettering from the Granada TV studios sign, recently acquired. Beyond is a BBC Dalek and at centre a cotton spinning machine made in 1964 by the Shirley Institute, a Manchester-based research centre

Left: Sir Patrick Moore's Russian lunar globe showing the near side of the Moon and the boundary with the far side

Top right: Eurostar 3000 satellite

“ Sir Patrick Moore was a towering figure in astronomy. His archive will help to inform the museum's future astronomy and space displays, and will become an important resource for historians

ALISON BOYLE SM DEPUTY KEEPER OF SCIENCE AND MEDICINE



SCIENCE MUSEUM LONDON

Archive of Sir Patrick Moore, the television star who died in 2012. Includes planetary observation drawings, telescope, book manuscripts and *The Sky at Night* scripts from his career in astronomy and popularisation spanning much of the 20th century. Opposite, we see his lunar globe, 1962, which shows details of the far side of the Moon revealed by the Luna 3 spacecraft in 1959

Eurostar 3000 telecommunications satellite, 2000, made by EADS Astrium Ltd. Now on display in *Information Age* (and shown above), this is a rare chance for visitors to see a real satellite close up

Running blade for above-knee amputee, c. 2012, by Otto Bock Healthcare Ltd. The blade, for recreational athletes, incorporates cutting-edge technology that has previously been the preserve of Paralympic athletes

Silver tracheotomy tube, 1950s, made by Phoenix Surgical Instruments Ltd. Includes inner tubes and speaking valve, plus cotton tape for attaching around the neck. Ronald Hughes contracted polio in 1956 at the age of 34 and wore these tubes for the rest of his life

Two albums of cigarette cards, 1934–35, showing early British radio performers, manufactured by Imperial Tobacco, distributed under the brand name W D and H O Wills and Company

ARM1 microchip, 1985. The first Reduced Instruction Set Computing chip produced for the mass market, made by Acorn Computers Ltd. Fewer instructions enable more efficient performance

Mobile phone base station antenna disguised as a two-storey cactus, 2013–14, manufactured by Larson Camouflage LLC, Arizona, USA

Poster of international telephone exchange, 1935. A General Post Office poster designed by John Cooper

Post Office telegram, Pontygwaith to Archangel, 9 October 1943. 'Wishing you happy birthday look after yourself always thinking of you.' Acquired during a public collecting project run by the Science Museum with partner museums across the UK

Silver-plated fast-boiling travel kettle, 1930s, by Thompson, Ritchie & Co. Ltd, London. Owned by Lady MacMichael, wife of the governor of Tanganyika

Ear lobe arterialised blood collector, 2005. Developed by Thais Russomano, Brazil, and designed for taking blood samples in space, the technology should lead to cheaper and quicker forms of blood testing

Electronic tide modelling machine, 1960–2007, invented and constructed by Shizuo Ishiguro at the National Institute of Oceanography, Southampton

TWO-FOLD PURPOSE BEHIND COLLECTING

MUSEUM OF SCIENCE & INDUSTRY MANCHESTER

Granada sign, 1962. The glowing red sign on Granada TV's Quay Street building was a Manchester icon from 1962 to 2010, marking the first purpose-built television studios in the UK [pictured on page 62]

Design portfolio, 1924–37. Jean Elizabeth Gregson's portfolio of coursework from the Manchester School of Art illuminates the career path of women in the male-dominated textile design industry

Ergometer, 1960s. Used at a 'human performance laboratory' at Salford University, this machine helped British cyclists prepare for the 1968 Mexico Olympics

Hard hat, 1990s, worn at the opening of Manchester's velodrome. The construction of the National Cycling Centre spearheaded the ambitious regeneration of east Manchester

Plans of Liverpool Road station, 1860s. Three drawings that illustrate how the museum's historic site continued to evolve through the 19th century, revealing previously unknown detail



Above: Jean Elizabeth Gregson's textile design portfolio

Below: An ergometer housed at Manchester's velodrome since about 1996



NATIONAL RAILWAY MUSEUM YORK

Wooden rails dating from the 1780s, from the Willington 'waggonway' on Tyneside. They form part of the oldest surviving standard-gauge track in the world [see photograph inside front cover]

1:12 scale model, 1890–1914, of a Great Northern Railway Class 1 Stirling Single locomotive. Made by Barry Wallwork and a fine example of the model-maker's art

'Unbeaten Tracks', 1860–70. Manuscript letters detailing the journeys of a railway engineer, believed to be H Bird, in western and central Europe

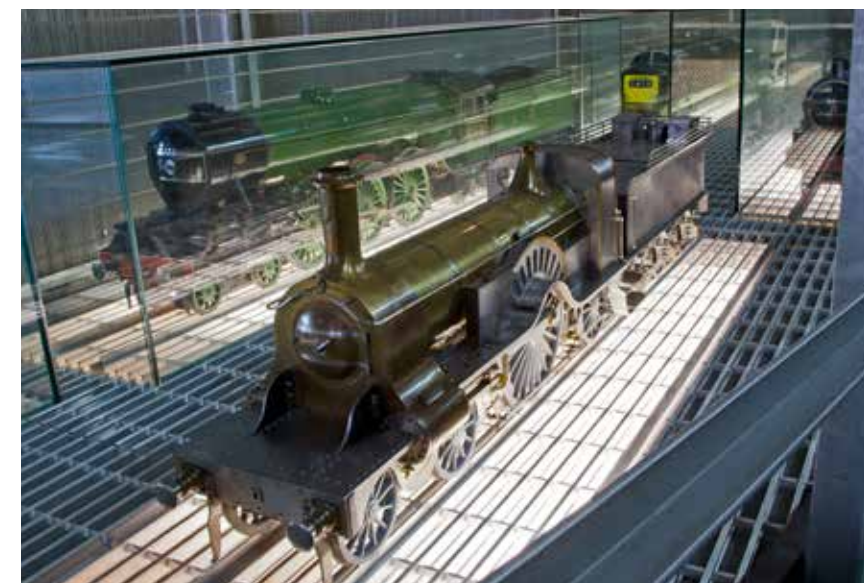
Leaflets, c. 1964, published by the Soviet Ministry of Transport and collected by ASLEF member James Collin on a trade union visit to the USSR

Pair of yellow plastic sandals inscribed 'Merseyrail: more than just a journey'. These were given to women rail passengers attending the 2009 Grand National



NATIONAL MEDIA MUSEUM BRADFORD

Giclée-printed portrait of Tricia Wylie, fishing industry worker in Scotland, photographed by Paul Duke between 2009 and 2012. One of a selection of prints by the Scottish photographer from his series *At Sea* documenting the fishing communities of the Moray Firth



Photograph titled Rachel Weisz, 1993. Silver gelatin hand-printed and toned with selenium. One of 104 prints acquired by the museum from the estate of Irish photographer Bob Carlos Clarke © The Estate of Bob Carlos Clarke

Polyphoto proof sheet. Introduced in 1933, Polyfoto was a commercial portrait studio system that produced distinctive



photographs – 48 different poses, each little bigger than a postage stamp

Colortron 99 enlarger, 1965. Designed for professional use, this enlarger was one of the first to use electronic exposure control to simplify the process of colour printing

Shirley Beljon studio equipment, late 20th century. Shirley Beljon was a well-known photographer in the 1970s and 1980s, specialising in fashion photography and portraiture. This is a complete set of her studio equipment

This page, at NMeM: Photographic portrait of Tricia Wylie, 2009–12, by Paul Duke... Photographic portrait of Rachel Weisz, 1993, by Bob Carlos Clarke

At NRM: Five-inch-gauge model steam locomotive Class 1 Stirling Single, made by Barry Wallwork

FINANCIAL OVERVIEW: INNOVATIVE WAYS TO OFFER VFM

Jonathan Newby, SMG Chief Operating Officer (below centre) identifies the new energy that is driving ideas to generate income



The fiscal climate over the past 12 months has been no less challenging than in recent times, with the ongoing decline in Government funding making it harder to balance the books. In this context finding new ways to deliver self-generated income is ever more important. Key to this is ensuring that the public programme at each of the Group's museums continues to attract visitors in increasing numbers. Then encouraging more visitors to spend more during their visit is the route toward financial sustainability.

Our commercial team, SCMG Enterprises, has delivered another great set of results [see page 56] and made a contribution exceeding £2.5 million to the Group. Whilst some areas of the business have struggled in the face of current market forces (notably retail), others have stormed ahead, particularly corporate hire.

That said, we continue to innovate and demonstrate entrepreneurial flair.

A seasonal pop-up Science Museum shop at the Bluewater shopping mall proved very popular, as has the continued interest in specialist railway models from our Locomotion Models business. We've also refurbished several of our eateries, notably at the Museum of Science & Industry, and introduced a delightful outdoor terrace café at the Science Museum, as well as the charming *Countess of York* high-tea restaurant in a converted vintage carriage at the National Railway Museum.

Our visitor giving programme, now in its fourth year, continues to drive individual donations as visitors are welcomed at each of our sites. Income at both the Science Museum and National Railway Museum has been strong, with some new records being broken during peak holiday periods, and the introduction of the scheme at the Museum of Science & Industry and National Media Museum has been particularly encouraging.

The temporary exhibition programme

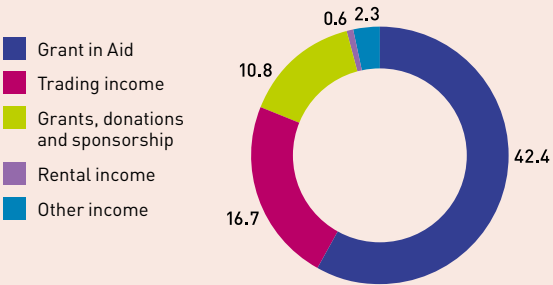
has seen some notable successes with ticket income exceeding expectations for a number of shows, including *Collider* at the Museum of Science & Industry [its first paid-for exhibition since joining SMG in 2012] and *Drawn by Light* at the Science Museum. Indeed, *Collider* is further making its mark around the world as it embarks on its ambitious four-year tour, the first leg of which was to Paris; it will then move on to the Far East and Australasia, generating new income and enhancing SMG's reputation as it goes.

The expectation is that we will need to go even further in developing innovative ways to secure self-generated income as Government funding declines yet more in the coming years. But over the past year or so we have shown ourselves to be fighting fit, fleet of foot and up for the challenge.

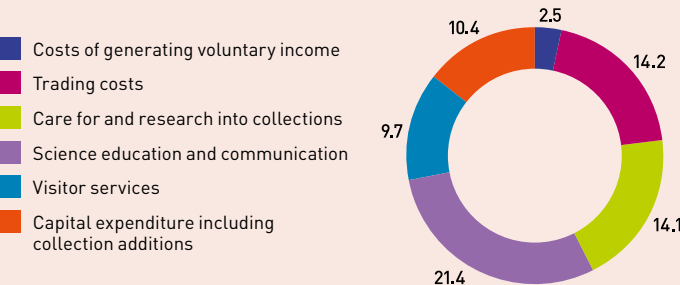
Top: Jonathan Newby with RAF Red Arrows pilots launching a new 50th display season cockpit-viewpoint 3D film for the 3D simulation in the Science Museum's Fly Zone

GROUP FINANCIAL SUMMARY 2014-15

Income 2014-15 (£m)



Expenditure 2014-15 (£m)



Our generous sponsors, trusts, foundations and individuals have together contributed to and made possible the wide range of programmes across our museums in 2014-15, from the opening of *Information Age* to cutting-edge contemporary science displays and our ground-breaking STEM-based learning activities and research.

Once again, our visitors have made a huge difference, with income from visitor donations exceeding £2 million. In the context of continued public-sector funding cuts, the generosity of our visitors and other supporters is ever more critical to our continued success.

Whilst our core government funding continues to fall year on year, we have been successful in bidding for additional Grant in Aid awards exceeding £1 million this year for specific one-off projects. This funding will enable SMG to begin construction

of a special exhibitions gallery in Manchester and to develop a series of contemporary science festivals in Bradford and Manchester. These additional awards recognise our innovation and impact as part of the UK science base, particularly in the north of England, and will provide invaluable support in helping us realise our ambitions for the northern museums.

In order to manage continued core funding reductions and enable investment in our strategic vision, we have maintained our focus on income generation. Self-generated income represented 42% of total incoming resources this year, testament to the success of this strategy. Profit from our commercial activities reduced slightly from 2013-14's record figures. This income was supplemented by ticket income from our paid-for exhibitions and from our international exhibition touring programme.

Our success in generating commercial income together with the generosity of our supporters has enabled the Group to continue to balance budgets without compromising on either visitor experience or the care of our collections. This has required a continued focus on cost-reduction strategies across our museums, including a fall in staff numbers, which has continued in this financial year. As a group we are becoming more strategically focused, leaner and more efficient, but if public funding continues to decline we will have to review the scale and range of our operations.

These figures are extracted from management accounts at 31 March 2015 and were published before statutory accounting adjustments and external audit. The full Annual Report and Accounts is published in July each year and is available on our website: sciencemuseum.org.uk/group

SMG VISIT NUMBERS 2014-15

Total number of visits to the museums	Science Museum	Museum of Science & Industry	National Railway Museum	NRM Shildon	National Media Museum	All Science Museum Group
Outturn 2013-14	3,342,000	669,000	926,000	296,000	479,000	5,712,000
Outturn 2014-15	3,348,000	680,000	727,000	167,000	414,000	5,337,000**

Visits in education groups	Science Museum	Museum of Science & Industry	National Railway Museum	NRM Shildon	National Media Museum	All Science Museum Group
Outturn 2013-14	442,000	54,000	39,000	*	26,000	*
Outturn 2014-15	452,000	65,000	40,000	5,000	33,000	595,000**

Information is sourced through both internal and periodic independent visitor surveys.
* Methodology in recording visits in education groups at NRM Shildon was changed further to align with the rest of the Group. It is not appropriate to compare year on year.
** Any anomalies in totals arise from roundings.

THE YEAR'S HIGHLIGHTS
The Science Museum Group attracted a total of 5,337,000 visits during the past year, among which 595,000 people visited in booked education groups. **The Science Museum** enjoyed 3,348,000 visits, and welcomed 452,000 visitors in education groups, of which a record-breaking 388,000 were children and young people.
The National Railway Museum (York and Shildon) achieved a total of 894,000 visits during the year.

SMG'S DIGITAL AUDIENCE
The trend for year-on-year increases in visits to the Group's websites has continued this year, reaching 10,799,000 in total. The methodology for reporting web visits has been changed. Industry leader Google Analytics is now being used to report figures, in line with other national museums. The latest figures have been amended to reflect this new methodology, to enable like-for-like comparison.

OUR GENEROUS SUPPORTERS

We extend our grateful thanks to all those individuals, families and organisations that have chosen to support the work of the Science Museum Group

SCIENCE MUSEUM	
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NATIONAL RAILWAY MUSEUM
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The Science Museum Director's Annual Dinner where we thank our supporters

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Wick Moorman
Richard Robertson
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All those who wish to remain anonymous

Legacy
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All those who wish to remain anonymous

NATIONAL MEDIA MUSEUM

Corporate supporters
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Toon Boom Animation
Wikia

Individuals
Jesse Bryant
Mr and Mrs Jordanova
Mr and Mrs Michael G Wilson OBE

Trusts, foundations and government
City of Bradford Metropolitan District Council
The Great Britain Sasakawa Foundation
Italian Cultural Institute

SCIENCE MUSEUM FOUNDATION

The Science Museum Foundation was set up in 2012 to support the fundraising efforts of the Group. We are grateful to the following Trustees for their continued involvement and support:

Michael G Wilson OBE (Chair)
Lord Borwick of Hawkshead
Donald Brydon CBE
Howard Covington
Edwina Dunn
Michael Hoffman
Lord Rees of Ludlow
Sir Martin Smith

SUPPORTING THE SCIENCE MUSEUM GROUP

The financial support of our visitors and partners provides critical funding for the museums' core priorities and future plans. We are grateful to all those who have kindly made a donation to support the work of the Science Museum Group. There are a number of different ways to become a supporter:

Individual philanthropists play a unique role as transformational donors and enjoy special access to bring them closer to our museums, collections and programmes.

Corporate supporters partner with us across a range of activities including gallery and exhibition sponsorships.

Patrons support the work of the museums through their annual donations and enjoy special access to bring them closer to our museums, collections and programmes.

Trusts, foundations and lottery bodies provide essential and substantial support for our new gallery developments, exhibitions, learning programmes and wider public engagement.

Visitor giving provides an opportunity for all our visitors to support our museums.

For further information, please contact us on **020 7942 4041** or e-mail **development@sciencemuseum.ac.uk**

THE BIGGEST MUSEUM ALLIANCE IN SCIENCE



Michael G Wilson presenting the Queen and Prince Philip with their Fellowships

SCIENCE MUSEUM GROUP OBJECTIVES

The Science Museum Group (SMG) is devoted to the history and contemporary practice of science, medicine, technology, industry and media throughout which the common bond is human ingenuity. Our collections form an enduring record of scientific, technological and medical change since the 18th century. SMG incorporates the Science Museum, its library and archive and the Wellcome Collection of the History of Medicine in South Kensington; the Museum of Science & Industry in Manchester; the National Railway Museum in York and Shildon; and the National Media Museum in Bradford. Our two major collections stores are located at Wroughton in Wiltshire and Blythe House in West Kensington.

Our strategic objectives across SMG are to aspire to the highest international museum standards in the care and preservation of collections, scholarship, programming, learning and advocacy for our subject areas; strengthen our core narratives and deliver dynamic gallery displays; implement clear audience strategies that focus on providing life-enhancing experiences; extend our reach nationally and internationally; be an organisation that is extrovert, entrepreneurial, efficient and dedicated to the development of great people.

THE CHARITY

The Board of Trustees of the Science Museum was established under the National Heritage Act 1983. SMG is an exempt charity under the Second Schedule of the Charities Act 1994.

The Science Museum Group comprises:

Science Museum, London
Museum of Science & Industry, Manchester
National Railway Museum, York and Shildon
National Media Museum, Bradford
SCMG Enterprises Ltd

BOARD OF TRUSTEES OF THE SCIENCE MUSEUM GROUP

The Board of Trustees of the Science Museum is responsible for the whole of the Science Museum Group. The Trustees, who may number between 12 and 20, are appointed by and are responsible to the Prime Minister through DCMS. The Director of SMG, as Chief Executive Officer, is responsible to the Board of Trustees, and as Accounting Officer is accountable to DCMS for compliance with the Management Statement and Financial Memorandum.

All those named in this page held office during the year under review, 2014–15

Chairman

Dr Douglas Gurr, until June 2014
Dr Gill Samuels CBE, from July 2014 to December 2014
Dame Mary Archer DBE, from January 2015

Members

Lady Chisholm, until January 2015
Mr Howard Covington
Professor Dame Athene Donald DBE
Lord Faulkner of Worcester
Mr Andreas J Goss
Lord Grade of Yarmouth CBE
Professor Ludmilla Jordanova
Mr Simon Linnett
Professor Averil Macdonald
Professor Sir Howard Newby CBE, until January 2015
Dr Gill Samuels CBE
Mr James Smith, until January 2015
Mr Christopher Swinson OBE, until January 2015

New Fellows of the Science Museum (FScM)

HM Queen Elizabeth II
HRH Prince Philip, Duke of Edinburgh
Dr Douglas Gurr

OUR DISTINGUISHED ADVISERS

Science Museum Advisory Board

Chairman: Dr Gill Samuels CBE (Trustee), until January 2015
Mr Howard Covington (Trustee), from January 2015

Ms Jane Atkinson
Dr Sarah Caddick
Professor Dame Athene Donald DBE (Trustee)
Dr Marcus du Sautoy
Mr Malcolm Garrett
Dr Lucie Green
Sir Tim Hunt
Professor Michael J Reiss
Dr Gill Samuels CBE (Trustee), from January 2015
Professor Simon J Schaffer
Professor Molly Stevens
Professor Helen Storey MBE

Museum of Science & Industry Advisory Board

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Dr Gill Samuels CBE (Trustee), from January 2015

Professor Colin Bailey
Dr Maria Balshaw
Mr Michael Emmerich
Mr Steve Johnson
Sir Richard Leese CBE
Dr Erinma Ochu
Ms Sinead Rocks
Dr Gill Samuels CBE (Trustee), until January 2015
Ms Susan Woodward OBE

National Railway Museum Advisory Board

Chairman: Professor Sir Howard Newby CBE (Trustee), until January 2015
Mr Simon Linnett (Trustee), from January 2015

Mr Philip Benham
Mr Christopher Garnett OBE, until February 2015
Mr Bryan Gray CBE
Mr Brian Greenwood, until February 2015
Professor Ludmilla Jordanova (Trustee)
Mr Simon Linnett (Trustee), until January 2015
Mr Darren Richardson, until May 2014
Mr Adrian Shooter CBE
Ms Sarah Tanburn, from September 2014
Mr Anton Valk
Mr Philip Verster, until March 2015
Mr Christian Wolmar, from March 2015
Mr William Woolley, until February 2015

National Media Museum Advisory Board

Chairman: Lord Grade of Yarmouth CBE (Trustee)

Mr Pierre Brahm
Professor Brian Cantor
Lady Chisholm (Trustee), until January 2015
Mr Philippe Garner
Ms Suzan Hemingway, from November 2014
Mr Matt Locke
Professor Averil Macdonald (Trustee), from January 2015
Ms Zahida Manzoor CBE
Dr Annette Nabavi
Mr Tony Reeves, until October 2014
Ms Carolyn Reynolds
Ms Gillian Reynolds MBE

SCIENCE MUSEUM, LONDON



Star exhibit: Astronaut Dr Helen Sharman with the Zvezda spacesuit worn during her mission to the Mir space station in 1991

Director: Ian Blatchford

Science Museum
Exhibition Road
London SW7 2DD
www.sciencemuseum.org.uk

OBJECTIVES

The Science Museum's mission is to make sense of the science that shapes our lives. This commitment drives everything we do. Through our world-class collections of original historic objects, galleries, interactive experiences and our learning programmes we aim to be the leading international museum championing the understanding, enjoyment and prestige of science in modern society. We are now three years into our ten-year Strategic Ambitions, which include a commitment to focus on the urgent choices faced by society and the fundamental science and technology that underpin them.

To help create a scientifically literate society and inspire the next generation, our strategy focuses on four core themes: climate science and sustainability, medicine, informatics and the science of data, and understanding the universe.

AUDIENCES

The museum continues to attract many more than 3 million visits a year. About half of all visitors come in family groups and 1 in 10 visits are made in education groups, typically 400,000 per year, uniquely in the UK. Adults visiting independently make up the rest of our audience, and this is a sector we are committed to growing. For many visitors to London the Science Museum is a must-see destination, with well over a third of general admissions visitors coming from overseas. The museum's digital reach is also global, with about 40% of our website traffic coming from outside the UK.

HIGHLIGHTS

The Science Museum traces its origins from the Great Exhibition of 1851 when its world-class collections of original artefacts began amassing to represent the history of science, technology, engineering and medicine. Among our key exhibits are Arkwright's prototype spinning machine (1769), Stephenson's steam engine *Rocket* (1829), Cooke and Wheatstone's telegraph (1837), the Pilot ACE computer (1950) and the Apollo 10 capsule that went into lunar orbit in

1969. Our library and archive collections include rare and significant items such as the first Latin translation of Ptolemy's *Almagest*, letters written by Sir Humphry Davy and Charles Babbage's notes and drawings on his calculating engines.

The museum has been a pioneer of interactive science interpretation for more than 80 years. Recent innovations in our programming include monthly 'adults only' Lates evenings and an IMAX auditorium enhanced to host live productions, lectures and debates, as well as 3D films. Flagships of our cutting-edge contemporary science programming are the *Antenna* and *Who Am I?* galleries.

FUTURE AMBITIONS

A revitalised exhibitions programme at the Science Museum explores the birth of the space age in the trail-blazing *Cosmonauts*. Our ambitious Masterplan will also see one third of our floor space repurposed or upgraded by the end of 2019. The centrepieces of this are a new suite of medicine galleries and expanded interactive galleries. The museum's library, enlarged into a world-class research centre, reopens in 2015.

MUSEUM OF SCIENCE & INDUSTRY, MANCHESTER



Star exhibit: Daily demonstration of original spinning and weaving machines in the *Textiles* gallery

Director: Sally MacDonald
Museum of Science & Industry
Liverpool Road, Castlefield
Manchester M3 4FP
www.mosi.org.uk

OBJECTIVES

The Museum of Science & Industry is devoted to inspiring visitors through the ideas that change the world, from the Industrial Revolution to today and beyond. It's a story that we're uniquely placed to tell – the site of the oldest surviving passenger railway station, in the heart of the world's first industrial city, today alive with innovative cutting-edge discoveries in science and technology. We combine the distinctive appeal of our historic site with a vibrant contemporary science programme to surprise and delight audiences, making connections between the past and the present, between scientific theory and real-world applications.

Sally MacDonald joined the museum as Director in September 2014.

AUDIENCES

Families continue to be our largest group of visitors, while almost 1 in 10 visits are made in educational groups.

Our aim is to inspire the next generation of scientists, engineers, designers, chemists and entrepreneurs. We are also committed to growing our audience of independent adults.

HIGHLIGHTS

We care for a globally important heritage site comprising five listed buildings, two of them listed Grade 1. This site was the original terminus of the world's first inter-city railway and our characteristic 1830 Warehouse epitomises Manchester's 19th-century reputation as 'the warehouse of the western world'.

Key objects in the collection include the models used by John Dalton to demonstrate his atomic theory, laying the foundations of modern chemistry; parts from the world's first commercially available computer, the Ferranti Mark I; and one of the world's largest collections of working steam mill engines, which visitors can see in action in the *Power Hall*. There are also daily demonstrations from spinning to weaving on original machines in the museum's *Textiles* gallery.

One of the flagship events in our cultural calendar, bringing science to life for

people of all ages, is the 11-day multi-venue Manchester Science Festival. Each October half term it attracts the best scientists from Manchester and beyond to showcase current research and promote the region's rich heritage of innovation.

FUTURE AMBITIONS

In coming years, the museum's strategy will ensure that we remain a vital and vibrant part of people's cultural life in Manchester and beyond. We will continue to develop our relationships with the Wellcome Trust, Siemens UK and the city, helping to build our international reputation while maintaining our regional focus.

Manchester is enjoying significant investment as a 21st-century city of science, so the Museum of Science & Industry will take advantage of this exceptional opportunity to engage with contemporary science and innovation.

We are producing a major exhibition on graphene for 2016, launching a new brand identity during 2015, and raising funds to create a world-class temporary exhibitions gallery in the 1830 Warehouse.

NATIONAL RAILWAY MUSEUM, YORK AND SHILDON



Star exhibit: Station Hall at NRM York boasts a choice selection of Victorian locomotives and royal trains

Director: Paul Kirkman
National Railway Museum
Leeman Road
York YO26 4XJ
www.nrm.org.uk

OBJECTIVES

The National Railway Museum comprises a main museum in York housed in inspiring historic buildings and a second museum in Shildon, County Durham. The NRM in Shildon is operated in partnership with Durham County Council and houses some of the National Collection in a new building. A charismatic 19th-century site also features the former workshop of Timothy Hackworth, built for the world's first passenger railway of 1825. Shildon is known as the 'cradle of the railways'.

The NRM's vision is to be the prime showcase in the world for the huge impact railways and their technology have had in the past and will have in the future on people, the economy, society and the environment in Britain and the wider world.

We focus on appealing to non-specialist audiences by telling bigger, bolder stories, showcasing the modern

railway industry, creating new public spaces and galleries, and responding to developments in the museum's surroundings.

AUDIENCES

Our museum in York continues to appeal successfully to family groups, who make up about half of our visitors. More than two-thirds of our audience are non-enthusiasts, including our growth audience of adult nostalgia seekers. A large proportion of visitors come from outside the Yorkshire and Humber region, many from overseas.

HIGHLIGHTS

The NRM is a world authority on railway history and preservation, and holds the world's largest collection of 70,000 railway artefacts from 300 years of railway history. Locomotives and other rail vehicles in the collection include *Sans Pareil*, a competitor in the 1829 Rainhill Trials won by *Rocket*; the famous *Flying Scotsman*; the elegantly streamlined world steam speed record holder *Mallard*; the only Japanese bullet train outside Japan; a giant Chinese steam locomotive; and a world-class collection of royal trains, among them Queen Adelaide's saloon (the oldest preserved railway

carriage in Europe). Other items include coins and medals, railway uniforms and costumes, equipment, documents, records, artwork, photographs and even a lock of Robert Stephenson's hair.

Twenty-seven of the locomotives in the collection are in full working order, maintained by an army of eager volunteers and apprentices at both York and Shildon.

FUTURE AMBITIONS

During the 40th anniversary year of our site in York the museum's programme highlights our partnership with York Theatre Royal. A revival of the hugely successful production of *The Railway Children* stars one of our steam locomotives. Other creative partnerships include our annual *Locos in a Different Light* event.

We will continue our Masterplan developments focusing on the South Yard and opportunities presented by the development of York Central. We are hoping to increase our contemporary relevance with an exhibition on modern station architecture and by collaborating with industry partners to deliver a series of high-profile debates.

NATIONAL MEDIA MUSEUM, BRADFORD



Star exhibit: Frames from Louis Le Prince's cine film of Leeds Bridge, 1888, believed to be the first moving pictures ever

Director: Jo Quinton-Tulloch
National Media Museum
Pictureville
Bradford BD1 1NQ
www.nationalmediamuseum.org.uk

OBJECTIVES

At the National Media Museum we explore the science, technology and art of the still and moving image, and their impact on our lives. We have eight floors of galleries which help us to display our world-class collections in photography, film and television. Our three cinema screens – managed in partnership with Picturehouse Cinemas – showcase the best films from around the world in Bradford, the first UNESCO City of Film. Our objective is to be a dynamic and inclusive museum, globally recognised for its national collections and for using them in meaningful and inspiring ways.

AUDIENCES

The largest single section of our audience comes as part of a family group. The museum is an important attraction and resource for communities in Yorkshire – especially Bradford District and Leeds – and the vast majority of visitors come from the region. Almost a fifth of visitors come to watch a film in one of

our cinemas, about 9% are from BAME backgrounds and the number of children visiting the museum as part of an educational group is rising.

HIGHLIGHTS

The museum is home to 3.5 million objects, comprising some of the most compelling visual material to be found anywhere. This includes three pivotal firsts: the world's earliest known surviving negative, taken by William Henry Fox Talbot in 1835; the Leeds-made camera used by Louis Augustin Le Prince in 1888 to make the earliest moving pictures in Britain; and John Logie Baird's apparatus used to produce the first true television pictures in Soho in 1925.

Other key holdings include the cinematographic camera used by Herbert G Ponting on Scott's Antarctic expedition of 1910 and the *Daily Herald* archive of more than 3 million photographs from 1911 to the mid-1960s – a fascinating record of local, national and international events during this period.

Europe's first IMAX cinema opened here in Bradford and continues to offer an exciting programme of 3D

and blockbuster films. Our two other cinemas, Pictureville and Cubby Broccoli, accommodate most film formats in programmes ranging from cult classics to contemporary art-house titles.

FUTURE AMBITIONS

The investments announced in September 2014 are a significant milestone in the strategic ambitions of the National Media Museum: funding from Bradford City Council helps us to play a much bigger role in the education of young people from the district and beyond, positioning us as a centre of excellence for engaging disadvantaged young people in STEM.

Our forthcoming interactive gallery – due to open in late 2016 and our first new permanent gallery since *Life Online* in 2012 – will be a world-leading facility for exploring the science of light and sound. During 2015 we open a newly upgraded digital IMAX auditorium in partnership with Picturehouse so we can fully exploit this ultra-large format.

SCIENCE MUSEUM GROUP STORE, WROUGHTON

The Science Museum Group's collection is outstanding not just because of the iconic exhibits on display at each museum, but the depth and breadth of the objects stored behind the scenes. Huge artefacts such as the Rugby tuning coil that forms the centrepiece of the new *Information Age* gallery [see page 10] are brought out for display from a site of equally impressive scale – a 545-acre former airfield at Wroughton in Wiltshire.

Wroughton is increasingly becoming the national hub that enables the collection to be accessed and used across and beyond the Group. It is designated as the primary object store for the whole Group, and this year 5000 objects from the Museum of Science & Industry joined 30,000 objects already on site from across the Group,

and more than 500,000 items from the library and archives. Costs of operation are partially offset by income from commercial uses of parts of the site not needed for the collection, and there is a strong focus on sustainability.

In 2015 we will be delivering a solar park at Wroughton. This 40-megawatt project will put more electricity into the grid than we use as a Group, while providing a secure and reliable income to help us continue our work conserving the extraordinary objects in our collections.



At Wroughton: Vickers Tango 1 submersible, c. 1975

BLYTHE HOUSE COLLECTIONS STORE, LONDON



At Blythe House: Conservation intern Louise Stewart working on the First World War medicine collection

Behind the preparations for the Science Museum's major forthcoming galleries on mathematics and medicine lies Blythe House, the Group's small-object store at Olympia in London. Here, curators select artefacts for display, photographers digitise the objects and conservators prepare them. As well as ensuring the preservation of the collection, the site facilitates researchers studying objects

and loans to other museums. The Group currently occupies a third of the building, shared with the V&A and the British Museum. Its location, however, is not a sustainable long-term solution for the storage of our collection. In its Autumn Statement, the last government announced that it would consider the benefits and costs of relocating collections from Blythe House.

The Group has subsequently undertaken detailed feasibility work that will help to inform the new government's decision. There may be significant public benefits to consolidating the storage of the collection, enabling it to be made more easily available across the Group's museums and online activities.

WHAT WE LENT OUT

In 2014–15 the Science Museum Group loaned about 2500 objects to 156 different venues in the UK and 149 objects to another 25 overseas. Here's where ten ended up

Sources:
SM – Science Museum, London
MSI – Museum of Science & Industry, Manchester
NRM – National Railway Museum, York and Shildon
NMeM – National Media Museum, Bradford



Staatliche Kunsthalle
Baden-Baden, Germany
Calotype negative (1843) of the Hotel Canterbury, Rue de la Paix, Paris, by William Henry Fox Talbot, loaned to *Room Service* at the Staatliche Kunsthalle Baden-Baden, Germany. Source: NMeM



J Paul Getty Museum,
Los Angeles, USA
British kinematograph apparatus (1896), possibly used to film Queen Victoria's Diamond Jubilee procession in 1897, loaned to *A Royal Passion: Queen Victoria and Photography*. Source: NMeM



M van Museum, Leuven
Ivory anatomical figure, male (17th–18th century), with some removable internal organs, lying on a couch, possibly German. Source: SM



Hong Kong Heritage Museum,
Hong Kong
English wickerwork Bath chair (20th century) – one of four loans to *The Extraordinary in the Ordinary: Chairs for Viewing the World through Time* at the Hong Kong Heritage Museum. Source: SM



Dallas Museum of Art, USA
Islamic nocturnal and sundial loaned to *Nur: Light in Art and Science from the Islamic World*, an exhibition at the Dallas Museum of Art, USA. Source: SM



Lancashire County
Museum Service
Two-bladed variable-pitch propeller (after 1950), made in Lancashire by De Havilland Aircrafts, previously on long-term loan to the Museum of Lancashire in Preston. Source: MSI



Gwili Vintage Carriage Group,
Carmarthen
Steam locomotive (1897), built at Taff Vale Railway Works, Wales, loaned for a display at the Gwili Steam Railway in Bronwydd Arms, Carmarthen. Source: NRM



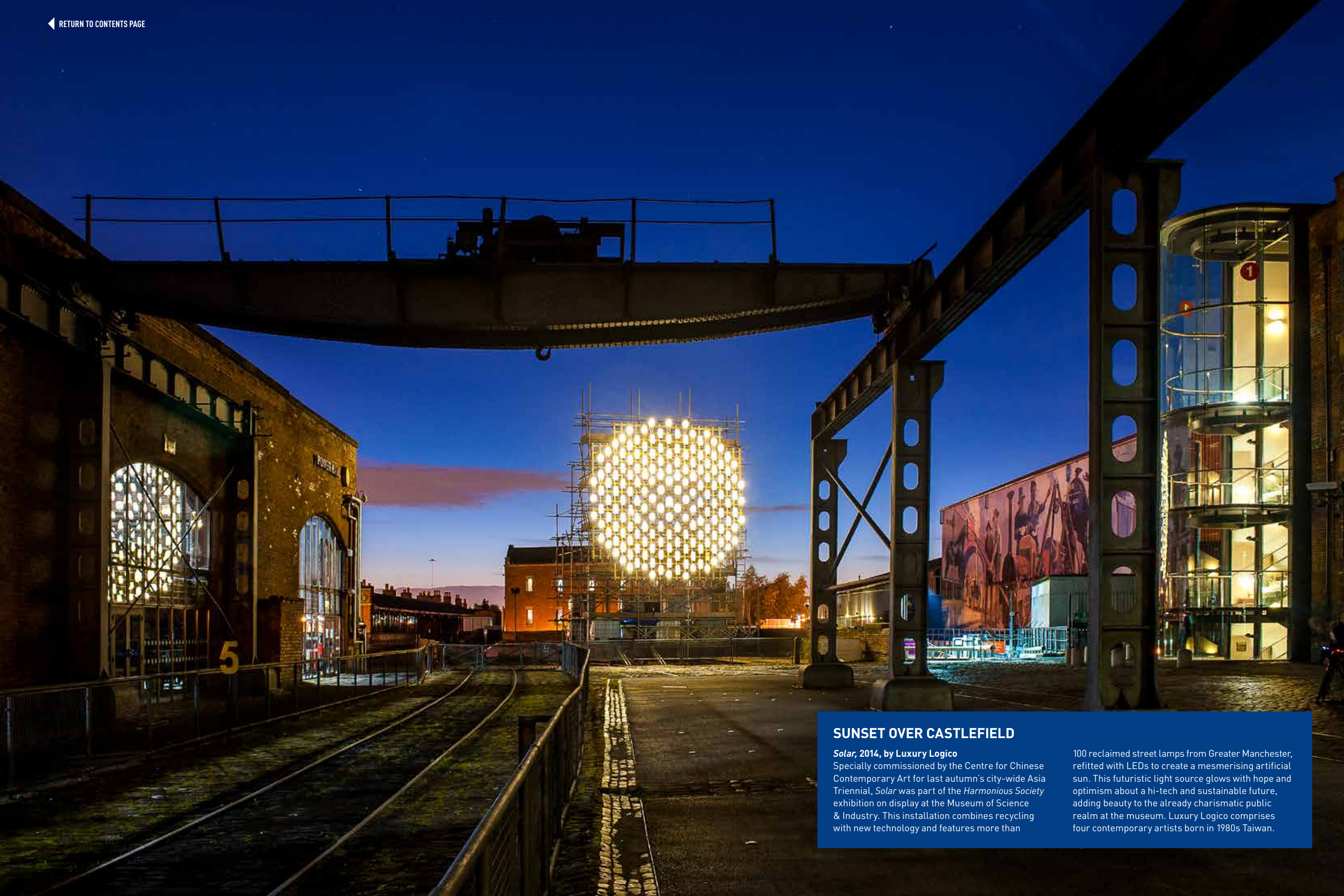
Herschel Museum
of Astronomy, Bath
Twelve objects (1770–1820), astronomy equipment, globes and here an armillary sphere associated with William Herschel, loaned to the permanent display in Bath. Source: SM



St George's Healthcare
NHS Trust, London
Pair of lower limb prostheses (1966) for a thalidomide-affected child, displayed in *A Very Special Hospital 1960–1988* at Queen Mary's Hospital, London. Source: SM



Totnes Museum, Devon
Components from Charles Babbage's difference engine (c. 1830) on long-term loan to Totnes Elizabethan House & Museum, Devon, for its display about Babbage. Source: SM



SUNSET OVER CASTLEFIELD

***Solar*, 2014, by Luxury Logico**

Specially commissioned by the Centre for Chinese Contemporary Art for last autumn's city-wide Asia Triennial, *Solar* was part of the *Harmonious Society* exhibition on display at the Museum of Science & Industry. This installation combines recycling with new technology and features more than

100 reclaimed street lamps from Greater Manchester, refitted with LEDs to create a mesmerising artificial sun. This futuristic light source glows with hope and optimism about a hi-tech and sustainable future, adding beauty to the already charismatic public realm at the museum. Luxury Logico comprises four contemporary artists born in 1980s Taiwan.

REMEMBERING A TITANIC STATESMAN

As an echo of one of Britain's greatest state funerals ever, Sir Winston Churchill's funeral train from 30 January 1965 was reassembled in the Great Hall at NRM York for *Churchill's Final Journey*. The funeral signified the end of an era. Not only did it mark the passing of a giant figure from history, but it was also the last to involve a steam locomotive.

The exhibition in York brought together NRM's Battle of Britain class locomotive No. 34051 *Winston Churchill* with the restored parcel van that carried the coffin, plus luxury Pullman carriage *Lydia*, which took his family from Waterloo station to Hanborough in Oxfordshire for the burial. Here we see Trevor Addison using a grinder and Ian Matthews painting during the transformation of the parcel van at NRM Shildon. The locomotive had received cosmetic restoration earlier at the Mid-Hants Railway. [See also *Churchill's Scientists*, page 42]



**“ We have great history,
railway history, and this
is part of that railway history**

JIM LESTER FIREMAN WHO STOKED THIS LOCOMOTIVE
WHICH PULLED CHURCHILL'S FUNERAL TRAIN IN 1965