

Bristol in WUN



A brief look at Bristol's involvement with the Worldwide Universities Network

The Worldwide Universities Network (WUN) is a unique partnership of leading institutions committed to addressing some of the key research issues of our time.

WUN brings together teams of experts to tackle major global issues in ways that institutions working alone cannot. But what makes an institution truly 'global'? Professor Eric Thomas, Vice-Chancellor of the University of Bristol and Chair of WUN, offers his analysis.



Members of WUN

In the UK:

- University of Bristol
- University of Leeds
- University of Manchester
- University of Sheffield
- University of Southampton
- University of York

In the US:

- Pennsylvania State University
- University of California, San Diego
- University of Illinois at Urbana-Champaign
- University of Washington, Seattle
- University of Wisconsin-Madison

In China:

- University of Nanjing
- University of Zhejiang

In Europe:

- University of Oslo
- University of Bergen
- University of Utrecht

Two recent events have prompted me to explore the meaning of the term 'global university': my appointment as Chair of the Worldwide Universities Network (WUN) and a recent visit to the American partners in WUN.

The first definition everyone tends to use is that a global university is one with multiple and diverse international collaborations between academic staff. However, there are thousands of universities that fit this description and they cannot all be global institutions. So what are the extra factors required? I would suggest the following:

1. Global brand penetration

Popular culture has helped influence the views of some international audiences to the extent that they fail to recognise UK cities other than London or universities beyond Oxford or Cambridge. This begs the question of whether any other UK institution can honestly claim to be global. But I would argue that if yours is to be a global university, at least your peers and national policy makers should see it as that.



Professor Eric Thomas,
Bristol's Vice-Chancellor and the Chair of WUN

“a global university is independent, has good governance and is well led”

2. Comprehensive excellence in all key aspects of the university

It is essential that a global university is independent, has good governance and is well led. Excellence in research,

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teaching and academic staff are basic requirements and a number of UK institutions would qualify as global players on these bases.

3. Innovative global research

The pursuit of innovative global research is the prime characteristic. Such research must be more than good 'connectivity', that is, putting people together in different ways such as video seminar series and summer institutes. These may lead to new ways of thinking and collaborating, but they are not 'global' characteristics.

The global dimension comes in the marshalling of these universities' huge intellectual and logistical resources to address global problems and questions in new ways.

These are the three main strands to WUN's activities:

Research

Joint research activity enables members to develop critical mass and competitive advantage and deliver research programmes of greater scale and scope than could effectively be delivered by individual institutions.

Exchanges

WUN offers innovative opportunities for graduate student and staff exchanges and secondments between members and with corporate partners. Gaining experience of working in different research and work cultures, establishing new contacts and enabling access to international programmes are some of the benefits to participants.

Distributed learning

Sophisticated online delivery and sharing of up-to-the-minute learning material from across the partnership, combined with agreed standards for quality and course accreditation, is at the core of WUN's activity.

“a truly global university must have what other people in the world want to see.”

The size of the endeavour, the scale and centrality of the issues and the multiplicity of partners are the crucial factors here. This means asking academic staff to think in new ways – to ask them to look out of the rut and see different horizons.

4. Global distribution of teaching and learning

A global university will have global distribution of its educational material. This will involve the provision of high-quality programmes that will attract individuals who wish to make themselves employable anywhere in the world.

5. Strong and diverse international student and staff demand

A truly global university must have what other people in the world want to see. The frequency and diversity of overseas academics and students wishing to visit, work or study at the university is a good indicator of global presence. A diverse, international student body is also an essential prerequisite.

6. Impact on global issues

Academic staff of a global university will be helping global institutions formulate policy – for example, advising the United Nations about solutions to global poverty or the World Health Organization about AIDS and its management in the Third World, as well as contributing to scientific progress in key areas relevant to the global economy such as nanotechnology or understanding our global ocean and climate environment.

7. Close interactions with global business

Chief executives and senior managers in global businesses will interact and collaborate with organisations,

What is WUN?

WUN is an international alliance of 16 leading research universities in the USA, UK, Europe and China which are committed to working together to take advantage of research and educational opportunities emerging in rapidly moving interdisciplinary areas of global significance.

“I regard Bristol's involvement with WUN as critical to the University's progress towards global status.”

including universities, that they consider to be punching at the same weight.

There are some UK institutions that have all or nearly all of these characteristics in part, but none that has all of them in full. Comparison with US universities is sobering. We still have a way to go before we can confidently say we have a number of global universities, but it is vital that we invest to get there.

I regard Bristol's involvement with WUN as critical to the University's progress towards global status. This publication explains more about WUN and highlights some of the projects we in Bristol are already undertaking with our global partners.



Professor Eric Thomas
Vice-Chancellor of the University of Bristol and Chair of WUN



Garden History and Archaeology US exchange

Ella Searle, the first Garden History PhD student from Bristol to receive a Worldwide Universities Network exchange scholarship, describes her experiences at the University of Illinois at Urbana-Champaign.

I've had cream teas on the lawns of great country estates, been knee deep in mud uncovering a lost canal, read dusty diaries and found curled maps buried deep in archives for centuries and, as a result, I became a garden historian! Stretching my academic life further, I now find myself doing a PhD in Garden History and Archaeology, looking at 'eclecticism' and the Rococo, where Chinese Pagodas are placed in gardens between Turkish Tents and Greek Temples.

And I couldn't have picked a better time to study at Bristol. Through WUN, the Centre for Garden History at Bristol teamed up with the Department of Landscape History at the University of Illinois at Urbana-Champaign (UIUC). For six weeks last autumn, I went to UIUC to complete my research on The Indian House and Garden at Sezincote in the Cotswolds. My host faculty at UIUC had great expertise in the area of Islamic and

Indian Landscape and Architecture and the daily exposure to endless images, and the terms and histories of these Islamic sites, has fully equipped me with the vocabulary and references I'm finding invaluable now as I write up my chapter on Sezincote.

UIUC also boasts one of the largest depository libraries in America, and I was there to celebrate the arrival of their ten millionth volume – a figure so staggering I assumed it was enthusiastic exaggeration until I read it in official print! And once I mastered the electronic moving 'Stax', I delighted in roaming the two wings and ten floors of the main library (not to mention the numerous subject libraries dotted around campus) and made valiant attempts to exceed my 100-book borrowing limit!

The exchange gave me the opportunity to consider my work, and really see the wood for the trees. So many things clicked into place or leapt

out to be unravelled that I have made advances not only in the specific research I went to UIUC to pursue, but also in other areas that I have been developing over the past year.

So far I've succeeded in finding a life that is so fantastically varied and full of possibilities that I am, as predicted, not rich, but very happy. And I know as I write up my chapter on Sezincote that the benefits of my WUN exchange can be read into almost every line.



The Wireless Challenge



Joe McGeehan (pictured), Professor and Research Fellow in Communications Engineering, Department of Electrical & Electronic Engineering, outlines Bristol's role in a WUN collaboration on state-of-the-art wireless technology.

In the world of wireless communications, these are exciting and challenging times. The demand for high-quality audio-visual services and high-capacity data services in both business and the emerging 'digital home' has never been greater. In order to satisfy this thirst, the ability to transmit and receive data reliably at extremely high rates (greater than 5,000 million bits per second) is crucial.

This is relatively easy in the traditional field of 'fixed-wire' communications, but more difficult with mobile wireless systems where external interference can severely distort the signal and result in a poor service. Furthermore, technical solutions that require combinations of larger terminal size, increased power consumption and higher costs are not viable in an ever-competitive global marketplace. With this rather daunting scenario in mind, the Centre for Communications Research at Bristol is heading the WUN 'Grand Challenge' in Wireless Communications, with a view to seeking novel solutions for such ultra wideband (UWB) communications.

to achieve the very high data transmission rates required, it will be necessary to use state-of-the-art antenna systems

Very little is known at present about how to design and produce such a system, so many fundamental studies will have to be undertaken – propagation characteristics, antenna design, modulation techniques, silicon architecture and implementation are just a few examples. But this vast range of problems cannot be tackled in an effective way by any one organisation, so the opportunity to harness the breadth of expertise of the WUN network greatly increases the probability of finding the best solutions. For example, to achieve the very high data transmission rates required, it will be necessary to use state-of-the-art antenna systems (MIMO) at both the transmitter and receiver. A number of the universities in the network, especially University of California at San Diego (UCSD) and Bristol, have considerable strengths in this area and Bristol in particular is examining how data-enhancing schemes such as MIMO can be used without dramatically increasing either the complexity of the silicon chip design or the power consumption.

we shall see almost all electronic equipment efficiently connected together without wires

Furthermore, the interaction of leading research groups may have spin-offs outside the core research programmes. Using their expertise in MIMO, radar signal processing and electromagnetic simulations of the human body, research teams at Bristol and Wisconsin-Madison have collaborated in the field of breast cancer detection using radio waves as an alternative to traditional X-ray screening (mammography). Experimental trials of the technique are to begin shortly.

Given the globalised nature of telecommunications research and standards, the WUN initiative provides an excellent vehicle for academia and industry to work closely together to develop next-generation technology. If all of this can be achieved in a cost-effective way, we shall see almost all electronic equipment such as televisions, camcorders, PDAs, laptops, mobile phones, digital projectors and audio equipment incorporating UWB devices so that they can be efficiently connected together – but without wires. The world will be revolutionised once again.

Areas of particular interest within WUN

- Informatics
- Bio-medical Informatics
- Stem Cells and Tissue Engineering
- Nano-technology
- Mobile Devices and Wireless Communications
- Advanced Materials
- Green Chemistry
- Earth Systems
- Geographical Information Systems
- Globalisation and Geography of the New Economy
- Public Policy and Management
- Medieval Studies
- Nursing and Midwifery
- eLanguages
- eLearning

Globalisation and education

An interdisciplinary group of researchers within WUN could make a real difference to the ways in which we are educated. Dr Susan Robertson, Reader in Education (Sociology), Graduate School of Education, explains how.

As you drink your next glass of New Zealand Sauvignon Blanc, contemplate this thought: 'education exports' are ahead of New Zealand's world-famous wine industry. Small wonder that the government has sought to make sure the education business is properly badged, marketed and protected. Under the 'Brand New Zealand' programme, the government aims to increase returns from its investment in education, along with research and development, arts, culture and innovation. New Zealand is not alone in this.

Cast your eye upward towards Australasia and you will find similar developments – from Australia to Singapore and Hong Kong. Let's take Singapore. In August 2003 the Minister for Trade and Industry launched a new initiative – 'Singapore's Global Schoolhouse'. In his speech, Minister Yeo stated that education was now one of Singapore's key sources of growth for the economy and that Singapore will

become a global player in the education market. This market includes all levels of education – from compulsory to higher education, as well as teacher and other forms of vocational training. This sort of sentiment is echoed by the European Union in its Lisbon and Bologna Declarations, where education is central to the development of a competitive economy.

Developments of this kind have captured the attention of an interdisciplinary group of researchers drawn from the departments of geography, education and sociology across the WUN partners. The value of WUN to these researchers is that considerable expertise can be assembled from across the network to examine these issues, enabling them to generate new theoretical and practical knowledge in a real global community of learners. This sort of interdisciplinary and cross-border initiative is increasingly important in a world which seems to be becoming

more complex and changing more rapidly. Sharing research questions and capacity is one way of slowing down the pace of change sufficiently to get some purchase on these developments for education.

Co-ordinated by Susan Robertson at Bristol and Kris Olds at Wisconsin-Madison, the group will be working on making sense of these global developments in education under the broad title of Constructing Knowledge Spaces, Transnational and Interdisciplinary Perspectives. A whole host of questions are on the drawing board – questions around the changing governance of education; the emergence of new institutional arrangements and patterns for educating the global elite; issues of brain drain and brain mobility; the virtual university; how best to research these topics; and so on. Answers to these questions will be vitally important to governments and organisations as they grapple with new complexities and new problems.

The eChina programme

An innovative collaboration with WUN partners, including Beijing Normal University (BNU), has recently begun at Bristol. The eChina programme is developing online Masters-level modules, targeted at in-

service teachers in China, particularly teachers of English (of whom there are approximately 10 million).

The programme is intended to support current educational reforms under way in China, moving away from formal teaching methods towards more collaborative, child-centred learning. Sue Timmis, eLearning Research Fellow at Bristol's Institute for Learning and Research Technology, who has just returned from Beijing, said: 'We were particularly struck by the very

large classes of 40 or 50 children, arranged formally in rows, which were said to be ahead in terms of reform. Nevertheless, all the teachers we spoke to showed a strong desire to improve their own practice, which is very encouraging.'

The outcomes from Bristol's evaluation activities within the two-year pilot project will make a significant contribution to the next phase in the development of Masters courses within the eChina programme.



Thin films connect WUN members

The member institutes of WUN incorporate a significant proportion of the world's leading research groups on electrodeposition. Dr Walter Schwarzacher, Reader in Physics, describes Bristol's particular area of expertise.

The current revolution in information technology and communications would have been impossible without the ability to place layers of metals, insulators and semiconductors exactly where required. These 'thin film deposition methods', as they are called, and electrodeposition (electroplating) in particular, are classic examples of an enabling technology.

despite its wide range of applications, electrodeposition remains extremely poorly understood

Interestingly, electrodeposition has a long history – displacement plating having been used by the pre-Columbian civilisations of South America more than 2,000 years ago, for example, to coat copper masks with gold – and it continues to find new applications such as interconnects in integrated circuits. But surprisingly, despite its wide range of applications, electrodeposition remains extremely poorly understood.

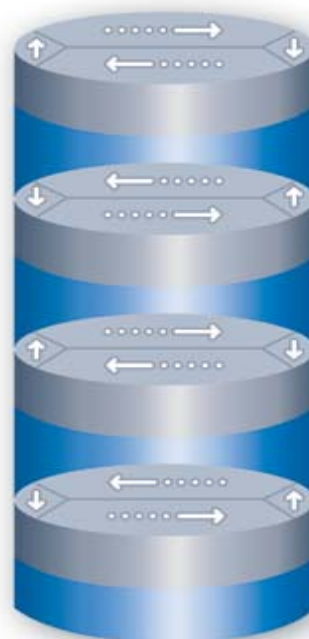
Here at Bristol we use scanning probe microscopes capable of near-atomic resolution to study electrodeposited metal films at the nano-scale. We have

found, for example, that the surface roughness of electrodeposited films can obey remarkably simple and elegant mathematical rules. These turn out to be of fundamental interest as well as practical importance because so many applications (decorative, magnetic, electronic) require smooth films. We also use electrodeposition to grow magnetic nanostructures with unusual properties, such as multilayered nanowires.

Although the individual groups involved in research on electrodeposition are small, together they possess an exceptional breadth of expertise and, united by WUN, are uniquely qualified to achieve goals that would be beyond any one group acting alone. To further encourage this collaboration, WUN has organised a series of on-line, video-conferenced Advanced Materials seminars engaging the universities of Illinois at Urbana-Champaign, Penn State, Washington, Seattle and Wisconsin-Madison, as well as the UK partners.

Details of the seminars can be found at www.Bristol.ac.uk/Depts/Personnel/CRS, then scroll to WUN Videoconference Seminar Series.

A model of a multilayered nanowire showing the inferred magnetisation distribution. The diameter of the column would be about 100 nm. A nanometre (nm) is one-millionth of a millimetre and a single human hair is around 80,000 nm in width. ▼



Dr David Pilsbury,
Chief Executive, WUN

“Globalisation is not a new phenomenon and an international dimension has been important to scholarship for millennia through the active exchange of ideas between individuals from different traditions and cultures.

But we are entering an era of unprecedented change in terms of the rapidity with which the barriers are diminishing and the drivers are increasing, against a background of ever-increasing expectations of scholars and students that they should be able to access expertise and facilities unconstrained by time and geography.”

For more information about WUN, see www.wun.ac.uk

For more information about the University of Bristol's involvement with WUN, contact Tim Jones, Director of International Affairs, email tim.jones@bristol.ac.uk

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