Promoting joint innovation and knowledge transfer between the UK and China
The Innovation China UK (ICUK) programme is the first UK Chinese collaboration to promote joint innovation and knowledge transfer. Launched in 2007, the £4.9 million initiative is led by Queen Mary, University of London, and has been jointly funded by the Higher Education Funding Council for England; Department for Innovation, University & Skills, and the Chinese Ministry of Science and Technology.

Prior to the launch of Innovation China UK (ICUK) in 2007, few substantial collaboration programmes with China were in existence and technology derived from UK research had seldom been exploited in China. However, during the past five years, the ICUK programme has made significant progress in improving collaboration and knowledge transfer between the UK and China. The ICUK programme has identified the challenges facing UK and China innovation and has endeavoured to break down these barriers, implementing changes which encourage collaboration and joint innovation.

ICUK Collaboration Development Fund
Through its dedicated Collaboration Development Funds, ICUK has become a champion of progressing research from universities to markets in both countries. The £3 million grants have helped to initiate collaborations with China, carry out feasibility studies, fund market appraisals, and above all support joint research and development in both countries.

Knowledge Network
Our strong links with government and industry in China and the UK have enabled us to increase awareness of technology opportunities arising in both countries. We have played a significant role in overcoming the regulatory barriers and issues of cultural understanding which UK innovators often struggle with when trying to take advantage of the vast Chinese market. ICUK and BIS Global Partnership Fund supported events have been the anchor of our Knowledge Network activities: 15 sector-focused events have been held in China jointly with Chinese local Science and Technology Commissions/Bureaus, bringing experts from the UK and China together to discuss key technology areas and promote the sharing of ideas.

Value-added Services to UK Innovation Base
With 90 UK and Chinese companies involved in the ICUK projects, many joint projects are leading to commercial outcomes: as of December 2011, 14 new patents have been filed, 4 income-generating licensing agreements have been signed and one spin-out company has been created.

ICUK also offers value-added services to help UK companies commercially exploit their technology in the Chinese market. Our experience of funding and partnering over 70 joint Proof-of-Concept research projects between UK and Chinese Higher Education institutes has given us the necessary contacts and know-how to help technology businesses find commercial partners in China. Through our own events and those organised by our Chinese partners, our aim is to help UK technologies become more widely available to Chinese companies.

ICUK has been widely recognised as one of the most successful bilateral collaboration programme between the UK and China. The programme will continue to support and help accelerate innovation from public and private sectors and in championing the UK as the innovation partner of choice in China.

Manyi Cristofoli
Director, ICUK
In the last few decades, Science and Innovation has been climbing the agenda for the Chinese and British governments as governments around the world start to recognise that innovation is a key driver of economic growth. Many research-intensive higher education institutions in the UK have significant R&D collaborations with China which have produced positive results. However, the outcomes of these joint research programmes are rarely developed commercially due to the significant cultural barriers and the lack of dedicated support and funding for UK-China technology transfer.

For these reasons, the ICUK Collaboration Development Fund was created and launched in 2007, providing Proof-of-Concept and Partnership Funding, a crucial component to enable UK and Chinese academics to bring their joint research into the market place. These awards allow inventors to demonstrate the feasibility of their research, which encourages commercial partners to buy, develop or license their technology.

Two types of ICUK fund
• Partnership grant (up to £15,000) facilitating UK-China collaborations through staff exchange, feasibility studies and market research.
• Proof-of-Concept Fund (up to £90,000) supporting joint pre-commercialisation research and development of projects with clear market potential.

Over the last three years, 72 projects from a range of technology sectors have been successfully funded by the ICUK Collaboration Development Fund. A total of £2.79 million has been awarded, including 41 Partnership grants and 30 Proof-of-Concept projects. The ICUK project managers supported academics in every step of the application process, identifying suitable Chinese partners, co-ordinating joint activities and assisting in submission of the proposals required by the assessment panel.

Over 270 UK/Chinese academic partners have been involved in these joint projects, which has led to 25 joint research papers being submitted for publication.

Chinese match funding
Chinese match funding for ICUK joint Proof of Concept projects totaling £1.95 million came from multiple sources including national and international funding schemes of several Chinese Ministries, charities, local governments, Chinese HEIs and industries. The Chinese Ministry of Science and Technology (MoST) contributed almost half of the total Chinese match funding from several of its national and international funding sources.

Further funding for ICUK projects
The ICUK team has also been helping ICUK projects to access other funding streams both in the UK and China. With its wide public and private sector networks, ICUK has been able to guide these early stage technologies to calls for funding in both countries. Seven ICUK joint projects have been successful in receiving £1.3 million in follow-on funds from the UK and Chinese public sources in order to develop further. This is a trend that is expected to continue as China places increasing importance on innovation and maintains its high level of R&D investment.

ICUK’s Proof-of-Concept funds give research scientists the opportunity to test out their innovative technology in a business orientated environment. It provides the platform for academics to interact with experts in intellectual property and marketing.

PROFESSOR WEN WANG, QUEEN MARY, UNIVERSITY OF LONDON
The ICUK programme was initially comprised of five UK universities which have a strong track record in collaborating with China. These are Queen Mary, University of London (lead), King’s College London, The University of Nottingham, The Royal Veterinary College, University of London and University of Southampton. These institutes have made great progress in establishing their own Chinese development capability.

ICUK has also extended its activities and services to include more UK higher education institutes. Examples include City University London, The University of Lincoln, Rothamsted Research, London Southbank University, Bradford University, East Malling Institute, Brunel University, Agri-food and Biosciences Institute (AFBI), and CABI.

From forging joint research initiatives to identifying Chinese development partners to seeking commercialisation opportunities, ICUK has helped UK HEIs to develop a range of collaborative opportunities and activities in China.

ICUK has worked with over 60 Chinese universities and institutes through the Collaboration Development Fund and Knowledge Network. Examples include:

**BEIJING**
- Tsinghua University
- Peking University
- Beijing Institute of Technology
- Beijing University of Aerospace and Aeronautics

**HANGZHOU**
- Zhejiang University

**HONG KONG**
- Hong Kong University

**LANZHOU**
- Lanzhou Institute of Chemical Physics
- Lanzhou Institute of Animal Science and Veterinary Pharmaceuticals

**NANJING**
- Nanjing University
- Nanjing University of Aeronautics and Astronautics
- Nanjing University of Science and Technology
- Hohai University

**QINGDAO**
- China Ocean University

**SHANGHAI**
- Fudan University
- Shanghai Jiaotong University
- Tongji University

**SHENZHEN**
- Shenzhen University
- Shenzhen Institute

**TIANJIN**
- Tianjin University
- Tianjin University of TCM

**WUHAN**
- Wuhan University
- Huazhong University
- Wuhan Institute

**XI’AN**
- X’ian Jiaotong University
China’s central and local governments have been actively encouraging technology innovation and the establishment of the ICUK programme has provided our companies with a large portfolio of technologies with huge market potential.

XIA WENHUAN, DIRECTOR OF TECHNOLOGY & COMMERCIALISATION, BEIJING TECHNOLOGY EXCHANGE & PROMOTION

Strategic Links

Science and Innovation Network (SIN) China

SIN is a network of UK national and locally engaged staff that are based in UK embassies and consulates abroad. The Network’s purpose is wide ranging, and involves science diplomacy and fostering collaboration in science and innovation.

ICUK is engaged in a partnership with SIN to promote UK innovation and knowledge transfer at a bilateral level. Working closely with Chinese central and local governments, ICUK and SIN have organised six events in the past two years consisting of Innovation Forums and Technology Partnering Workshops funded by the Business Innovation and Skills Global Partnership Fund.

Knowledge Transfer Network (KTN)

A Knowledge Transfer Network is a single over-arching national network in a specific field of technology or business application which brings together people from business, universities, research, finance and technology organisations to stimulate innovation through knowledge transfer.

KTNs have been established and are funded by government, industry and academia. They bring together diverse organisations and provide activities and initiatives that promote the exchange of knowledge and the stimulation of innovation in these communities.

Research Council UK Office in China

Research Councils UK (RCUK) is a strategic partnership between the seven UK Research Councils. In October 2007 RCUK opened its China Office in Beijing.

The strategic partnership between ICUK and the RCUK Office in China aims to further promote the excellence of the UK research and science base in China, to share and increase opportunities for research collaborations between China and the UK, and share best practice and information on science and research in the two countries.

UK Trade and Investment (UKTI)

UKTI is the Government organisation that helps UK-based companies succeed in the global economy and assists overseas companies to bring their high quality investment to the UK.

ICUK and UKTI organised a joint mission in China to support UK companies and research institutes to forge partnerships and commercialise bio-pharmaceutical technologies at the China Bio Partnering Forum in Suzhou and ICUK Technology Partnering event in Shanghai.

Medilink UK

Medilink UK is a network of formal regional associations which brings together life science companies, universities, hospital and community trusts to stimulate innovation and improve patient care.

ICUK worked with Medilink UK to promote UK healthcare technology at the China Medical Equipment Fair. ICUK is also planning to work with Medilink UK on future events to showcase UK innovative health technologies and attract Chinese venture capital to support UK technology start-ups.

Beijing Science and Technology Exchange and Promotion Centre (BTEC)

BTEC is a governmental technology transfer organisation sponsored by the Science and Technology Commission of Beijing Municipal Government.

The long-standing collaboration between ICUK and BTEC has seen many innovative UK technologies introduced to local Beijing companies. BTEC has also assisted ICUK in identifying appropriate industrial partners to commercialise UK technology in China.

Shanghai Technology Transfer and Exchange (STTE)

STTE was founded jointly by the Ministry of Science and Technology and the Shanghai Municipal Government. It applies itself to the innovations and development of SMEs, providing solutions for industry demand, assisting them in partner matching and technology transfer. ICUK has signed a strategic partnership agreement with STTE to promote UK technology/products in Shanghai and its associated cities in the areas of pharmaceuticals, biotechnology and general healthcare.

China International Cooperation Association of Small and Medium Enterprises (CICASME)

CICASME is the first national small and medium-size enterprise community organisation in China. It consists of enterprises from different industries, specialised service organisations, social organisations, and other experts, scholars and components. The CICASME is currently one of the 15 associations that are directly managed by state-owned assets and the Administration Commission of the State Council. ICUK has established a strategic partnership with CICASME in providing commercial training for Chinese SMEs and facilitating technology transfer between the two countries.

International Union for Science and Technology Innovation (IUSTI)

IUSTI is a governmental technology transfer organisation sponsored by the Ministry of Science and Technology and the Shanghai Municipal Government. It applies itself to the innovations and development of SMEs, providing solutions for industry demand, assisting them in partner matching and technology transfer. ICUK has signed a strategic partnership agreement with STTE to promote UK technology/products in Shanghai and its associated cities in the areas of pharmaceuticals, biotechnology and general healthcare.

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ICUK Services

Benefits to UK Institutes and SMEs

With the ever-increasing development of Chinese industries, the demand for a wide range of technologies is booming. The Chinese Government has recognised the shortage of indigenous innovation from local industry due to recent fast market expansion. It has invested significant funding in Chinese HEIs for providing innovation capacity to local industries. UK-China research collaboration will enable the UK innovation base to conduct interdisciplinary research on an unprecedented scale in China as well as develop commercial applications with much shorter development cycles than those that currently exist in the UK. Through ICUK events and consultancy services, our aim is to closely engage end users, the technology community and policy makers in China for developing industry focused applications and influence technology strategy development for the global economy. If you have an innovative technology or product that is close-to-market or already on the market in the UK, ICUK would like to hear from you.

ICUK’s Strengths

- Strong support from China’s central and local governments and direct access to high-level government contacts.
- Experience in partnership building based on over 70 ICUK funded joint UK-China research and commercialisation projects.
- A network of over 60 Chinese institutes and 100 Chinese companies that ICUK has worked with.
- Strategic collaborations with several public-funded technology transfer organisations in China, helping to generate good-quality commercial leads.
- A team of UK-based, bi-lingual consultants who have solid R&D and commercialisation experience. A Beijing-based ICUK coordinator will also ensure smooth project execution in China.

ICUK ran an in-depth research identifying market dynamics, industry contacts and regulatory requirements for introducing our product in China. The work was executed and presented with utmost professionalism and therefore I have recommended ICUK to other companies.

VITO LEVI D’ANCONA, CEO OF MICROTEST MATRICES LTD.
ICUK Delivers

Research partnerships
- Identifying the most compatible research partners in China to facilitate joint research initiatives
- Assessing patentability, regulatory barriers and market acceptance in the Chinese market for early-stage technologies
- Initiating joint proposals between UK and Chinese research partners and applying for UK/China public funding

Market intelligence
- Evaluating your technology through feasibility and market assessment specific to China
- Providing in-depth knowledge of the Chinese market, including local customers, competition and regulations

Business development
- Working with you to develop the most suitable strategy for your technology
- Helping you source R&D partners, licensees, buyers and distributors in China
- Facilitating communications and project managing collaboration with Chinese partners

IP commercialisation
- Using our knowledge of technology transfer in China we will guide you through the steps required to commercialise your IP in the Chinese market
- Identifying development partners amongst over 60 Chinese HEIs currently working with ICUK
- Facilitating IP assignment or licensing through our large networks of Chinese enterprises

CASE STUDY 1
UK-China joint research centre for strawberry breeding and production.
Through the ICUK Agri-tech Innovation Forum, the UK East Malling Institute (EMI) and the Beijing Academy of Agriculture and Forestry Science (BAAFS) have developed contacts and established a joint research centre for strawberry breeding and production. The Centre was awarded R&D facilities and pump-prime funding by the Beijing Agriculture Commission. The EMI experts will introduce new strawberry varieties and provide training and technical guidance in China. The exploitation rights of newly developed local varieties will be shared by BAAFS and EMR.

Meiosis, EMI’s UK commercialisation partner has commissioned ICUK to identify 12 key strawberry propagation companies in China. Many of them had discussed licensing models with Meiosis at the 7th International Strawberry Symposium in Beijing facilitated by ICUK.

CASE STUDY 2
A market research and regulatory investigation for a Femcare-Nikomed Limited
Femcare is specialised in unique medical devices for the gynaecologists, urologists and general surgeons. The company commissioned ICUK to undertake a in-depth market research to assess the market acceptance and regulatory environment for the company’s key product in China. ICUK reviewed and compared medical procedures in 31 Chinese regions and conducted 18 interviews with regulatory bodies, hospitals and medical device companies – three being key opinion leaders in the sectors.

Taking in consideration the high costs of SFDA registration and the number of established low-cost domestic competitors, Femcare decided not to distribute its key products in the Chinese mainland market. This decision has potentially saved the company its planned investment of £1.5 million in the Chinese market.

The information and detail of the research received was of an extremely high calibre and from past experience of other such research, the report was of far superior accuracy and quality than others received.

JULIE THORNLEY, FEMCARE-NIKOMED LIMITED
Knowledge Network

There are significant opportunities for the UK in China – bilateral engagement offers potential to exploit more technology and build expertise across two very different national systems.

For UK companies, HEI’s and research institutes interested in the Chinese market, the best way to learn about what opportunities are available is to visit China and talk to companies and government agencies about the technologies, products and services you have to offer. ICUK has established a state-of-the art knowledge network to stimulate knowledge exchange, showcase technologies and enhance communications to promote UK technologies in China.

ICUK leads on ‘UK/China Innovation and Knowledge Transfer’, a programme funded by the BIS Global Partnership Fund. The programme focuses on initiating joint innovation projects through accessing technology expertise in the UK and leveraging research capability, collaboration funding and cost effective services in China, developing partnerships between HEIs and industry and between the UK and China.

ICUK has been contracted by BIS to run 7 focused technology partnering events in at least two cities in China during 2010-2012 (see table below). UK technology-based companies and institutes can access UK government funding to demonstrate their technology and services in China at sector-focused events in key Chinese regional cities. The distinct feature of ICUK technology partnering events is that we will identify at least three interested local companies for each UK project and facilitate communication even before you travel to China!

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<tr>
<th>Event</th>
<th>Venue</th>
<th>Date</th>
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<tr>
<td>UK-China Venture Capital Collaboration Forum and Investment Road Show</td>
<td>Beijing</td>
<td>October 2012</td>
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<tr>
<td>UK-China Innovation Forum on Advanced Water Technology</td>
<td>Beijing, Qingdao</td>
<td>May 2012</td>
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<tr>
<td>UK-China Innovation Forum on Medical Devices</td>
<td>Beijing, Shanghai</td>
<td>March 2012</td>
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<tr>
<td>UK-China Innovation Forum on Internet of Things</td>
<td>Shanghai, Wuxi</td>
<td>December 2011</td>
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<tr>
<td>UK-China Innovation Forum on sustainable building technologies</td>
<td>Beijing, Shanghai</td>
<td>June 2011</td>
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<tr>
<td>UK-China Agri-tech Innovation Forum</td>
<td>Beijing, Jiaxing</td>
<td>December 2010</td>
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<tr>
<td>UK-China Biomedicine Technology Partnering Event</td>
<td>Shanghai</td>
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Conventional prosthetic hands offered on the market allow a disabled person to recover lost ability due to the loss of a hand in accidents or due to illness. However, even though these prosthetic hands allow people to recover limited basic functions, the majority of the abilities of a human hand are lost, which seriously limits the ability of the prosthetic hand wearer to recover his or her normal life. Furthermore, these prosthetic hands are weighty, have small graspability and poor dexterity and can only accomplish simple open and close motions. Despite recent developments which have resulted in a two-part palm, the development of functionality of the palm is still limited.

To address these problems and improve on current designs, researchers from King’s College London with excellent mechatronics knowledge and experts in prosthetic robotics from Tianjin University have developed a new generation of prosthetic hand designs with a mechanism which allows itself to change structure and adapt to any requirement. It also includes a unique palm mechanism which allows the palm to move independently of the fingers, introducing additional degrees of freedom and hence generating a wider range of movement and offering a better quality of life for the patient.

Prior to the commencement of this project, there had been much industry interest surrounding the technology. Having developed the mechanical prototype of the prosthetic hand, it has been demonstrated to relevant industry contacts. Numerous enquiries have been received about the technology and the team at King’s College are currently assessing these industrial interests in the technology and their potential for a commercial licensing deal. The collaboration team is also investigating ways in which the technology can be translatable to broader commercial applications which require maximum robotic hand functionality.

| Partners: | Professor Jian S Dai, King’s College London  
| | Professor Shu X Wang, Tianjin University |
| ICUK funding: | £70,000 |
| Chinese funding: | £70,000 |
Energy use in buildings accounts for about 40% of the UK’s total primary energy consumption. It contributes to similar proportions of national total carbon emissions. Of this, heating, ventilation and air conditioning systems consume approximately 50% of the energy used in buildings. Reducing energy consumption of Heating, Ventilating and Air Conditioning (HVAC) systems is therefore important in terms of controlling carbon emissions.

Conventional mechanical compression air conditioning systems consume a huge amount of electrical energy, which is largely dependent upon fossil fuel. This mode of air conditioning is neither sustainable nor environment-friendly. However, Dew Point air conditioning technology performs the function of air-conditioning using the evaporative cooling concept, i.e., it cools the air through the evaporation of water which significantly reduces the amount of electricity used.

It is different from conventional evaporative cooling in that it can lower the temperature further down to dew point, rather than wet bulb. The dew point is a lower temperature than the wet bulb.

There has been much interest in this technology from the highly competitive Chinese air-conditioning market. Following discussions with several manufacturers, an agreement to license the technology was recently signed between the University of Nottingham and a Chinese electrical and mechanical equipment company which aims to bring the product to market in the next two years.
New sustainable energy sources

Fast Pyrolysis is a novel technology used to convert widely available biomass into liquid biofuels and high value products. Unlike the technology used to create 1st generation biofuels, Fast Pyrolysis does not consume food crops. With an abundant supply of under-used biomass and much reduced operation costs there is a strong business case for the implementation of this new technology in China and the major energy and power producers in China have been actively pursuing commercial exploitation.

Although Fast Pyrolysis technologies already exist, the particular advantage of this technology is that it can deliver much higher yields. The UK Principal Investigator has made rapid progress towards completing the design of a Fast Pyrolysis system ready for scaled-up installation and a laboratory prototype has now been built and is currently being tested in Southampton.

The Chinese partner secured a grant of £70,000 from the Ministry of Science and Technology International Collaboration fund and following this success the UK team was awarded €0.7 million from the FP7 EU-China Biofuel Network as well as a £500,000 grant from the EPSRC.

On the UK side, there is a significant window of opportunity arising out of a projected 100% increase in landfill tax by 2014 and the consequent need for companies to find innovative ways to deal with waste. The research team at the University of Southampton is working with a UK company to identify a potentially high value waste stream for use as an input for an optimised Fast Pyrolysis plant and to seek investor support.

Spin-out company created

1

www.icukonline.org • Innovation China UK 11
Flooding is the worst natural disaster that affects the UK, with annual flood damage totalling £1.5 billion. The floods occurring in China over the last decade have been the most devastating worldwide in terms of the number of human fatalities and economic losses. To address the problem, many software systems for performing flood risk analysis have been developed and used commercially. However, these systems are restricted to forecast only the immediate flooding event and are unable to provide mid-term or long term assessment of the risks. Hence there is no time for proper evacuation, resulting in devastating consequences.

To address this need, a novel meteo-hydro flood prediction and risk analysis framework was developed by researchers at King’s College London and has been successfully demonstrated in the UK with the support of the Natural Environment Research Council. With further funding from ICUK, a collaboration with researchers at Hohai University, a world leading hydrology research institute in China, has been established to test the technology in China. Based on this research, a commercial prototype, the Novel Early Flood Warning System (NEWS), has been developed. It has the capability to incorporate multiple weather forecasts and post-forecast data processing to achieve reliable flood warning, assess uncertainty and risk of an ensemble forecast and provide API Web services with interactive flood risk mapping. The software has attracted interest from both public agencies and private companies who are keen to develop the technology further.

**Novel Early Flood Warning and Risk Assessment System (NEWS)**

**Partners:** Dr Hannah Cloke, King’s College London  
Professor Zhijia Li, Hohai University

**ICUK funding:** £66,976  
**Chinese funding:** £33,200

洪水灾害灾情重、影响面广。在英国，洪灾为其自然灾害之首，造成高达15亿英镑的年经济损失并呈逐年上升趋势。过去的十几年中，洪灾在中国造成损失亦为全球之最。基于此因，建立有效的洪水险情分析与早期预警系统乃成当务之急。尽管已有多家公司为此研发了相应软件系统。但由于技术原因，这些系统仅能分析预报即将发生的洪灾，无法进行中、长期的险情分析预警，故对于有效控制洪灾，效果有限。

为实现对洪灾险情进行中长期分析与预警，国王学院的科技人员提出了一种基于气象-水文相结合的新型险情分析预报模型，并在英国环境署的支持下，成功的验证了该技术的有效性。进而，国王学院与河海大学的水文专家合作获得了‘中英科技创新计划’的联合资助，对该技术进一步开发和验证，研制了一个‘新型洪灾风险早期分析及预警系统（NEWS）’的软件样机。该系统在超级集合预报系统的基础上结合其现有的分布式水文模型，实现了完整的气象、水文和水力模型的有机耦合，使得系统预报的准确率显著提高，虚警率得以降低，并可提前3到10天预报洪水过程，为有效控制洪灾提供了宝贵的时间。该系统亦将提供网络应用接口为用户提供实时、开放式服务。该软件系统引起了业界的极大兴趣，数家公司业已表示愿就进一步发展该技术进行合作。
Traditional Chinese Medicine Database

Partners:
- Dr Peter Hylands, King’s College, University of London
- Dr David Barlow, King’s College, University of London
- Dr Weiliang Zhu, Shanghai Institute of Material Medica (SiMM)

ICUK funding: £88,341
Chinese funding: £9,000

Traditional Chinese Medicine (TCM) is increasingly being used instead of, and alongside Western medicine. The size and growth potential of this market is significant; for instance in 2006, recorded sales of TCM products were approximately US$14.73 billion. However several factors restrict its growth in Western countries, notably the lack of information identifying active components of TCM with corresponding data, supporting safety and efficacy. Unfortunately, the existing information on TCM is confusing because there are several names used for each TCM herb and thus many repetitions exist.

With the increase of new TCM publications and the growth of the TCM sector, researchers at King’s College London and SiMM saw an opportunity to properly organize TCM information, clarifying confusions with a view to exploiting the demand from the TCM community and the pharmaceutical and biotechnology industries. Using SiMM’s knowledge of TCM compounds and King’s College’s understanding of Western users, they have developed a valuable research database covering over 12,000 constituents from over 300 Chinese traditional medicinal herbs including all their available chemicals, botanical and biological activity data and searching facilities.

A prototype of the database software has attracted some strong interest from a US chemical database software and service company and discussions are taking place regarding the terms of the contract to license the technology.
The fight against the Hepatitis Viruses

Partners:  
Professor Ping Wang, Queen Mary University of London  
Professor Jimin Zhang, Fudan University  

ICUK funding: £89,883  
Chinese funding: £90,000

The Hepatitis C Virus is a life-threatening disease for which there is currently no vaccine. As many as 85% of people infected with Hepatitis C may go on to become chronic carriers of the disease, which leads to the risk of developing liver cancer or cirrhosis. Current medical treatment is limited; the usual method involves a combination of two drugs: Pegylated interferon and Ribavirin. Overall, this treatment is only successful in clearing people of the virus in half of all cases.

However, the novel immune reagent developed by researchers at Queen Mary works differently to existing drugs used to treat the virus. It acts as a vaccination once the patient is exposed to the virus; stimulating the human immune system to activate a person's natural immune response to eliminate the Hepatitis C virus. In collaboration with researchers at Fudan University, the technology was adapted to treat the Hepatitis B virus which is a less serious disease (only 2-10% of Hepatitis B infected patients become chronic carriers of the virus) but is more prevalent than the Hepatitis C virus in China. They carried out in-vitro experiments using blood samples of around two hundred Hepatitis B patients of which the results so far have been very promising. Currently, discussions have been initiated with a leading contract research organisation in China which is interested in investing in clinical trials. Following the positive results from the trials with Chinese Hepatitis B patients, the researchers at Queen Mary are keen to pursue a pre-clinical development programme for a vaccine for the Hepatitis C virus.
Overcoming the blood-brain barrier

Innovative biotechnology company, PrioCam, a spin-out of the Royal Veterinary College, is developing a unique technology which enables the production of novel antibodies that can cross the blood-brain barrier and facilitate the entry of drugs into the central nervous system. PrioCam was formed in 2007 based on research derived from a collaboration between the Royal Veterinary College and the Chinese Agricultural University funded by ICUK and the Ministry of Science and Technology in China.

The blood-brain barrier is the body’s natural protective mechanism that restricts the diffusion of large and small molecules circulating in the blood into the interstitial space of the brain. PrioCam’s technology will use camelid antibodies to ‘beat’ the blood-brain barrier and transport otherwise non-penetrant pharmaceutical agents to treat disorders of the brain, such as Alzheimer’s disease.

PrioCam is seeking investors who are keen to share in the development of its receptor-mediated transport technology. Meanwhile, the company is currently talking to a Chinese biotechnology company based in Beijing about a possible joint venture that will allow it to enter the Chinese market.

Partners: Dr Mourad Tayebi, Royal Veterinary College
Professor Deming Zhao, China Agricultural University
ICUK funding: £103,626
Chinese funding: £100,000
CCTV cameras have played a prominent role in the battle against crime and terrorism in the last few decades. They are increasingly being employed for surveillance purposes, recording our every move in the street, on transport, in shops and at work. Currently, video footage from CCTV cameras is analysed by an operator after the event has happened. This can be a long and expensive process and is prone to human error.

To solve this problem, QMUL and Beihang University have developed a software system that enables the automatic profiling and interpretation of human subjects in real time for crowded public space. Automating the analysis of human behaviour from CCTV footage can significantly improve the efficiency and accuracy of surveillance, allowing for real-time information gathering and off-line demographic analysis of human populations in crowded spaces.

Using funding from ICUK and the Ministry of Science and Technology the researchers have been able to develop a software platform. Potential commercial applications of the software will undergo pilot trials with a number of potential commercial partners.

**Chinese companies engaged for commercialisation**

58家中国企业参与技术产业化
China has a thriving industry building large scale construction machinery for use in the construction of China’s roads and cities. However, much of the machinery currently manufactured in China does not meet US and European safety standards, causing health and safety hazards for operators and preventing manufacturers from exporting to US and European markets.

The aim of the project is to develop and validate a process and model for optimising the ride comfort of the cabin-seat-operator dynamic system of a Motor Grader. The outputs from the model will feed directly into the seat/cabin design process, removing the need for repeated field testing, greatly reducing the product development cycle and helping to meet the necessary ISO standards.

The Chinese partner is linked to a production facility whose main product is the Motor Grader. A cabin has been shipped to the UK and modelling is underway in the Institute of Sound and Vibration Research at the University of Southampton. The project is scheduled to complete by June 2010.

The process and the mathematical model that was developed and applied as part of this project are transferable to the cabin/seat dynamic systems of other types of construction machinery and the University of Southampton is currently in the late stages of negotiation on a similar contract with one of China’s largest construction machinery manufacturers.
Highly precise low cost GPS receivers

Partners:
Dr Xiaolin Meng, University of Nottingham
Professor Chuang Shi, Wuhan University

ICUK funding: £70,000
Chinese funding: £100,000

Location awareness has already become an indispensable utility in our modern lives. GPS positioning is playing an essential role which cannot be replaced by other positioning technologies. GPS receivers embedded in mobile phones are becoming more popular and many people use them for navigation purposes. However they can only provide a positioning accuracy of several tens of metres.

There currently exists a potential market somewhere between the current low-cost mass-market sectors and the professional sector. For this market the current standalone handheld GPS receivers cannot deliver the required accuracy although they are inexpensive. Furthermore, although the geodetic GPS receivers can easily provide the accuracy they are too expensive and cumbersome to use.

However, the technology developed by the University of Nottingham and Wuhan University is a low cost GPS receiver that can deliver real-time positioning with decimetre accuracy. This technology is aimed at existing consumer and professional markets. For consumers, the technology offers more attractive user benefits and will open up many new applications which are currently not possible. The technology will also underpin a large potential professional market, currently limited by the cost of high precision equipment which has an unnecessary degree of accuracy.

A Nottingham-Shanghai GNSS Lab was established during this project period to commercialise the prototype system. The first generation of these positioning products will be available from June 2010.

Partners:
Dr Xiaolin Meng, University of Nottingham
Professor Chuang Shi, Wuhan University

ICUK funding: £70,000
Chinese funding: £100,000

Case Study

信息通信技术、工程与空间技术

低成本高精度实时GPS定位原型系统开发

合作伙伴：孟晓林博士，副教授，英国诺丁汉大学
Chuang Shi 教授，武汉大学

中英科技创新计划资助：£70,000
中方资助：£100,000

随着知晓自己的地理位置已成当今人们生活中不可或缺的内容。GPS是其它技术无法替代的定位手段。近年来，嵌入GPS的移动电话数量增长迅速，但绝大多数都是单机模式，只能提供几十米的定位精度，因此其应用仅限于娱乐和粗略导航。

在高端用户（厘米级精度）和大规模用户市场（几十米精度）间存在一个中间用户群。对他们来说，单机模式的价格虽并不昂贵，但是不能提供必要的精度。而用于专业测量的GPS接收器虽可以提供高精度，但价格相当昂贵并且外形笨重。

由诺丁汉和武汉大学共同开发的低成本GPS接收器，能实时发送分米级精度的地理位置信息。目前，诺丁汉大学和上海GNSS公司已成立了一间联合实验室用于这个项目成果的产业化。第一代产品预期将在二零一零年六月生产。

与中国公司签署4项技术转让协议
Staff at the lab have been working on a number of projects and are now actively engaging local software development companies with a view to finding a commercialisation partner for IPExplorer, their first major software product. Drawing on knowledge bases from China’s top Universities, IPExplorer will provide a search engine for intellectual property, a trading platform and additional added value services using Linked Data techniques. The benefits derived by the two Universities from this collaboration have been extended far beyond the WSL itself. In December 2009, one year after the opening of the WSL, the two Universities opened the Southampton-Tsinghua Technology Innovation Centre in Shenzhen, again with support from the FCO Science and Innovation Network. The centre will use the expertise and experience available from Southampton's Research and Innovation Services to contribute to the commercialisation of joint research including the outputs of the WSL. The University also intends to use the Centre as an access point for RoS spin-outs and companies from our science park and business incubation centre that are looking to enter the Chinese market. The centre has already organised a successful visit by ILIKA, a University spin-out specialising in new materials development for a number of China’s major lithium-ion battery manufacturers.

The objectives of this partnership project were to support the establishment of a Joint Web Science Lab (WSL) in Shenzhen and the creation of a research roadmap to guide the Lab in its early years of operation. The Lab was formally opened in December 2008 and the project got underway having raised additional funding from the two partner Universities and a small project award from the Science and Innovation Network of the Foreign and Commonwealth Office in Guangzhou.

The Southampton Tsinghua Web Science Lab is one of a worldwide network operating under the guidance of the Web Science Trust.

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Web Science: Breaking down the barriers to collaboration on the internet between China and the UK

Partners: Professor Dame Wendy Hall, Professor Nigel Shadbolt from the University of Southampton
Professor Yong Jiang, Tsinghua University
ICUK funding: £14,753

万维科学：打破中英两国互联网合作的障碍

合作伙伴： Dame Wendy Hall 教授, Nigel Shadbolt 教授, 南安普敦大学 江勇教授, 清华大学。
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