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INNOVATION INTERNSHIPS: LESSONS LEARNED

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Abstract

The ICP Innovation Internship Program is an immersive innovation experience for interns. Students apply design thinking extend their discipline knowledge with hands-on experience in projects involving the Internet of Things (IoT), network technologies and data science. The Program also benefits the sponsors and supervisors, as they receive a working prototype or proof of concept, and a potential future employee. Key to the success of the Program is the selection of students suited to innovation, then preparing them for the projects with the necessary skills and resources. In this paper we present the approach taken, results achieved and lessons learned through the initial cohort of ICP interns.

Keywords: Innovation, Internship, Industry

1. Introduction

A common challenge across industry and academia is fostering innovation to create business opportunities. Around the world, governments have attempted to re-create the Silicon Valley cluster, highlighted by Porter (1998), with little success. Porter studied many geographic clusters and identified critical factors which may be necessary, but not sufficient, for the desired outcomes. Simply assembling linked industries and entities, on a large or small scale, is not alchemy for producing innovation. So how do we create an innovation machine? What is the secret ingredient that will bring it to life?

Innovation Central Perth (ICP) is a collaboration, led by Cisco, to bring together industry and researchers to develop innovative business solutions. ICP brings together Cisco, Curtin University, Data 61 (CSIRO) and Woodside as a pool of skills and expertise to test and transform ideas into new opportunities. In 2017, the ICP Innovation Internship program (ICP, 2018) was initiated to provide students with a 10-week paid internship working with industry and academic supervisors on a range of projects. The initial cohort of eleven students has generated many unexpected outcomes, going beyond our expectations with proofs of concept and trials of new designs and combinations of technology. In this paper we outline the structure of the program, the experience of the first cohort and the outcomes to date.

2. Approach

There are many ways that researchers and industry can be engaged through the ICP. As the largest university in Western Australia, Curtin has a supply of bright, enthusiastic students with quality skills and education. The intern program works to provide students with interesting projects, which may lead to future employment with partners and sponsors. Internships and Work Integrated Learning (WIL) programs are established ways to connect students with

industry, and develop real-world skills to complement and extend their university studies. Key learning outcomes that have been shown to come from industry experiences include:

- "the development of students' occupational capacities
- different kinds of activities led to distinct kinds of learning outcomes
- building students' confidence to engage in their selected occupations
- assisting students to learn more about their selected occupation
- transformation of students' personal perspectives
- informed insights into the world of work and work practices
- the importance of engaging with practice as part of occupational preparation." (Billet, 2011)

This list provides a base for the expected outcomes of any WIL program. In the ICP Internships, we are also interested in generating benefits for the sponsor(s), the supervisor(s) and partners. The ICP Innovation Internships are an evolution of the approach to intern programs developed at iVEC (a.k.a the Pawsey Supercomputing Centre, described in Maxville (2010). The iVEC/Pawsey program has supported over 140 students since 2007, linking them to researchers at the universities, CSIRO, industry and government agencies. Pawsey (2017) and the Curtin Hub for Immersive Visualisation and eResearch (Curtin HIVE, 2018) continue to deliver variations of the iVEC internship program.

2. 1 Program design and preparation

The program is led by the author (Internship Coordinator) and the ICP Strategic Project Officer, Jim Wyatt. This arrangement allowed for two lenses to be focused on the program – one somewhat project-centred and the other looking at the student experience. In reality, the roles have overlapped and we have been a well-functioning team to support the students.

For the ICP internships, a 10-week program was arranged, with an initial induction week and a symposium for final presentations. Students also wrote up a report and created a short podcast. Internships were available to all Western Australian undergraduate university students, in third year and above. With this structure in place, projects were requested from the ICP and Curtin Institute of Computation (CIC) networks. The CIC is co-located with ICP and supports collaboration between researchers who utilise computational and data science techniques, as well as providing computational expertise to researchers at Curtin. This gave visibility to seek potential supervisors and sponsors across all connected organisations. Seventeen projects were selected and sent out as part of the call for student applications. The selection committee was overwhelmed to have 85 student applications for the first offering of the program.

Selection of students is a difficult task – similar to a typical recruitment process, however none of the applicants are likely to have experience in a similar role. The first pass was to short-list the students, identifying those who did not qualify, or were clearly weaker in their results than the rest of the group. A matching process then took place to work through each student's three preferred projects and then consider which applicant was most suited to each project. Summer internship programs are a competitive playing field, and we found that a number of the students had already accepted internships with "big international companies" before we made our offers. Thus we worked through our own list of preferences until a cohort of eleven interns was finalised.

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ICP Summer Internship 2017-18 Program Induction Week Schedule

Program 27th November to 1 December, 2017

	Monday 27th Nov, ICP	Tuesday 28th Nov, ICP & Computer Lab	Wednesday 29th Nov, ICP & Computer Lab	Thursday 30th Nov, ICP & Computer Lab	Friday 1th Dec, ICP & Computer Lab
9:00am to 12:00pm		**Internship Reporting** • Collaborative workspace • Access & Accounts • Project Plan, Report dates and requirements (Valerie Maxville) Building 314, Computer Lab	**A Bit of Software Carpentry** Building 314, Computer lab (Valerie Maxville)	**Project Scope** Meetings with Supervisors & Industry Sponsors	**Troubleshooting** 9 to 10:30am – Building 314, Computer lab (Valerie Maxville) 10:30am to 12pm - ICP, Building 216, Lv 2 (Jim Wyatt)
1:00pm to 4:00pm	**Welcome to ICP & the 2017-18 Summer Internship program** – Including ICP Overview ICP, Building 216, Lv 2	**Project Planning** The ICP Project Delivery Plan, Project resourcing and TAIGA Building 314, Computer Lab (Jim Wyatt)	**A Bit of Software Carpentry** Building 314, Computer lab (Valerie Maxville)	**Project Scope** Meetings with Supervisors & Industry Sponsors	**Week 1 and 2 Preparations** ICP, Building 216, Lv 2 (Valerie Maxville & Jim Wyatt)
After Hours				**Optional** Attend Data61 & ICP Launch event ICP, Building 216, Lv 2	**Interns Sundowner** ICP, Building 216, Lv 2

Figure 1: Induction week schedule

2.2 Program delivery

The author has found that it helps to create a team atmosphere within the intern cohort. This is important when they may be struggling with their project and ensures there are others who they can relate to. We begin this process during the induction week. Following the pedagogic practices outlined in Billet (2011), we ensure that the students are: oriented to the workplace; knew the expectations and responsibilities of the program; and, aware of the different parties they need to work with. We also make it clear that they are expected to think and generate ideas. These are not "paint-by-numbers" projects – a change from what they may have been used to in their studies to-date.

Figure 1 shows the schedule for the induction week. It includes plenty of networking, along with information about requirements and expectations. We also ensured the students were familiar with Taiga, the project management system used by ICP and CIC (Taiga Agile, 2018). As the interns came from a range of backgrounds, we took them through some Software Carpentry (2014) to give them a taste of some skills they may find useful in the course of the project. References were given for where to extend skills in those directions if needed.

Each project was set up as a sprint in Taiga. Interns were instructed to generate a series of tasks for each week of work, then update tasks with progress and status until they were completed and closed. The system provided transparency for all of the projects and has been the main communication centre for the group (along with email).

Each intern was required to submit a project plan and bill of materials (if needed). To support this, students participated in a Design Thinking workshop, led by Jim Wyatt. Similar workshops are a key part of the innovation process at ICP and we feel should play a role in future selection processes.

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Figure 2: ICP interns during induction week

With all of this in place, the students (Figure 2) dispersed to their respective supervisors. All students were given 24/7 access to the ICP facility and computer laboratories in the Computer Science and Engineering buildings. These common areas were made familiar throughout the induction and many of the students chose to spend the majority of their time there. This was a sensible choice as help was never far away as they worked on their projects.

Throughout the internship, the students were brought together each week to discuss project, practice presenting their ideas and progress, and to share their experiences. Some of these meetings were combined with site visits to the Pawsey Supercomputing Centre, the HIVE and a ride in Kip, Curtin's autonomous bus (Figure 3). As the projects moved along, we trained the students in writing, presenting and videoing their projects. As with the iVEC internships (2010) the students prepare an academic paper, a presentation to a general audience, and a short video aimed at Year 10 high school students. This range of deliverables helps improve their science communication skills, as well as giving profile to their projects and stakeholders. Equivalent podcasts from the iVEC/Pawsey internships can be accessed at Pawsey (2015).

3. Results

There are three facets to measuring the success of the internship program. The first is the experience of the students. Returning to Billet's list of learning outcomes (2011), for each project we have achieved the goals. All of the students have developed interesting and innovative responses to their original challenges, and have gained experience and work-ready skills in the process. Regular meetings and presentations to the group have shown increasing confidence in their work and in their ability to communicate status and results.

Secondly, the feedback from supervisors and sponsors of projects is very positive. To illustrate, many of the projects have the same industry sponsor. In the closing weeks, the sponsor moved to embargo the details of the projects – a indication that the outcomes have potential commercial significance. Other projects are likely to have an impact on professional practice and policy-making in health and local government. In all of the projects, there is support for them to continue, either with the student, or in a continued collaboration with ICP.

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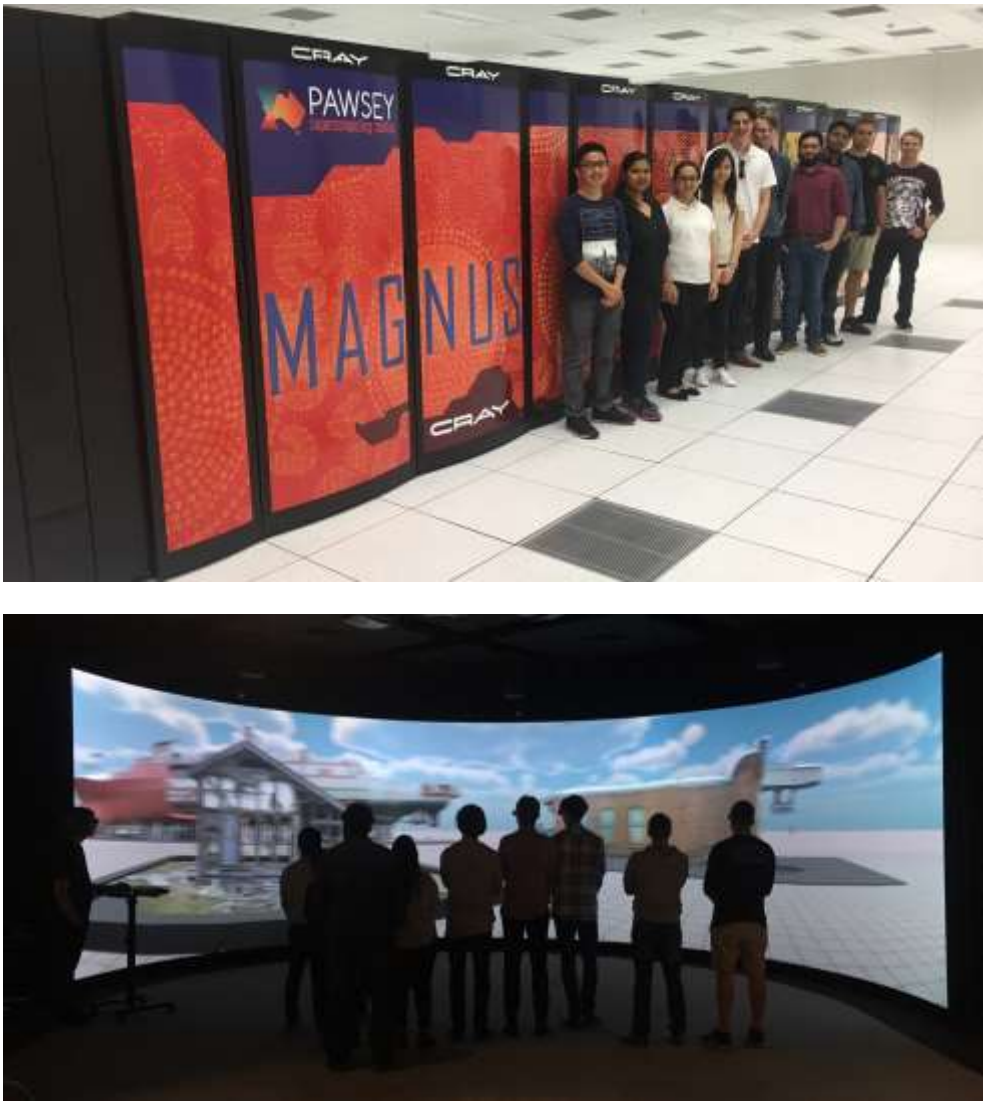

Figure 3: ICP interns at the Pawsey Supercomputing Centre (top) and Curtin HIVE

Finally we can consider the ICP who have underwritten the 2017-18 program in terms of student stipends, materials and support staff. The level of ingenuity shown by the students has impressed all involved. It is clear that the combination of sponsors, support, equipment, projects and, the vital ingredient, bright students, has fused into something quite special. The response from the Operating Committee is clear – they want to increase the internship program four-fold in 2018. There have been challenges, particularly around the Christmas/New Year/holiday[1]* closedown period, but we have strategies to deal with them in future offerings.

4. Conclusion and future work

Around the world, organisations are trying to find ways to produce innovation. In the ICP program, the interns have produced outcomes beyond our expectations. For all eleven projects generate such positive outcomes is a testament to the students, and also to the value of the framework that has been put in place. We see students as the vital ingredient for innovation in

[1] Summer in the Southern hemisphere

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our context. With our base at a technology-focussed university, we are well-placed to have a steady supply of innovators to work with our sponsors for even better results in the future. As the initial cohort move on, we will tweak the issues identified in the initial run of the program, then plan the logistics for forty students to come through in the coming year.

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