

Chemists look forward to summer as much as anyone. The lab coats get shorter, we don our most fashionable safety specs, and the glassware gleams in the brighter light of day.

Academics rejoice in the weeks of research work, without all of the bothersome students cluttering up their universities, and students rejoice in their free time, thoroughly refreshed after dozing through months of lectures.

Yet the summer period doesn't have to be quiet. All sorts of interesting and exciting opportunities arise for the

most eager secondary and tertiary students to broaden their experience and flesh out their resumé's.

Internships and summer work experience

The most obvious opportunity over summer is industrial/commercial work experience, either paid or unpaid. Some 20 years ago, I worked for a summer at a wax-blending factory, grateful to receive a nominal pay for my full-time work. At that time, it wasn't even possible to graduate from industrial chemistry at the University of New South Wales without getting work experience.

A large minority of students will still get their first work experience this way. In the best cases, these will be transformative experiences, a revelation about the dynamic and complex world that blossoms outside the more structured academic boundaries.

Having said this, I place an important distinction between paid work experience and unpaid internships. The terms are sometimes used interchangeably, but as I discuss in the RACI 'Understanding the Job Market' video series (bit.ly/1Nou93Z), as an employer I actively avoid unpaid internships (see box).

School's in for summer

BY **DAVE SAMMUT**

Prefer a faster pace in the warmer months?

There are plenty of ways to boost your CV or broaden your horizons.



Several Australian universities (such as ANU, University of Sydney and University of Queensland) offer paid and unpaid work experience, internships and research programs, in some cases with subsidised or fully paid on-campus accommodation. Generally, these are open to all Australian university students who have completed at least one year of study.

These opportunities can range from short experience programs to give an introduction and insight into what further research-based study is like, through to participating in fully blown research projects with some really interesting topics.

The University of Sydney and ANU, for example, offer 6–8-week programs for Australian and New Zealand students. On its website, the University of Sydney notes: 'A summer scholarship in the School of Chemistry offers a unique opportunity for undergraduate students to obtain experience in chemical research and provide an insight into what it's like working with well-established researchers in high quality research facilities' (bit.ly/1ksxqGf).

These academic programs might be particularly worthwhile for students considering honours or postgraduate study, with a general view towards

more academically oriented careers. For students with an eye on industry, there is no better preparation than direct commercial experience.

Summer schools

Summer school programs are another very interesting opportunity, run by a wide variety of institutions and organisations.

There are the direct summer school programs available through many universities, often taught in intensive blocks of classes. As noted by the Queensland University of Technology: 'The summer program is a good time to complete any project work required

Unpaid internships: pros and cons

Relevant work experience is of major benefit to any candidate. It is, of course, an opportunity to deepen the resumé and make the person more employable, but it is also much more than that. It is an opportunity to better understand the workplace and the industry, to learn the nuances that it is simply not possible to learn at university, and it is also an opportunity for a candidate to better understand their own interests. Quite simply, a great work experience (or even a bad one) can answer a lot of questions that you never knew to ask.

So it is completely understandable that work experience is a high priority for any candidate seeking to break into a new role, and that they might even offer their services for free in order to get that experience. This is particularly the case given that there is usually a productivity cost to the employer to train and mentor that candidate.

Over the years, I have very often been asked by candidates for unpaid work experience, but I refuse all requests unless I have the budget to instead offer paid work. This is for two key reasons. First, I have a philosophical objection to taking someone's labour without paying, and regardless of the learning opportunity, people still have basic needs that only money can buy.

Second, an internship represents a pretty extreme version of a power imbalance. The intern has virtually no power, and it is a relationship that is fraught with the unpleasant possibility of unbalanced expectations. A solid case in point would be the recent news of the New Zealand United Nations intern sleeping rough in Geneva. In taking on an unpaid internship at the UN, he reportedly told the prospective employer that he had sufficient funds to cover his expenses in one of the most expensive cities on Earth. When he did not have enough funds, he resorted to sleeping in a tent, which is bad, and then went to the media with a story of how unfair it was that UN interns are unpaid. I can only imagine that his public slap in the face to the employer will hurt his career (I probably wouldn't take the risk of hiring him, and I wouldn't be alone in this), but ultimately *both* he and the employer came out of that with mud on their faces.

I would caution anyone looking at an internship (either employer or intern) to be very clear about: (1) your mutual expectations and obligations of the role; (2) what both parties will contribute and receive; (3) the (short and finite) time period; and (4) the arrangements at the conclusion of the period.

In the best case, an internship should be a mutually rewarding experience, and I would hope that this would be the case for the majority. However, I see plenty of potential for something to go wrong.

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for your course. You can tailor this project to help your post-study career options' (bit.ly/1LG3mXP).

For secondary students, the Australian Science Olympiad Summer School offers programs in biology, chemistry, earth and environmental sciences and physics (bit.ly/1hV3Xmi). Scholarships are available for public school students meeting key eligibility criteria for financial need.

Some TAFEs offer short science courses over the summer. Both these and some of the university programs could be particularly interesting for people with a general interest in science. The key point is that you don't have to be a scientist or already on a scientific career path to explore your interest in the field, to broaden your knowledge or generally learn more about hands-on practical science.

Study and work abroad

One option that would have very much appealed to me as a student is

international study. Many well-respected institutions offer summer programs, although of course this generally refers to the northern summer, our winter.

As an example, Cambridge University offers a summer school program. 'This program presents a great opportunity to undertake interdisciplinary study in the Sciences with some of Cambridge University's finest teachers. The course has an interdisciplinary approach and includes a range of topic areas drawing from a wide range of experts. Sessions make use of some of the many splendid collections, museums and facilities within Cambridge.' (bit.ly/1WcMgwd)

The University of New South Wales offers global short course study opportunities through partner institutions such as Peking University (bit.ly/1PB9PzJ). Queensland University of Technology offers internship opportunities with industry-leading companies (bit.ly/1XkZYzj). And there is a really cool opportunity to work and study at CERN in Geneva (bit.ly/1M9IR1C). These are just a few examples.

Some websites collate data and help organise overseas study opportunities. The Cambridge University example was taken from AIM Overseas (bit.ly/1PHCdzf), but there are others such as the Centre for International Studies (bit.ly/1RX5nK0) and Internnzoz (bit.ly/1LMLJzr). Having no direct experience with any of these, I can't recommend any in particular.

Several of these sites also offer opportunities to gain international work experience.

Volunteerism

In a related fashion, several of the 'meta' sites have international volunteering opportunities available. As a concept, these could potentially offer incredibly rewarding international



experiences with communities in need.

There are many humanitarian, ecology and conservation, education and other projects seeking help. The UN (bit.ly/1jBHqwf) notes engineering professionals and laboratory technicians among its 'professional backgrounds in demand' (bit.ly/1NUXGFD).

More widely, science-based volunteer programs are less common, but international teaching is one area where science skills might be relevant. This might be one area that could appeal to a wide range of RACI's membership, not only early-career scientists.

With any of the international opportunities, whether study, work or volunteering, a key factor is always going to be cost. For any of the programs, the participant is likely to be liable for their own travel, accommodation and living expenses, fees and insurances.

Taking AIM Overseas' Cambridge University study program as just one example, it charged A\$3990–5350 in 2015 for a four-week program, including tuition, accommodation, and AIM's own fees. This did not include airfares, insurance or other personal expenses. It would be reasonable to budget something in the order of \$10 000, which is a fair bit of money for an undergraduate.

More to explore

This is just a sample of a very large body of opportunities for education, growth and experience development over summer programs, both domestically and internationally. Much more information is available online.

So this summer, the message is 'slip, slop, slap, study'.

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Universities invest in industry internships for PhDs

Eight universities in Victoria and New South Wales entered into a partnership with PhD internship program AMSI Intern earlier this year to boost industry-academic collaborations and improve the work-readiness of Australian postgraduate students.

The partnership looks set to deliver the federal government's current agenda on the commercialisation of publicly funded research with every internship creating a collaboration between academia and industry – ensuring a work-ready PhD student and a significant outcome for the industry partner.

Placing over 130 postgraduate students into industry – across all study disciplines and business sectors – AMSI Intern delivers research solutions for challenges facing business. The student receives a stipend and is supported by an academic mentor throughout the 4–5-month project. Meanwhile, industry is reaping the benefits responding with a 97% business satisfaction rating.

'Work-readiness of our PhD students, and the links between industry engagement and national productivity, are critically important matters for this country. The AMSI Intern program is one such shining example,' said Professor Ian Chubb, Chief Scientist for Australia (bit.ly/1Sck2fv).

The Victorian cluster includes the University of Melbourne, Monash University, Deakin University, Swinburne University, La Trobe University and RMIT University. And in the NSW cluster are the University of Sydney and University of Technology, Sydney.

'The strategic partnership will enable AMSI Intern to greatly expand. By embedding business development officers within these Victorian and NSW universities we will develop a wider range of industry connections for the benefit of our PhD students,' said Dr Hannah Hartig, National Program Manager, AMSI Intern.

Further expansion into other Australian states and territories is planned for 2016 and 2017.

Australia ranks 29 out of 30 in the OECD in terms of the proportion of businesses collaborating with universities (bit.ly/1ionY4T). This is in stark contrast to Australia being ninth in research output per capita amongst OECD nations. Australian businesses that engage in collaborative innovation with research organisations are three times more likely to gain productivity growth – so why this disparity?

'We must increase the penetration of Australian graduates with advanced research expertise into the private sector. They will boost innovation and business-university collaboration but we must give them those skills. And give business the confidence to employ them,' said Professor Geoff Prince, AMSI Director.

This co-investment partnership is timely given the National Strategy for Work Integrated Learning led by the Australian Collaborative Education Network. There are few industry-based work-integrated learning opportunities for PhD students, especially those cohorts not associated with industry-supported initiatives such as Cooperative Research Centres or Industrial Transformation Training Centres.

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