



UNIVERSITY OF  
BIRMINGHAM

# OUR IMPACT

ON GUANGZHOU

The economic and social impact of the  
University of Birmingham on the city of Guangzhou

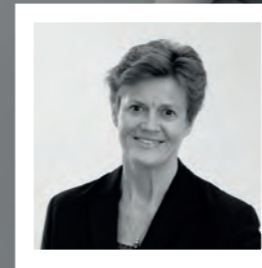


## Welcome

Great universities shape and influence the physical and intellectual spaces in which they operate. As a global civic University, we decided almost ten years ago that Birmingham's sister city of Guangzhou was the ideal place for us to base ourselves in order to work collaboratively with local partners and the city government to deliver social and economic impact in the way we do in Birmingham.

We commissioned London Economics, who had previously carried out an assessment of our impact on the city of Birmingham, to provide an independent appraisal of our work in Guangzhou. I'm delighted with the results and that we are able to measure this not only in financial terms, but terms of the benefit to the lives of the people of the city. We look forward to many more years working together with the Guangzhou Municipal Government to meet challenges and facilitate closer relations between our cities.

**Professor Sir David Eastwood**  
Vice-Chancellor and Principal



The report's findings are a testimony not only to the strong partnership between the University of Birmingham and the city of Guangzhou, but also the commitment shown by both parties to ensure that the fruits of their collaboration are shared as widely as possible. It is clear that by working together, public and private organisations in the UK and China can generate impressive results in a variety of areas, from healthcare and advanced manufacturing to environmentally sustainable transportation. These results pay significant dividends to the economy and society at large, and to the lives of individuals. I am pleased to see UK higher education institutions playing such significant roles in our relationship with China, with the joint research and two-way exchanges, contributing to the development of both countries. I wish the University of Birmingham and the city of Guangzhou the best of success in their joint endeavours going forward.

**Dame Barbara Janet Woodward**  
British Ambassador to China

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## Our impact on Guangzhou

Based in Guangzhou for almost a decade, the University of Birmingham maintains a permanent office that coordinates research activity, manages relationships with stakeholders and explores new education initiatives. Working closely with local partners and the Guangzhou Municipal Government, we have delivered the impact below to the local economy and community.

### The teaching and learning initiatives will create capacity for **300 highly skilled graduates**

to be inducted into higher education in Guangzhou every year through the Jinan University–University of Birmingham Joint Institute.

### Since 2012, the cumulative value of our research in Guangzhou was **¥212 million**

(£23.9 million) with research activities generating **¥32 million** (£3.6 million) annually.

## The total annual financial impact

associated with the University’s education and research collaborations and from activity supporting these initiatives in Guangzhou is **¥327 million** (£36.9 million).



## The ripple effect of direct, indirect and induced spending in the economy

from the University of Birmingham and its partners accounts for **¥247 million** (£27.8 million) of the overall economic impact.

## Our economic impact is made up of:



Total impact of **¥327 million** (£36.8 million) per year



**¥47 million** per year from our teaching and learning initiatives (£5.3 million)



**¥247 million** per year from spending in the economy (£27.8 million)

**¥32 million** per year from our research activities (£3.6 million)

## Social impact



Delivered health and exercise programmes to over **60,000** schoolchildren



Generated capacity to produce additional **300** highly skilled graduates per year



Improved safety and comfort for **8.2 million** people on the Guangzhou Metro



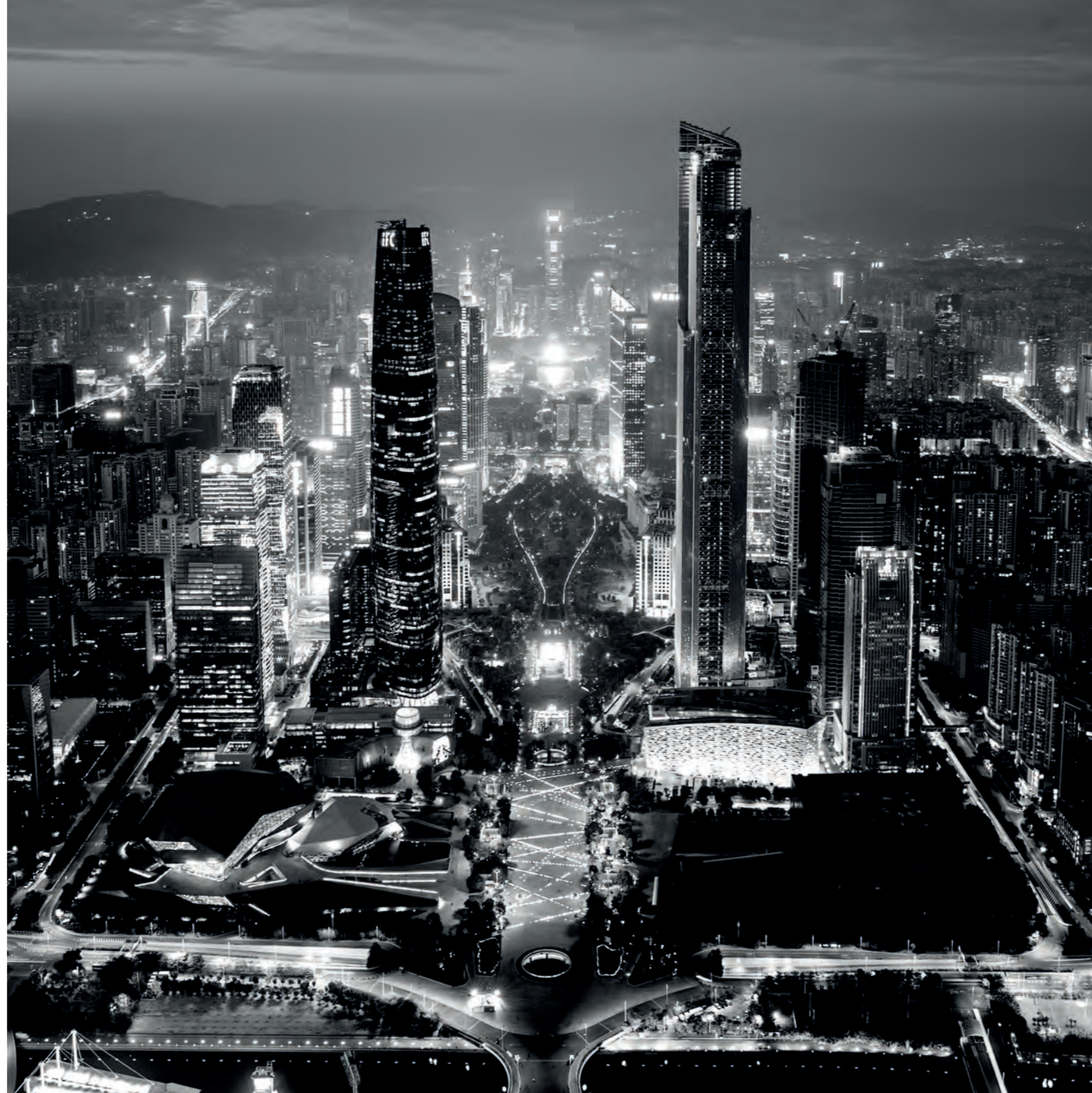
Conducted professional development training for over **800 GPs**

Our teaching and learning initiatives, notably through the Joint Institute with Jinan University contribute **¥47 million**

(£5.3 million) per year to the local economy rising to **¥126 million** per year (£14.2 million) once it reaches full capacity.

University of Birmingham academics working with partners in **Guangzhou Metro** are analysing power supplies to trains, energy storage from breaking and smart timetabling to make **¥7million** (£800,000) savings in energy costs.

It is estimated that every **¥1 million** (£110,000) invested in research partnerships with the University of Birmingham generated a return of **¥2 million** (£220,000) for the local economy.



Our work has helped build capacity in primary care

and improve health outcomes by delivering professional development to over **200 General Practitioner (GP)** 'best practice trainers' and more than **800 GPs** across Guangzhou.

Over **60,000** primary schoolchildren have taken part in the **CHIRPY DRAGON** programme to develop healthy diet and exercise plans to alleviate obesity.

## Social impact of research: helping improve healthcare in Guangzhou

The University of Birmingham and Guangzhou No.12 Hospital jointly established one of China's first biobank project in 2003 – allowing researchers to study the roles of occupation, environment, lifestyle and genetic backgrounds in influencing major chronic disease in a cohort of over 30,000 men and women in their 50s.

The wealth of information collected has helped improve understanding of the interplay between multiple factors in overall health, leading to the publication of research in prestigious international journals such as *The Lancet*, and has helped to gauge the impact of passive smoking on public health.



Guangzhou No.12 Hospital has undertaken two research projects with the University of Birmingham under the Guangzhou Municipal Government framework agreement successively – one of them has already completed and achieved very good outcomes, and the other one is still in progress. We have broadened our horizons and deepened our exploration through the collaboration, which helps us to provide precision science evidence for prevention and control for major chronic disease.

*Professor Jiang Chaoqiang,  
former President of Guangzhou  
No. 12 People's Hospital*

Together with Guangzhou Women and Children’s Medical Center (GWCMC), we are a key partner in the ‘Born in Guangzhou Cohort study’.

Working with almost 40,000 pregnant women since 2012, this collaboration has created the largest such study in China with over 2 million bio-samples stored. This gives a unique insight into challenges such as vitamin D insufficiency and how microbiomes of babies born ‘naturally’ differ from those born by caesarean section.

Gathering quality data at this scale can inform decision-making and redefine healthcare for mothers and children across Guangzhou and beyond.



## Primary health delivery is an area of particular strength in the UK

and one in which we have worked with local partners to deliver professional development, whilst improving the service capacity of community health centres across the city.

We have also promoted healthcare more widely across the province and country – working with partners, we have delivered training to over 800 GPs.



The way to win the trust from patients is to have profound professional knowledge and skills, and to sincerely communicate with patients with great care . The Guangzhou-Birmingham “Spark” Training for General Practitioners has broadened my horizons and has given me a deeper understanding of what it is to be a GP.

*Dr Sun Guoqiang, the Baiyun Street Community Health Centre, Yuexiu District, Guangzhou*



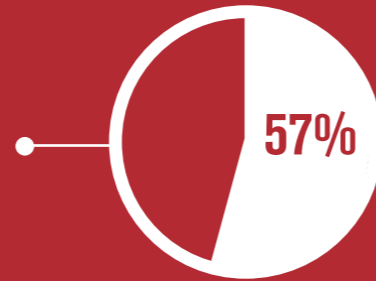
## Economic impact of teaching and learning

In September 2017, the University of Birmingham and Jinan University established an innovative Joint Institute, that welcomed its first cohort of 111 students onto four Bachelors degree programmes. The Mathematics-based programmes allow Chinese students to experience both international and local teaching methods, providing graduates with degrees from both institutions.

Programmes include Mathematics, Applied Mathematics, Information and Computing Science, Economics and Statistics, and Economics. In addition to improved skills, graduating from the University of Birmingham has a positive impact on students' confidence with 90% of Chinese learners expressing that their learning experience with the University of Birmingham had improved their self-esteem and quality of life.

The Joint Institute is bringing some of the best and brightest from across China to study in Guangzhou, and helping to develop talent and skills in the region

with 57% of these students coming from Guangdong.



In 2020 the Joint Institute will reach full scale, at which point up to 300 students will graduate each year.

This increases the economic contribution of teaching and learning at the Institute to **¥126 million**

(£14.2 million) per year.

The economic impact of the teaching and learning delivered at the Joint Institute in 2017–18 created **¥47 million** (£5.3 million).

This includes a **'graduate dividend'** for the students whose employment prospects are enhanced by receiving high-quality education

through the Jinan Joint Institute. For the 111 students who started in 2017–18, this would amount to **¥28 million** (£3.2 million).

The remaining **¥19 million** (£2.1 million) is the boost to **Government income**

through additional tax revenues from these highly skilled graduates.



It is quite a revolutionary measure to allow foreign educational methods to come into China. We, the students who choose to join Sino-foreign cooperative education are pioneers. We involve ourselves in finding the balance between the Chinese and English education systems. More importantly, we have global vision and the ability to achieve cross-cultural communication. Teachers and students are working together to localise the western education system. Although there may be challenges, we are moving towards brilliant prospects.

*Liu Yuxi, Joint Institute student*

## Social impact of research: helping to keep Guangzhou moving efficiently

Our rail experts are helping to keep journeys safe and comfortable for the 8.2 million people who use Guangzhou's Metro system every day.

The urban rail network connects people across Guangzhou with work and leisure and is the third largest in China. With 13 new lines under construction over the next decade, its 478km of track will swell to 823km across 27 lines.

The Birmingham Centre for Railway Research Engineering (BCRRE) is the largest university-based centre for railway research and education in Europe. Working with the Guangzhou Metro Corporation (GMC) since 2013, our experts are collaborating on three major research projects.

Cumulatively, including energy saving, cost reduction and the ability to transport ever-growing numbers of customers more efficiently, the University of Birmingham's partnership with Guangzhou Metro Corporation will deliver a total economic benefit of ¥70 million (£7.9 million).

### Using our Multi-Train Simulator to analyse the power supply to trains

and how storing energy produced by braking can combine with timetable improvements and ensure railway equipment and processes work together efficiently to create savings for the city of up to ¥7 million (£800,000).

### Developing new ways of monitoring and maintaining track switching equipment

and predicting future failures thereby reducing closures due to equipment failure.

### Using online monitoring systems to achieve real-time feedback

of conductor shoe status, promoting accuracy and efficiency in operation, as well as robust management of the conductor shoe, thereby supporting the safe and reliable operation of power supply systems for the train.

### Application and promotion of the technical achievements

of the cooperative research with the University of Birmingham are expected to achieve significant economic and social benefits by ensuring the reliable and safe operation of trains.

The University of Birmingham's position as the leading railways research group in Europe, combined with its project experience elsewhere in Europe and across Asia has enabled us to jointly develop technologies and solutions to achieve a higher level of safety and efficiency, as well as energy saving, resulting in real benefit to Guangzhou Metro and the commuters of Guangzhou.

*Mr Yuan Minzheng, Deputy Director General, National Lab of Urban Rail Transport System in Safety, Operation and Maintenance Assurance*





## Social impact of research: using expertise in translational medicine to combat disease

We are working with the Guangzhou Institutes of Biomedicine and Health (GIBH) to translate scientific discoveries into benefits for patients.

We have been combining our expertise in chemically synthesising and screening antibacterial drugs with the capability of the GIBH drug discovery team.

This collaboration has led to the identification of five novel compounds, which have now been patented in China and are ready for the next stage of validation, including in pre-clinical testing before moving to early-phase clinical trials. When fully completed, this exciting development will be available to help treat the 1 million cases of drug-resistant tuberculosis every year.

Funded by the **Guangzhou Municipal Government (GMG), UK Medical Research Council, Natural Science Foundation of China, and the Chinese Ministry of Science and Technology,**

a joint centre for medical research was set up in 2012.

Initially focused on treatments for liver disease, this was extended in 2015 to include research on novel small molecules

that might be used to treat leukaemia or multi-drug resistant tuberculosis.

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As the head of the DDP (Drug Discovery Department) at GIBH, partnering with the University was strategic and enjoyable as both teams worked closely together to develop this new class of TB drugs. In the future, we hope to expand our cooperation into other areas.

*Micky Tortorella, Director of Drug Discovery Department, Guangzhou Institute of Biomedicine and Health, Chinese Academy of Sciences*

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The Centre aims to screen new chemical structures and test them against tuberculosis

as well as other major infections, such as those involving ‘superbugs’ – creating new treatments that will improve the health of people in China and the UK.



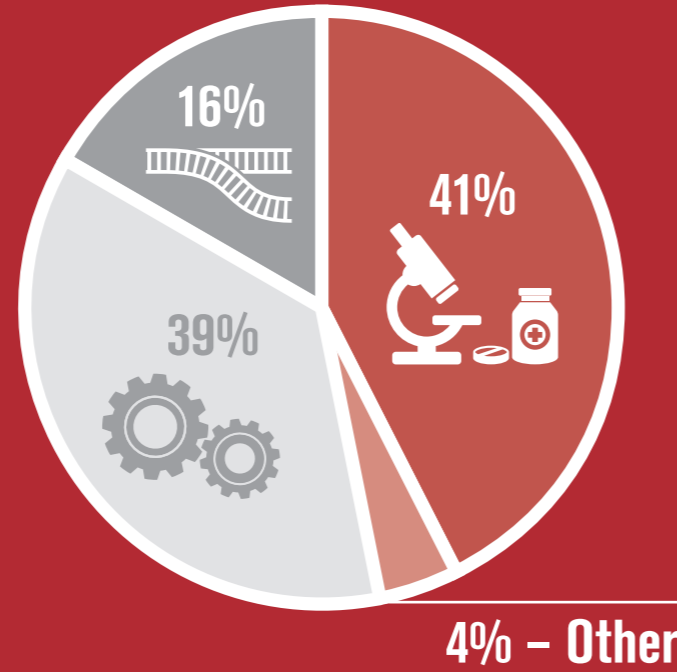
## Economic impact of research

The University of Birmingham has benefited from participating in funding schemes available from the Guangzhou Municipal Government that have enabled its researchers to collaborate with Guangzhou-based experts to deliver more than 40 collaborative research projects since 2012, and attract research funding totalling ¥175 million (£20 million).

In 2017–18 alone, we secured ¥26 million (£3 million) of funding for running projects with local partners.

We received the majority of this input – ¥22 million (£2.5 million) – from Guangzhou Municipal Government funding streams, with the remaining 13% coming from other sources.

This funding allowed research aimed at delivering economic and social impact across a number of disciplines.



In 2017–18, research into medicine and health care accounted for **¥10.5 million** (£1.2 million) or 41% of the total. Research into advanced engineering and materials attracted **¥10.1 million** (£1.1 million) or 39% of the total and ongoing transport research accounted for **¥4 million** (£480,000) or 16%.



Econometric research finds that research and development activities significantly and positively contribute to economic growth. Using this benchmark, we determined that our collaborative research activities in Guangzhou in 2017–18 were worth **¥32 million** (£3.6 million) to the economy.

It is estimated that every **¥1 million** (£110,000) invested in research partnerships with the University of Birmingham generated a return of **¥2 million** (£220,000) for the local economy.

## Social impact of research: the benefits of collaboration in advanced manufacturing and materials to everyday life

Guangzhou and Birmingham share a rich history of engineering and industry. After working together for five years, researchers from the Guangdong Academy of Science and the University of Birmingham formed a joint research institute, the Guangzhou Advanced Manufacturing and Innovation Centre (GAMIC).

GAMIC is a partnership for research and professional training, which builds on existing collaborations that have delivered a number of successful projects, and trained several PhD students and researchers. It brings together great minds and contributes to innovation in the advanced manufacturing sectors in both cities.

Whether improving patients' health care with custom surgical implants created using 3D printers or creating surgical tools that kill hazardous bacteria, our work with the Guangzhou Municipal Government and industrial partners across the city ensures that our innovative research benefits the people of Guangzhou.

GAMIC is a new model for international co-operation, launching 13 joint research projects with a total projected economic value of ¥112 million (£13 million).

One project involves creating an antibacterial surface that can kill 95% of bacteria within six hours – vastly reducing surgical infection by using our expertise in active screen plasma alloying to add lasting antibacterial effects to medical instruments and surgical tools.

Working with our partners in Birmingham has helped to continue the development of cutting-edge approaches that are helping Guangzhou industry improve significant engineering technologies.

*Professor Zhouyu Zhou,  
Vice-President of GDAS*

### GAMIC also leads the way in corrosion resistance and protection of nickel-copper tubes

often used in seawater and vital to offshore, power and desalination industries.

### Another project looked into the use of friction welding technologies

in the fabrication of light transport structures, which supports the national focus on the development of environmentally sustainable transportation.



### Using metal powder, we can 3D print microstructure customised implants

for hip and knee replacements as well as using similar technology to produce high-quality, personalised denture products.

## Economic impact of the University's presence in Guangzhou

In addition to economic and social benefits resulting from research and teaching by the University of Birmingham and our partners, the activity required to support and conduct this work makes a beneficial contribution to the city of Guangzhou.

Direct, Indirect and Induced impact are calculated by examining our spending on goods and services in Guangzhou, as well as the subsequent 'ripple' through the city economy as these businesses engaged procure goods and services themselves, whilst employing people to fulfil these orders.

The economic benefit associated with the University of Birmingham's presence in the city is collectively worth **¥248 million (£28 million) per year.**

The impact on the economy of the spending by the University of Birmingham and its partners amounts to **¥103 million (£12 million).**

Spending and taxation relating to graduates from the Joint Institute adjusted to deduct the graduate premium and related tax benefit to the city, will amount to **¥140 million (£15.7 million).**

Every **¥1 million (£110,000)** of University of Birmingham expenditure associated with our activities in Guangzhou generates an additional **¥4 million (£440,000)** of economic impact throughout the economy.

Every **¥1 million (£110,000)** of expenditure by Birmingham-Jinan Joint Institute graduates will generate an additional **¥3.28 million (£370,000)** of economic impact throughout the Chinese economy.

## Social impact of research: countering the obesity threat to Chinese children

Changing lifestyles have led to the increase of childhood obesity representing a significant health challenge. Over 30 million Chinese children, aged between seven and 18, are overweight or obese – placing them at greater risk of an early death.

Obese children are at much greater risk of becoming obese adults, increasing physical health problems associated with obesity and mental health issues such as low self-esteem. More than half of these young people will go on to become obese adults.

By working with the Guangzhou Centre for Disease Control, our academics delivered a groundbreaking partnership with schools and families known as the CHIRPY DRAGON project.

The four-year obesity reduction programme involved more than 61,000 children, aged six to seven, at 43 primary schools.

Established in January 2014, it aimed to improve the health of Guangzhou children by:

- Improving families' **understanding of the causes** of childhood obesity
- Improving the **nutritional quality of school lunches**
- Increasing children's physical activity level **outside school**
- Increasing children's physical activity level **in school**



The support from Guangzhou government in the CHIRPY DRAGON project helped to maximise participation from schools and families. Therefore, Guangzhou government and the close collaboration between local authorities and UK research institutions formed an excellent role model for researchers and governments in other countries.

*Dr Bai Li*  
2018 national winner of the 'Early Career Award' from the UK Society for Behavioural Medicine



In both China and the UK, grandparents are increasingly responsible for childcare, and part of the focus of CHIRPY DRAGON was to encourage grandparents to promote the importance of healthier, more active lifestyle choices amongst children.

Our research showed children in China mainly cared for by grandparents are twice as likely to be overweight or obese as those raised mainly by parents or other adults. We also discovered that Chinese children who go to bed later and sleep less are more likely to be more overweight.

We hope that as a result of the CHIRPY DRAGON programme, Guangzhou will be seen as a role model city for its work in tackling childhood obesity and will be introduced in cities across China and around the world. This would help to reduce the burden on public health and improve the quality of life for millions of young people.



The project's first phase tested and refined the intervention programme.

The second phase saw 40 Guangzhou schools take part in a randomised controlled trial to evaluate the programme's effectiveness.

For more information and to download  
a copy of the full report, please visit  
[www.birmingham.ac.uk/International/  
global-engagement/china-institute](http://www.birmingham.ac.uk/International/global-engagement/china-institute)



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Edgbaston, Birmingham,  
B15 2TT, United Kingdom  
[www.birmingham.ac.uk](http://www.birmingham.ac.uk)

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