Imperial College
London

Industrial Liaison Board, Department of Computing

Tuesday 12th May 2015
5.00pm (refreshments available from 4.30pm)
Ballroom, 58 Princes Gate
South Kensington Campus

Minutes

Present

External

Mark Baker (Mind Candy), Alice Bentinck (Entrepeneur First), Paul Clarke (Ocado), Christopher Gibson (IBM), Patrick Goldsack (Hewlett Packard), Ricky Leatham (Amazon), Raymond Mulligan (Credit Suisse), Johan Myburgh (Amadeus), Jon Page (BBC), Ioannis Papagiannis (Facebook), Wendy Tan-White (TechCity UK), Tim Wiffen (Formicary)

Internal: Marc Deisenroth (Research Fellow), Catarina Fernandes (Teaching Fellow), Anandha Gopalan (Teaching Fellow), Mark Hammond (Imperial Innovations), Michael Huth (Director of Research), Jonathan Keating (Corporate Partnerships Associate), William Knottenbelt (Director of Industrial Liaison), Peter McBrien (Director of Undergraduate Studies), Brian Mitchell (Teaching Fellow), Victoria Nicholl (Industrial Liaison and Undergraduate Admissions Manager), Anne O' Neill (Department Operations Manager)

Apologies: Tim Brennan (Amadeus), Joseph Do (Formicary), Susan Eisenbach (Head of Department), Julie McCann (Deputy Director of Industrial Liaison), Bill Mitchell (BCS), Hugh Proudman (IBM), Daniel Rueckert (Deputy Head of Department), Alessandra Russo (Director of Postgraduate Studies)

Agenda Item

1. Welcome and Introduction

William Knottenbelt welcomed all attendees to the meeting and thanked everyone for attending the board and in particular to the:

Stand-ins:
Johan Myburgh (Amadeus; standing in for Tim Brennan)
Tim Wiffen (Formicary; standing in for Joseph Do)
Christopher Gibson (IBM; standing in for Hugh Proudman)

Guest members:
Marc Deisenroth (Research Fellow)

Catarina Fernandes (Teaching Fellow
Anandha Gopalan (Teaching Fellow)
Jonathan Keating (Corporate Partnerships Associate)
Brian Mitchell (Teaching Fellow)

2. Membership & Terms of Reference

Attention was drawn to these.

3. Minutes of the Last Meeting

The minutes of the last meeting, held on 20th May 2014, were approved.

4. Matters Arising

2014 REF Results

William Knottenbelt discussed the department's strong results. Imperial came third for Computer Science and Informatics and highlighted that an analysis that takes into account the proportion of eligible staff submitted (so-called "research intensity"). Under the research intensity metric, the department was ranked in first place.

Michael Huth added that the Royal Statistical Society have recommended new approaches to reduce the scope for strategic manoeuvring (i.e. "gaming") in future exercises.

Update on admissions figures

William Knottenbelt reported that the department has received a 20% increase in applications each year for the last five years. The department is now in a position where it has to work very hard to select from a set of very well-qualified students. Unfortunately it is still the case that some students get accepted but cannot afford to come and there are still issues with gender balance. However, there are plans to expand the department, which could lead to the capacity to take on more students.

The board responded that this is a problem for industry too, who have targets, but not the candidates to select. This needs to be done from schools up. There is a key issue at age 16 when plenty of girls are doing maths, but then dropping it at A level. Role models are needed. Teachers need resources to teach maths and to get girls excited about computing.

5. Strategic Issues

Departmental Goals

William Knottenbelt summarised some of the strategic discussions held at a recent Departmental Away Day. The department is planning to recruit actively over the next five years. The majority of top performing Computer Science departments are larger, with approx. 100 academic staff, whereas Imperial Computing is half of that. An increase in staff will allow the department to cover more areas of core computing and expand its research remit. Industry is envisaged to be central to this, with key plans including:

- Active engagement with industry.
- Building long-lasting partnerships with research users and partners.
- Encouraging and providing opportunities for our students to be creative and entrepreneurial.

Michael Huth pointed out that this growth has risks attached. 51 FTE at the moment, 75 within the next 5-10 years. Would it be the same structure, or would this be building a school? Financing this is a completely different matter. If you increase the student numbers then you can mitigate the risks somewhat. At the moment we can easily increase student numbers from our applications whilst maintaining quality, but from an operational perspective it is not as simple.

Anne O' Neill stated that at MSc and PhD level there is reasonable potential to increase numbers, but at UG level there are some limits due to for example, the high number of contact hours per student, and a College promise of accommodation for all first year UG students who want it.

William Knottenbelt advised that space remains a significant issue. In the next two years, there may be opportunities for more space, either by moving to the new Imperial West Campus which is twice the size of the South Kensington campus, or by taking over space by other departments moving out to Imperial West.

The board approved of the Department's strategic goals. Amazon stated that entrepreneurship is important to them as it emphasises a customer-focused approach. The board agreed that Data Science and the Internet of Things are important areas in which they would like to see more engagement and production of graduate talent.

Centre for Cryptocurrency Research and Engineering

William Knottenbelt introduced the Imperial College Centre for Cryptocurrency Research and Engineering. The department and faculty have funded a small-scale operation, but there is interest from across the College, with a strong desire to involve industry.

The two main objectives for the Centre are:

- Research directed at improving the protocols underpinning blockchain technology e.g. improve transactional capacity, improve scalability, increase resistance to attack, and make the verification of transactions much more timely
- Application-based investigations directed at prototyping blockchain-based solutions across multiple domains

There were already a number of exciting student projects exploring applications:

- Gradbase - Bitcoin verified degrees. Second place at Bitcoin Forum innovation competition (http://gradba.se)
- Equity Bits (first year EEE student came up with this in his spare time). Winner of the Bitcoin Forum innovation competition (http://www.equitybits.cc)
- Bitcoin Betting Exchange (https://bitcoin-betting.herokuapp.com/)

There are questions about whether the UK should lead on cryptocurrencies, with the government, and the Treasury in particular, taking a progressive and enlightened view. £10 million was provided for cryptocurrency research in the recent budget, but there is no official call or allocation yet.

Concerns about the environmental impacts of Bitcoin mining were raised, and Wendy Tan-White suggested InnovateUK as a place to explore for funding Crytocurreny activities.

Actions: external board members to contact William Knottenbelt if they would like to engage in any of the following ways, or if they have suggestions of their own.

- **funding**
- **application case studies**
- **partners on research grant applications**
- **student project co-supervision**
- **attending/participating in Centre and Imperial Bitcoin Forum events**

6. Industry Presentations

Recruitment challenges
Paul Clarke (Ocado)
Slides attached

Largest online-only grocery retailer. No shops, huge automated warehouses. They build almost all of their technology. They tend to deploy IP for multiple purposes. The whole company runs on the technology hub embodied by Ocado Smart Platform. This has been built from ground up – shares no code with their existing platform.

Internship programme very important to Ocado. They like to see how much can be produced by giving a student an interesting project and then getting out of their way.

There is a huge variation in the content of degrees which are called Computer Science across the world, they would like more standardisation. Across the UK there is a surprisingly high rate of unemployment among CS graduates. This is possibly because of a lack of hard coding skills. In terms of Imperial students specifically, Ocado's experience with MSc conversion student hires had been variable, especially where they did not have strong STEM backgrounds.

Raymond Mulligan mentioned that MSc Computing students tend to be hired into business analyst rather than hard coding roles and that a lot of female students want to end up in analyst or project management roles rather than coding. Wendy Tan-White said that she experienced this, perhaps because it was a role that demanded good communication skills. The Board agreed that industry wants to see both coding and communication skills.

Ocado says Imperial students pick up technologies fast, but they would like them to have already cut their teeth on them, stating that it is less the specific tool and more the process and craftsmanship around the tools that is needed. This was echoed elsewhere – particularly open source skill/experience.

However, other members of the board felt it wasn't necessarily the university's responsibility to provide tool-specific training and that the company should expect to train new hires in these. This is why the MEng, with its placement programme, is so beneficial. There is a difference between a university project and building a commercial product that is bug free. Others said that building a product that is inherently testable is important. Michael Huth said that the curriculum is already very crowded and we need to be innovative to teach multiple things at the same time.

The start-up perspective
Alice Bentinck (EF)
Slides attached

EF is similar to an accelerator or an incubator. Their focus is on bringing together exceptional technical graduates. Some are brilliant technologists with no entrepreneurial flair, and the others are

good technically but are also good at selling. They love working with Imperial students, who they find are hugely ambitious and practical. Imperial, Cambridge and Edinburgh are the biggest source of students for EF. Fintech and cyber security are growing areas. There remains, however, a confusion amongst students as to the difference between the delivery of a consumer-facing app and an effective business model.

EF has issues with finding and retaining female entrepreneurs. Overall, 75% of women drop out during EF's recruitment process whereas only 25% of men do. This is partly because they are being recruited with fantastic offers. The Board wholeheartedly agreed it would be good to find mechanisms to encourage more women to participate in – and remain engaged in – entrepreneurial activities.

CodeFirst is an initiative that EF started to help address this – it is now a separate organisation. They are in 15 different universities, and have taught 1000 girls how to code. They are now oversubscribed for their courses, which is hugely positive – ten times oversubscribed in London.

Regulatory Change, efficiency and innovation
Raymond Mulligan (Credit Suisse)

Imperial is one of the top schools targeted by Credit Suisse. Last year they welcomed 20 Imperial students (interns, placements, graduates). What they strive to do is make internships and placements as meaningful as possible.

Regulatory change has created many disruptive situations. Almost all of the discretionary change budget has been directed to regulatory change. Simultaneously there has been a big drive for efficiency. For the last two decades investment banks have been focused on rapid system delivery. The result are numerous fragmented systems, many of which feature duplicated functionality, leading to maintenance and cost issues.

One important area of innovation is unauthorised trading. There are big challenges in the area of security, authentication and the use of block-chain technology. A more open source and git-style approach is expected to have a transformational impact. A lot of their people are institutionalised to think 'this is how things work and how they must work' which simply isn't true.

7. AOB

Victoria Nicholl and Catarina Fernandes drew attention to the fact that the Department of Computing website is currently going through redesign, and any testimonials about our students that Board members and their companies are happy to appear on the website/other media, would be greatly appreciated.

William Knottenbelt drew attention to the board mailing list doc-ilb-board@imperial.ac.uk and encouraged members to use it.

8. Close

The meeting closed at 7.00pm.