AUSTRALIA-CHINA AGENDA 2013

An Australia-China Scientific Partnership of Influence

IAN CHUBB

Professor Ian Chubb was appointed to the position of Australia's Chief Scientist in 2011. Prior to his appointment, Professor Chubb was Vice-Chancellor of The Australian National University from January 2001 to February 2011. He was also Vice-Chancellor of Flinders University of South Australia for six years, the Senior Deputy Vice-Chancellor of Monash University for two years and the Deputy Vice-Chancellor at The University of Wollongong for six years. This paper is based on 'Partners in Influence: how Australia and China relate through science', the third annual Australian Centre on China in the World Lecture, presented by Professor Chubb on 14 August 2013.

THE AUSTRALIAN Centre on China in the World engages with the public and policy discussion of relations with the People's Republic of China and the Chinese world. Australia-China Agenda 2013 *is our contribution to this important election year and the on-going consideration of the bilateral relationship.*

This is a relationship that touches on virtually every aspect of our national life. A mature and beneficial engagement of such breadth and depth requires the leadership and support of government at all levels, as well as public stewardship, media understanding, educational enhancement and the strategic involvement of the business community.

Australia-China exchanges are also profoundly influenced by regional and bilateral relationships. Australia and China trade in goods as well as culture, politics and people, ideas and education, community and personalities.

Australia-China Agenda: 2013 *brings to the attention of the public and the media, politicians and specialists some reflections and policy ideas authored by specialists with a professional interest and involvement in the relationship.*

—Geremie R. Barmé
Founding Director, CIW

中美全球研究中心
AUSTRALIAN CENTRE ON CHINA IN THE WORLD

Australian National University

ANU College of Asia & the Pacific
Canberra, Australia

JANUARY 一月
FEBRUARY 二月
MARCH 三月
APRIL 四月
MAY 五月
JUNE 六月
JULY 七月
AUGUST 八月
SEPTEMBER 九月
OCTOBER 十月
NOVEMBER 十一月
DECEMBER 十二月
二〇一四年

IN THE four decades since formal diplomatic relations began, China has not only become Australia's largest trading partner, but also our most significant single education partner, and a growing research partner. The last point in particular represents a scientific engagement that began even before diplomatic relations were established.

So Australia and China now share a strong and highly productive relationship in science – I will use science in this paper as shorthand for STEM: science, technology, engineering and mathematics – that has been built over more than fifty years.

Our relationship with China is important – to us and, given the recent growth, I think I can presume to the Chinese as well.

A worthwhile partnership

To be longstanding and trusted partners, in a culturally aware partnership which we can together mould and share, is a better and more secure place for us both than a fly-by, opportunistic, purely mercantile arrangement.

While we can't do everything with China because we are relatively small, we have some comparative advantages and strengths that are compatible with their needs and aspirations – and *vice versa*. And we have been in partnership with Chinese scientists for a long time; we know how to work with them.

For us, persistent linkages with a potential scientific super power are important. To be longstanding and trusted partners, in a culturally aware partnership which we can together mould and share, is a better and more secure place for us both than a fly-by, opportunistic, purely mercantile arrangement.

Our scientific relationship with China is not opportunistic – it began formally in 1963. It has prospered since then because each of us brings, and has brought, scientific capacity of quality, and a need to the relationship, based on quite different intellectual traditions that come together in exciting ways to create new knowledge. We have been doing it for fifty years, and it is growing not stagnating. Science and scientists have helped us relate, country to country, in an enduring way.

The relationship has been scientifically productive. It has given rise to many exciting discoveries, innovative new products and strategic new relationships.

These include the development of the first electricity generating plants to capture carbon dioxide for storage so contributing to world-leading research on reducing carbon pollution from coal-fired power stations; clinical trials of potential treatments for diabetes and pre-diabetes conditions; the discovery of biological control agents that have the potential to improve China's national wheat harvest by up to 10 percent.

And it is not just academic researcher to academic researcher. It includes academics working with industry. The Baosteel-Australia Joint Research and Development Centre is a world-first joint venture between the Chinese steel company and four Australian universities – the University of Queensland, the University of NSW, Monash University and the University of Wollongong.

The collaboration is designed to ensure a more holistic approach to research in order to drive innovation and develop new products.

Building better education together

When we think about another plank in our relationship, education, the connection is also strong.

In 2012, Chinese students accounted for around 30 percent of all international student enrolments in Australia and 40 percent of all international enrolments in higher education.

Australia places great value on the contribution our Chinese students make to our institutions and to our communities, a value well beyond simple economics.

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The presence of so many smart young Chinese in Australia helps us to learn about China, and them to learn about Australia. An Australian of my age, who was in our education system when I was, saw the first students here under the Colombo Plan close up and personal. We saw the importance of the 'learning' that comes from sharing a class-room, a tutorial group or a bench in the practical class with students from other cultures. And we made some enduring friendships along the way.

China and Australia are now solid partners aspiring for a better future: both are deeply committed to the generation of knowledge and its use, and education, that will combine to deliver improved economic, social and environmental outcomes for all.

Shared issues, shared goals

It is clear that science is a universal 'language' and it isn't even political, although we have seen how it can be politicised. But it is the **issues** that draw us together; it is the **issues** that encourage Australia and China to collaborate. The shared 'language' makes it possible.

We can't do on our own all there is to do about antibiotic resistance given our propensity to travel and to be travelled to.

But why does that collaboration matter? Why does international science collaboration matter?

I think it is important to note that scientific collaboration is part of a much broader international effort.

It is also important to note that many of the problems that confront us in Australia are global in character: issues related to climate are not uniquely Australian problems; nor are pandemics; antibiotic resistant microbes; influenza; food; security both for citizens and nations, to name just a few.

No one country can find the way to solve, or manage, or mitigate any of these huge problems on their own. We cannot, for example, face down bird-flu without working seriously with neighbours to our north. We can't do on our own all there is to do about antibiotic resistance given our propensity to travel and to be travelled to. How could we, to paraphrase Jane Lubchenco from the US National Oceanic and Atmospheric Administration (NOAA): *manage the unavoidable and avoid the unmanageable* without a concerted and co-ordinated international effort?

It is I think self-evident that science will be at the core of many of the solutions to the big problems facing humanity. It will be science that finds the new antibiotic, or a new way to treat microbial infections. It will be science that is at the heart of approaches to feed the people of the planet; and science will help us understand the climate, and the environment. It will be science that has a big part to play in finding the ways of *managing the unavoidable and avoiding the unmanageable*.

I don't argue that science (or STEM) will be there on its own; but it will be a constant. And I can't possibly argue that it will be Australia on its own; but I will and do argue that Australia as part of a globally connected STEM will help define the pathways we need to take; and we will be a partner because we earned the right. Because we are a partner, we will make our contribution to worldwide prosperity and global security.

The point really is simple: Australian science has been internationally networked from the time we got truly serious about it – from 1946 onwards. And it was networked because it had to be. We did not produce our first PhD graduate until 1948, so when ANU was established a fair bit of its early budget was spent either recruiting from overseas or sending people overseas to get the qualification to bring research expertise into the country. Many of those links were sustained over the years – primarily though not exclusively with the UK and the US. While the output from these links has grown in recent times, there has also been substantial growth with researchers in many countries in our region.

I think Australia learnt a lesson back then – one that I hope is not forgotten.

Until we did research on a reasonable scale in Australia, until our universities were expected to engage in the search for knowledge, until we became a contributor to the world's bank of knowledge, we were outside the tent relying on others to tell us what we needed to know. Whether or not they did that is one thing; but as part of post-war reconstruction, it was a clear resolve of the leadership at the time that we should not find ourselves in that situation again. We should contribute, and therefore get to sit at the table where important knowledge is exchanged and important decisions are made. We should offer knowledge to draw benefit from the work of others might have been a suitable mantra for the time. It still is.

We have seen change. Some 35 percent of articles published in international journals in 2008 are now internationally co-authored. Twelve years ago, that figure was 25 percent. The proportion of internationally co-authored publications from Australian science has risen from 25 percent in 1996 to 45 percent in 2009.

International collaboration has grown faster than domestic-only research in countries like Australia, the UK and Switzerland.

For China, the proportion has remained at around 25 percent, although this a constant proportion of a much larger volume – from fewer than 3,500 papers to over 30,000 during the period 1996-2009. Australian papers co-authored with Chinese colleagues has risen from 4 percent to 14 percent during that time.

The message is clear, particularly for Australia: STEM activities in any country with aspirations for the future will be internationalised at their core; and global presence is essential, not an optional add-on.

Collaboration on science

China is moving up the global ladder in terms of the number of research publications. It has overtaken the United Kingdom as the second-ranked country in scientific publication output and on current trends will probably overtake the United States by the end of the decade – if those trends continue.

China is also collaborating more with other nations, and even more so with Australia.

Between 1995 and 2010, Australia-China collaboration grew faster than China's overall collaboration with the world, and faster than China's collaboration with the USA.

In several fields of research – such as mathematics, engineering and chemistry – China is now Australia's leading partner in collaboration.

There are now 885 formal university-to-university partnership agreements in place to support exchange and cooperation between Australia and China – 72 percent more agreements than a decade ago – a situation that for the first time outnumbers US-Australian agreements. Some 2000 or so Australian students travelled to China to study in 2011 – and three universities have established joint campuses in China.

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But there's more!

Joint publications with China in more than half the subject areas examined have an average citation impact higher than that for all Australian publications in the subject area.

The China-Australia science relationship has been based on mutual benefit – surely the right way to go. How do we identify areas where we want to work together, put the processes in place, share know-how, and both get benefit?

As it happens, Australia and China appear to have complementary research foci. And we do share some research priorities. We both have concerns related to: (but by no means confined to) issues like adapting to changing climatic conditions, meeting the

healthcare needs of ageing populations, the environment, energy and food security and future economic directions to build and sustain prosperity. The question is then one of how we develop the policy approaches to address these common interests.

Possible approaches for policy

We need two approaches to our international collaboration: one approach is to align with shared challenges so that we can ensure focus and scale; the second is to ensure that individual researchers can participate in projects with colleagues that might arise because of a shared curiosity and the like.

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An example of the first approach is the Joint Research Centres program (or JRC as I will call them). These are virtual centres that link Australian and Chinese research institutions conducting a portfolio of research-related activities in a specified field of research.

The JRC for Energy will develop advanced energy technologies for improved energy security and reduced CO_2 emissions from both countries.

The JRC for Light Metals will develop revolutionary light-weight alloys and advanced manufacturing processes that will ultimately lead to greener, cheaper transport systems.

The JRC for Wheat Improvement aims to achieve major technical advancements in grain quality for wheat improvement.

The JRC for Minerals, Metallurgy and Materials (the 3-M Centre) aims to facilitate Australia-China collaboration for excellence in minerals, metallurgy and materials.

The JRC for River Basin Management aims to increase water productivity, food security and economic returns while protecting water ecosystems.

The ANSTO-SINAP Joint Materials Research Centre Development will develop materi-

als that will lead to zero-carbon emission technology for power generation and hydrogen fuel production.

These Joint Research Centres were announced during the visit to Australia last year by then State Councillor and now Vice-Premier Madam Liu Yandong.

Examples of the second approach, really a hybrid of the two approaches I mentioned, are the visits planned and supported by the Australia-China Science and Research Fund.

By next year it will have supported over 80 Australian research groups to travel to China; two groups of mid-career researchers to China (and two groups to Australia); one knowledge exchange symposium; and two Australia-China Science Academies Symposia (one in Australia, one in China).

All of this is good. All of this is worthwhile. But all of this will not be enough for either country.

What we need to do – both nations – is ensure we have sufficient alignment, focus and scale in order to increase the level and impact of China-Australia collaboration, and to get more influence from the partnership.

Australia can build capacity if we commit to a strategy. This becomes even more important when we hear that the resources boom is coming off the boil. Our relationship with China will enter a new and different phase. We will need to start now to work out how to build from the base that has been constructed by all these people over all these years. I recently laid out the case for such a strategy in a position paper which is available on the *Australian Chief Scientist* website.

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It proposes many key actions, one of which is the establishment of an Asian-Area Research Zone.

It is important that none of them are read in isolation.

That's the point of having a strategy to guide Australia's STEM enterprise – education, research, innovation and influence – and it must be done in its entirety.

And if we have a strategy, as China does, we can be partners in influence: changing the way we do what we do and how we think about the important issues that we need to be concerned about.

And that with China is surely what we want – a real and effective partnership between friends and colleagues – and a partnership of influence in world affairs.

Australian Centre on China in the World

The Australian Centre on China in the World (CIW), College of Asia & the Pacific (CAP), The Australian National University (ANU) is an initiative of the Commonwealth Government of Australia in collaboration with ANU, a university with the most significant concentration of dedicated Chinese Studies expertise and the publisher of the leading Chinese Studies journals in Australia. CIW is a national research centre that is jointly managed by a body of academics that includes scholars of China at universities in Adelaide, Brisbane, Hobart, Melbourne and Sydney.

The Centre is a humanities-led research institution that is engaged with the broad range of social sciences to produce academic work that, while relevant to the full spectrum of demands of international scholarship, also relates meaningfully to those in the public policy community, and to the broader interested public, both in Australia and overseas. It values a New Sinology, that is an intellectual, cultural and personal involvement with the Chinese world (be it in the People's Republic, Hong Kong, Macau, Taiwan or globally) that is underpinned by traditions of academic independence, local fluency and disciplinary relevance.

CIW sites
http://ciw.anu.edu.au
http://www.thechinastory.org

CIW publications (also available online)
China Story Yearbook 2013: Civilising China, October 2013

China Story Yearbook 2012: Red Rising, Red Eclipse, August 2012

Stephen FitzGerald, *Australia and China at Forty—Stretch of the Imagination*, 澳大利亚与中国已届四十年—舒展的想象力, February 2013

Australia and China: A Joint Report on the Bilateral Relationship 中国和澳大亚：关于双边关系的联合报告, with the China Institutes of Contemporary International Relations (CICIR), February 2012

CIW journals
China Heritage Quarterly
(http://www.chinaheritagequarterly.org)
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