
MANCHESTER
1824
The University of Manchester
MANCHESTER
WORLDWIDE
Proud to partner with India

Connect. Collaborate. Discover.

CONTENTS

The University of Manchester is the first and most eminent of England's civic universities and has one of the largest and most international student communities in the UK.

We have a heritage of innovation and inclusive education that can be traced back to 1824. Through our history 25 Nobel Prize winners have worked or studied here. Today, our research portfolio is tackling some of the biggest questions facing the planet.

We are driven by three core goals – research and discovery, teaching and learning, and social responsibility – to bring new thinking to international businesses, deliver insight to fellow institutions and create an unforgettable experience for those who partner and study with us.

FACTS AND FIGURES

27th
The University of Manchester is 27th in the QS World University Rankings (2019) and 33rd in the Academic Rankings of World Universities

25
We have 25 Nobel Prize winners among our current and former staff and students

40,000+
We have one of the largest and most international campus-based student communities in the UK, with a quarter coming from outside the EU

93%
More than 93% of our graduates go straight into employment or further study

480,000+
The largest alumni community of any campus-based UK university, with graduates in more than 190 countries

83%
The Research Excellence Framework 2014 judged 83% of our research activity to be 'world-leading' or 'internationally excellent'

FIND OUT MORE
manchester.ac.uk/worldwide

Improving air quality and public health

CASE STUDY: **ENERGY**
ACADEMIC LEAD: **HUGH COE**

Scientists in Manchester and India are helping us to better understand the causes and impacts of air pollution.

A cleaner urban atmosphere

The pace of daily life in the world's biggest cities has an atmospheric impact – which can also damage health. With its chronic levels of air pollution, Delhi is the perfect case study for research into the causes and effects of poor air quality.

A collaboration between The University of Manchester, the Indian Ministry of Earth Sciences, the Indian Institute of Tropical Meteorology and IIT Madras is exploring the connection between air pollution and human health in the city so that authorities can make informed policy decisions.

Cause and effect

Air pollution in Delhi is linked to a range of factors, including heavy traffic, burnt waste and the dusty air in pre-monsoon season. Its impacts are similarly wide-ranging: lung damage, heart disease, cognitive impairment and other conditions have been associated with poor quality of air.

The research into these is in its early stages but is already providing insights.

"The work we have done shows that although there are some variations in particulate matter (PM) concentrations across the city, the contributions from different sources are broadly similar," says Hugh Coe, Professor of Atmospheric Composition at Manchester.

"This will facilitate better policy implementation since the routes to reduction via policy interventions need to be broadly similar across the city.

"For example, the high levels of primary PM from motor vehicles need to be reduced. These are likely to occur from the extensive two-stroke engine fleet (tuk-tuks, motorbikes etc), although nitrogen-oxide emissions are low when compared to a modern European fleet since diesel use is less widespread.

"Evidence is increasing to suggest that rubbish-burning at open waste dumps and in streets is a major source of toxic pollution. Improved public waste removal is therefore required."

Combined expertise

The work has been supported by joint funding delivered by an agreement between India's Ministry of Earth Sciences and the UK's National Environment Research Council.

Professor Coe believes that collaborations such as these bring different communities together and facilitate international partnership building. In this particular case, the expertise brought by each side makes for a potent combination.

"The UK has extensive experience of conducting atmospheric chemistry measurements and carrying out computer modelling of air pollution that is world-leading. India has a rapidly growing research base in this field and a huge amount of local knowledge and understanding of the air pollution problems in Indian cities," he explains.

"Harnessing these two strengths in a joint programme that has collaborative and multidisciplinary research at its heart is vital in making rapid progress towards improving air quality in cities across the globe."

FIND OUT MORE
manchester.ac.uk/energy-beacon

Advancing industry with new materials

CASE STUDY: **ADVANCED MATERIALS**
PROJECT LEAD: **ARUN PRAKASH ARANGA RAJU**

Graphene has the power to change the world. One student travelled from India to Manchester to find out how.

From India to Manchester

For University alumnus and application specialist, Arun Prakash Aranga Raju, Manchester was an obvious choice for his postgraduate qualification: "My home city of Coimbatore is often referred to as the 'Manchester of South India' due to the importance of the textile industry in both cities," he explains.

"The University offered me exactly what I was looking for: renowned professors, world-class research facilities and high graduate employability too."

After his master's degree, Arun secured a PhD scholarship at the University to investigate and develop the application of graphene, the revolutionary 2D material that was isolated in Manchester in 2004 by Nobel laureates Sirs Andre Geim and Kostya Novoselov.

Advanced materials

The University is home to the global knowledge base in advanced materials such as graphene. We have more than 200 researchers working on related projects and a reputation reinforced by more than £248 million in capital and research investment, including the £60 million, state-of-the-art Graphene Engineering Innovation Centre (GEIC).

"The GEIC is unique in its proactive industrial engagement and agile approach of conducting projects: a 'fail-fast-learn-improve' approach that leads to the rapid development of prototypes. It helps de-risk the industry adaptation of graphene and results in innovative commercial applications," Arun explains.

From Manchester to India

Advanced materials solutions that are being developed in Manchester have the potential to transform the lives of people in India.

For example, a University-based start-up, Riptron Ltd, has developed efficient graphene-based gas sensors that could be used to monitor the quality of air in cities like Delhi. The development of graphene-based membranes could make affordable water filtration a reality and revolutionise access to clean water in some of the country's most rural areas.

"With their critical mass and centres of excellence, Manchester could help Indian industries gain confidence in exploring the use of graphene and 2D materials for their products via rapid development, de-risking and validation of the prototypes," Arun says.

We're at an exciting turning point for advanced materials. The technology exists to unlock their potential; our attention must now turn to building partnerships between researchers in Manchester and industry in India to foster applications that will change lives.

FIND OUT MORE
manchester.ac.uk/advanced-materials-beacon

Transforming cancer survival rates

CASE STUDY: **CANCER**
ACADEMIC LEAD: **VASKAR SAHA**

A Manchester-India collaboration is helping to increase survival rates of children diagnosed with cancer.

The cancer challenge

Each year 15,000 children in India are diagnosed with acute lymphoblastic leukaemia (ALL) – typically, only 9,000 survive. Research carried out at The University of Manchester has led to a 10% increase in survival rates among children diagnosed with ALL in the UK. Professor Vaskar Saha, who led this research, was inspired to recreate these results at an international level.

"I wanted to see if the science as applied in the National Health Service and Europe could also be applied to help children in less developed countries have the same opportunities for survival," explains Professor Saha.

He was already exploring how his research could help to increase survival rates for Indian children when he met a family whose search for treatment to save their daughter had sunk them into poverty.

"This family were forced to give up their jobs and sell their home," recalls Professor Saha. "I was reduced to tears but they were happy and they said: 'Everything you have is for your child. So if your child is well at the end of it, that's all that matters.' I thought: 'I understand that, but surely the journey doesn't have to be that hard?'"

The Manchester solution

"Manchester is recognised internationally as a centre for expertise in teenage and young adult cancers, and nationally as a centre for clinical studies in childhood leukaemia," says Professor Saha.

The University's reputation attracted the international partnerships necessary to deliver the initial life-saving research and Professor Saha set about replicating this in India through a partnership with the Tata Medical Centre in Kolkata.

"The aim of the project is to collaborate with specialists internationally known for their expertise, who can bring their skills and laboratories to India for the benefit of the Indian population," explains Dr Mammen Chandy, Director of the Tata Medical Centre.

Professor Saha pioneered improvements such as using laboratory technology to standardise treatments across multiple centres and established an equitable, standardised healthcare system. Its services today include modern care and financial assistance for families, supported by both the Indian government and private donors.

The future of cancer care

Since the Manchester-India cancer collaboration began, 4,000 families across the country have benefited from improved hospital treatment. Professor Saha's work helped increase survival rates in the Kolkata hospital from 65% in 2014 to 80% in 2019.

Building on this breakthrough, Professor Saha is facilitating other self-sustaining paediatric cancer centres in Delhi, Mumbai, Chennai and Chandigarh; integrating modern diagnostics and monitoring into routine cancer care; and developing the next generation of science leaders in India.

FIND OUT MORE
manchester.ac.uk/cancer-beacon

Our history with India

The University of Manchester and India have a rich heritage as powerful international partners.

We have a successful history of collaborating with India, resulting in innovative commercial partnerships, high-profile alumni and prize-winning academic staff.

We are proud to welcome more than 500 undergraduate and postgraduate students from India who choose to pursue courses in subjects relevant to the Indian economy, including engineering and biosciences.

Our partnerships with Indian industry allow us to apply our world-leading research in practical ways that will benefit local communities, such as joining forces with the Tata Medical Centre in Kolkata to help lower mortality rates of childhood leukaemia patients.

Revolutionary running shoes

Sports brand inov-8 has taken running shoes made with graphene to market after collaborating with our graphene scientists.

Changing cancer care

Our research with the Tata Medical Centre, Kolkata, has helped lower mortality rates in childhood leukaemia patients.

Innovative research collaborations

We are developing a range of life-changing research programmes in collaboration with the Indian Institute of Technology, Kharagpur.

AT A GLANCE

3,500
More than 3,500 alumni living in India

100
100 Indian academic staff based in Manchester

Community
One of the largest Indian student communities in the UK

Innovations
Joint innovations around water quality, air pollution and smart cities

FIND OUT MORE
manchester.ac.uk/india-partnerships

Our future with India

India is at the forefront of global industry. We're proud to be your research partner.

We're committed to building on the strong collaborative heritage between Manchester and India, creating more opportunities for academics, industry and students to benefit from international research programmes and world-class teaching.

Our location in Manchester, one of the UK's largest digital, manufacturing and life sciences hubs, means the University is well placed to complement India's current and emerging industries and research capabilities.

One area of particular interest is the development of graphene composites and their applications, which we research at the National Graphene Institute and the Graphene Engineering Innovation Centre.

Beyond research

Our links are cultural as well as academic. In 2021, following a landmark collaboration with the British Museum, the University will open northern England's first large-scale South Asia Gallery at Manchester Museum, one of the University's four cultural institutions.

The gallery will exhibit sculpture, textiles, paintings, ceramics, natural history, archaeological and ethnographic material. It is being co-curated by local residents, artists, academics and performers from the South-Asian diaspora.

FIND OUT MORE
manchester.ac.uk/india-partnerships

Manchester at a glance

We currently have around
500 STUDENTS FROM INDIA

A VAST GLOBAL NETWORK OF GRADUATES WITH 480,000 ALUMNI IN MORE THAN 190 COUNTRIES

The largest alumni community of any campus-based university in the UK, with almost 480,000 former students in more than 190 countries. This includes 3,500 alumni living in India

TEACHING AND LEARNING

Our Stellify initiative challenges students to understand the issues that face our global and local communities and take action to
MAKE A DIFFERENCE

More than a third of our students come from outside the UK – one of the
LARGEST INTERNATIONAL INTAKES of any UK university

1ST Ranked first in Europe for our impact related to the United Nations'
SUSTAINABLE DEVELOPMENT GOALS
(*Times Higher* Education, 2019)

SOCIAL RESPONSIBILITY

England's first large-scale
SOUTH ASIA GALLERY
at Manchester Museum (opening 2021)

An inclusive and diverse environment that welcomes the best talent from around the world, regardless of background –
A QUARTER OF OUR STAFF ARE FROM OVERSEAS

HOME TO FOUR OF THE REGION'S CULTURAL INSTITUTIONS
– Manchester Museum, John Rylands Library, the Whitworth art gallery and Jodrell Bank Observatory, home of the new Square Kilometre Array radio telescope

8 **EUROPE'S EIGHTH MOST INNOVATIVE UNIVERSITY**
(Reuters Top 100: The Most Innovative European Universities 2019)

Sports brand inov-8 has taken
RUNNING SHOES MADE WITH GRAPHENE
to market after collaborating with our graphene scientists

5 **RESEARCH BEACONS**
that find solutions to global challenges: advanced materials, cancer, energy, global inequalities and industrial biotechnology

Partnership with the
CSIR-INDIAN INSTITUTE FOR CHEMICAL BIOLOGY
has identified high levels of arsenic in rice in West Bengal

RESEARCH AND DISCOVERY

Research programmes around biomedical informatics, advanced materials, smart textiles and earth-environment-water sciences in collaboration with
INDIAN INSTITUTE OF TECHNOLOGY IN KHARAGPUR

BINA AGARWAL
– prize-winning development economist and Professor of Development Economics and Environment at the Global Development Institute

Research with the
TATA MEDICAL CENTRE IN KOLKATA
has helped lower mortality rates of childhood leukaemia patients

VASKAR SAHA
– chief investigator of a number of international clinical trials in childhood leukaemia. Director, the Tata Translational Cancer Research Centre, the Tata Medical Centre

PARTNER WITH US
To find out more about working with The University of Manchester, please visit **manchester.ac.uk/partner-with-us**

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