Department of Computing

Industrial Liaison Board

Tuesday 15th May 2018
5.00pm (refreshments available from 4.30pm)
Billiard Room, 58 Princes Gate
South Kensington Campus
London SW7 2PG

Minutes

Attendees

External:	Holly Cummins (IBM), Bryan Lillie (Qinetiq), Raymond Mulligan (Credit Suisse), Alexandros Papspyridis (Microsoft), Johan Myburgh (Amadeus), Sarah Wilkinson (NHS Digital)
Internal:	Anandha Gopalan (Deputy Director of Industrial Liaison), William Knottenbelt (Director of Industrial Liaison), Anne O'Neill (Department Operations Manager), Ben Glocker (Champion for Public Engagement), Peter Pietzuch (Director of Research), Daniel Rueckert (Head of Department), Fariba Sadri (Director of Studies: PG), Tony Field (Director of Studies: UG), Arthur Gervais (Lecturer), Robert Chatley (Principal Teaching Fellow), Tom Curtin (Industrial Liaison Officer), Molly Bridge (Industrial Liaison Officer)
Apologies:	Alice Bentinck (Entrepreneur First), David Sharp (Ocado), Paul Clarke (Ocado), Wendy Tan-White (BGF Ventures), Alison Whitney (National Cyber Security Centre), Tim Brennan (Amadeus), Alessio Lomuscio (Director of Strategy and Planning), Francesca Toni (Deputy Head of Department), Sonia Maciuszewicz (Entrepreneur First), Anna Shipman (Financial Times)

Agenda items

1. **Welcome and introduction by Daniel Rueckert (Head of Department)**

   Daniel thanked everyone for coming and introductions were made by all attendees

2. **Membership and terms of reference**

   Daniel indicated that the terms of reference and the minutes from last year's meeting were included in the pack provided to all attendees. He asked that if there were any comments to please email them through after the meeting.

3. **Minutes of the last meeting**

   Please see item two.

4. **Departmental update by Daniel Rueckert**

   Daniel gave some updates on recent staff achievements. Professor Alessio Lomuscio has been awarded Royal Academy of Engineering Chair in Emerging Technology for trusted learning-based autonomous and robotic systems. Dr Ben Glocker is launching a new industrial research collaboration with Heartflow to use AI for patients improved diagnosis of heart diseases using non-invasive imaging. Marily Nika, PhD graduate from the Department of Computing, was named Woman of the Year at the 2018 FDM Awards. Marily is now an Engineering Program Manager at Google. Several DoC Academics including Professors Maja

Pantic, Nick Jennings and Chris Hankin have responded to the call for evidence from the House of Lords' Select Committee on Artificial Intelligence.

Daniel then gave an update on the recent 5-yearly BCS/IET accreditation review for both Computing and JMC degrees. It was very successful and feedback included particular praise of the department's links with industry. He extended thanks to those members who contributed to or attended the review.

He then gave an overview of applications so far this year. UG applications are up by 18%. As discussed in previous meetings the intake remains the same due to limits on the amount of space the building has. The selection process is now very difficult as there are so many high quality candidates. PG Applications are up by about 22%, please see next item for more details.

Daniel then gave a summary of academic recruitment. The department is recruiting in four priority areas: Robotics, AI, Machine Learning and Cyber-Physical Systems. Several offers have been made and the department is hopeful that these positions will be filled for the coming academic year. We are additionally recruiting a Professor for Natural Language Processing.

He then went on to give details of the HiPEDS CDT (EPSRC Centre for Doctoral Training in High Performance Embedded and Distributed Systems). There are already many links with industry through this programme (e.g. scholarships, internships, group projects, sandbox etc.), and the potential for more, so please get in contact if you think this is something you could engage with. The HiPEDS CDT has cross cutting research themes and three main impact themes – please see slides for details. There are plans to put forward 2 two additional CDTs: 1 – Trustworthy Connected FutureEs (TRUCE) and in AI in Healthcare (please see slides for the main aims of these programmes).

Sarah Wilkinson commented that Edinburgh university has a big focus on interdisciplinarity – was this a consideration for Imperial? Daniel replied that the Engineering faculty is very large and currently the departments are quite separate. The focus is more on the depth of learning in computing rather than providing a breadth across other areas. There have been discussions of having a common first year but at the moment the momentum is to stick with separate departments. Tony Field agreed with this sentiment. Will Knottenbelt added that there is definitely a level of interdisciplinarity in post graduate research groups, institutes and centres, for example the CDTs. Tony added that funding is now usually cross departmental. Sarah asked about the possibility of having space for companies to work within the college and Daniel agreed this was easier to do at PG level, but there are barriers to this at UG level. It was discussed that such initiatives need to be sponsored from the top and Imperial currently is organised heavily at the department level.

5. **Presentation followed by open discussion: Proposed new courses by Fariba Sadri (Department of Computing)**

Fariba started by giving an overview of the current PG provision and moved on to note that application numbers are increasing, and the intake is around 200. A first class degree is required to be considered for entrance. There has been a noticeable shift in the most popular specialisms chosen from Software Engineering to Machine Learning and AI. In part due to this there are three new provisions proposed:

1 – The current MSc Computing (Artificial Intelligence) and MSc Computing (Machine Learning) would be combined to form MSc Computing (Artificial Intelligence and Machine Learning). Admissions for this programme would start in 18/19 for first intake 19/20. This new course would include lots of elective units and be very flexible in terms of choice for students.

2 – A new conversion degree – MSc Artificial Intelligence. This is aimed at students who have a strong background in maths but not necessarily computing. Again the content of the programme would include lots of choice and a first required for consideration. This proposal is up for discussion before submission in mid-June. It is hoped that the final endorsement would be in mid-September in time for the admissions cycle. We would appreciate industry input on a number or issues including course design and the future potential for internships.

3 – Online version of MSc AI. The suggestion is to offer the course through an online provider such as Coursera. There is the possibility to offer diplomas and certificates for those not wanting to complete the full Masters. The risk analysis and funding model are currently being considered.

Daniel then added that these proposals have come about partly as a result of the recent government recommendations for online and extended master's degrees to include internships in the area of AI. This is also taking into consideration the demand for AI education by those who are unable to come to Imperial in person or those wanting to study part time which would be very difficult to facilitate otherwise.

Sarah Wilkinson raised a question about whether extra faculty would be necessary for example to cover the marking of assessments. Daniel agreed that yes this would be a consideration. Bryan Lillie asked about the entrance standards for the online MSc. Fariba confirmed that standards would be the same as they currently are for residential MScs. Daniel added that the admissions process for the online course may actually be simpler as the entrance test could be more specific.

6. **Research presentation: 'Revolutionising how society trades and interacts' by Arthur Gervais (Department of Computing)**

Arthur gave a presentation on how the Liquidity.Network solves the problems currently faced by Ethereum-based trading for example compromises in speed and cost of transactions. Please see slides for more details of Arthur's presentation.

7. **Open discussion: Retaining staff in academia**

Daniel started the discussion by showing headlines that illustrate the difficulty that universities face in retaining staff in the area of computing and in particular AI specialists. For example a report by Nature suggested that around 65% of Google DeepMind's research hires since 2014 have been directly from academia. The main challenges include:
1 – salaries - universities are not in a position to match the salaries offered by top industry players
2 – location – many of the top AI recruiters are based in London now so there aren't the same barriers in terms of relocation as there have been previously
There are also opportunities to bear in mind including:
1 – joint appointments with industry rather than part time academic appointments - there must be benefits for both sides
2 – opportunities for secondments back to academia for substantial periods of time (e.g. 3 years)
3 – joint R&D labs with industry e.g. HeartFlow, Dyson

It is very important that we maintain the quality of our AI and ML teaching, especially with regard to the proposed new provisions and we would welcome any ideas you may have about how to do this.

Holly Cummins highlighted that having industry-based co-supervisors for PhD supervisors is a good way to do this and saves many of the overheads experienced by academics. Daniel agreed that this is something the department certainly wants to continue doing and expand upon.
Alexandros Papaspyridis commented that the salaries in industry cannot be matched by universities so instead how can you provide significant research value and resources? Daniel

replied that it is difficult to do this as of course we want to be able to provide opportunities for exciting research but teaching needs to be an important part of the role. There are opportunities such as secondments to AI hub for example to provide more time for research. Raymond Mulligan highlighted that universities certainly have an advantage in terms of IP ownership. Daniel agreed that universities are exciting in this way.
Bryan Lillie asked whether there could be more support for developing start-ups and Daniel said that academics could ask for a reduced teaching load to encourage this. A problem with trying to balance research and industrial endeavours with teaching is that it leads to many wanting part time positions and not leaving completely which makes it difficult to run the department sustainably. Sarah Wilkinson challenged this by asking why this set up would not work. Daniel replied that it would be difficult to ensure all bases are covered, to expand on current capabilities and explore new projects with this kind of model.

8. **Industry presentation: Updates from Microsoft by Alexandros Papaspyridis (Microsoft)**

Alexandros shared some key updates on the expansion of Microsoft Azure data centres, particularly highlighting issues such as the need to increase trust over data especially in light of recent breaches elsewhere. Microsoft provides extensive open source support and are one of the top contributors to github. Microsoft has many research areas including healthcare, quantum computing, and algorithms. AI is a key priority for Microsoft evidenced by recent breakthroughs in vision and audio. Please see Alexandros's slides for more information.

A discussion followed where Peter Pietzuch enquired about the ways that Microsoft currently engages with academia and academics. Alexandros explained that Microsoft does this is many ways including active collaborations for AI, supporting conferences, PhD summer schools. Tony Field asked whether there are any obvious gaps in the curriculum in terms of AI. Alexandros explained that this was hard to answer specifically but overall there is a feeling that AI is currently focused on in quite a narrow way but it would be more useful to focus on it more as a system. He also discussed the need for education on ethics and bias. Daniel commented that this was a great link to the new AI courses – we need to ensure these considerations are taken and that we include industry real life examples as much as possible to make this part of the course interesting.

Ben Glocker raised the point that academics generally struggle for infrastructure to implement research and that it would be great have this support from companies like Microsoft. Alexandros agreed that this should be explored more. He said that there were some issues that were associated with this for example resources being used inappropriately. Will Knottenbelt commented that Azure resources that are currently available have been extremely useful to projects in the department so far.

9. **Open discussion: Women in Computing Outreach Programme**

Daniel started by saying that details of the proposed programme can be found in the printed documents, and that he will also contact members about this additionally in the upcoming weeks. Essentially the idea is to establish a programme to encourage more females in Computer Science. We want to challenge conceptions about what CS is and what jobs computer scientists do. Please see slides and handout for further information.

Sarah Wilkinson questioned the target age range of 14+ and suggested it should be earlier due to the timing of GCSE choices which consequently affect A-level choices. Daniel replied that Maja Pantic would perhaps be able to give more information on why this particular age was chosen. He also commented that there may be more success in attracting women through the MSc conversion route rather than the traditional route through UG. He added that funding is required to enable this initiative to go ahead and welcomed feedback in the coming weeks on the proposed ideas.

10. **AOB**
The timing of the next ILB meeting was discussed. It was agreed that although September would give a more complete overview of the previous academic year, May provided a good

period of time in order to implement any feedback provided by the board in time for the next academic year.

11. **Close**
Daniel thanked everyone for attending and welcomed feedback on any of the items discussed.