CANON MEDICAL RESEARCH EUROPE LTD.

Made For life

Hazel McGraw, Policy Officer
Scottish Funding Council
Apex 2
97 Haymarket Terrace
Edinburgh
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17th January 2019

Your ref: SFC/CE/01/2018

Dear Hazel,

Independent Review of SFC's Research Pooling Initiative

I am writing on behalf of Canon Medical Research Europe in response to the above call for evidence.

We are a leading medical software R&D centre of excellence, generating breakthrough technologies and valuable intellectual property for Canon Medical Systems, a global corporation headquartered in Japan. Based in Edinburgh, we employ over 120 staff, including software engineers, scientists and clinical specialists. Our teams develop next generation medical imaging software to integrate with Canon Medical scanners and other diagnostic healthcare solutions which are installed in hospitals and health centres across the globe.

The following comments are based on our involvement with two of the research pools: Scottish Imaging Network: A Platform for Scientific Excellence (SINAPSE) and Scottish Universities Physics Alliance (SUPA).

What has been the impact of the initial research pooling initiative? (Q1a)

In November 2018, Innovate UK awarded £10m of the Industrial Strategy Challenge Fund to iCAIRD, the Industrial Centre for Artificial Intelligence Research in Digital Diagnostics, a pan-Scotland initiative to facilitate and advance the application of modern machine learning techniques to problems in radiological and digital pathology imaging.[1] Innovate UK's investment will be matched by £5.8m from industry, of which £3.3m is from Canon.

The four iCAIRD universities are all SINAPSE members, as are NHS Scotland and Canon. The existence of SINAPSE was significant to the success of the funding bid, in which we pointed out "SINAPSE has a 10-year track record of developing and strengthening relationships among the iCAIRD participating organisations involved with medical imaging." Reviewer feedback referred to "well established existing partnerships", "clear evidence of nationally leading research and innovation in the targeted areas" and "an existing environment of collaborative working".

Alison Murray, Director of SINAPSE and Professor of Radiology at University of Aberdeen, provides clinical leadership within iCAIRD (and represented iCAIRD at the Innovate UK interview stage). She is also – alongside Prof. Corri Black and colleagues – a leading figure with the Aberdeen Centre for Health Data Science[2]. In Canon's experience, this centre is an excellent example of effective collaboration between academia, NHS and industry: agile, pragmatic, can-do and joined-up. These qualities marked out Aberdeen as an essential core site for iCAIRD from Canon's perspective, alongside Glasgow. Therefore, Canon's AI research infrastructure – the Safe Haven AI Platform (SHAIP) and the AI Evaluation Cockpit – will initially be deployed at these two core sites, at a cost of £4.6m, and Canon will soon have branch offices at both locations.

Also key within iCAIRD is Prof. Keith Muir, Consultant Neurologist and SINAPSE Chair of Clinical Imaging at

[1] http://www.sinapse.ac.uk/news/icaird-scottish-centre-of-excellence-for-ai-in-digital-diagnostics-to-open-in-glasgow
[2] https://www.abdn.ac.uk/achds/

University of Glasgow. Prof Muir has been consistently generous, constructive and patient in his interactions with Canon over a period of many years, laying the groundwork for technologies and projects that are now set to accelerate under iCAIRD. These include both the £1.3m iCAIRD Acute Stroke AI exemplar for which he is Principal Investigator, and Canon's £6.6m Clinical Cockpits work programme for which Scottish Enterprise announced a £1.9m grant early in 2018.[3] Prof. Muir's style of engagement – alongside colleagues Prof. Dame Anna Dominiczak, Vice-Principal and Head of College of Medical, Veterinary and Life Sciences and Dr Kristin Flegal, SINAPSE Lead Scientist – has established University of Glasgow as a trusted and highly valued partner for Canon.

The research pools have also positively impacted Canon's business through the co-funding and co-supervision of postgraduate degrees. Since 2012, Canon has engaged with Scottish universities to co-supervise 17 doctoral students. Of these, three were directly funded through research pools (SINAPSE, SUPA and SPIRIT schemes) and supervised respectively by Prof Keith Muir (Glasgow), Dr Scott Semple and Dr Cyril Pernet (University of Edinburgh, SINAPSE). Additionally, six are within the (from our perspective) fabulously productive EPSRC funded Centre for Doctoral Training in Applied Photonics, which SUPA claims as a partner organisation[4], at the Universities of Glasgow, Heriot-Watt and Strathclyde.

Many of these students have gone on to become skilled employees at Canon or other Scottish imaging companies such as Optos. While studying, they have contributed academic papers, patentable IP and software artefacts that have subsequently been incorporated into Canon's products and sold around the world. Additionally, Canon has become better acquainted with the academic host institutions and supervisors, opening up possibilities for other forms of collaboration.

The positive outcomes for Canon have been especially noticeable in the case of the Photonics CDT funded EngD studentships. During an EngD, the student spends the majority of their time located at and supervised by Canon, working on a project closely related to Canon's near-term commercial priorities. The impact of these studentships on our business has been significant. We have hired a higher proportion of these graduates, and in many cases they have trailblazed research that has subsequently become central to our activities. By thus leveraging Scotland's academic strengths, we bolster our position within the internally competitive environment that inevitably exists in a large multinational such as Canon. We rather regret the fact that the majority of CDTs that we see proposed focus entirely on PhDs to the neglect of EngDs, and we commend the EngD model as worthy of greater consideration, particularly given the increasing requirement to demonstrate the impact of research.

What lessons can be learnt from the research pooling initiative? (Q1b)

We discussed above many successful engagements with research pools and will therefore focus now briefly on difficulties encountered.

Success in a potential engagement is clearly highly dependent on establishing a constructive and trusting relationship both at an institutional and a personal level. Where we have failed with either of these aspects, projects have floundered. Personal aspects are clearly intangibles and can't really be commented on in detail – merely noted as contributory. Institutionally, we need to work harder to understand where we are each "coming from". For example, Canon in Edinburgh – although part of a multinational – does not in fact have huge amounts of discretionary research funds, nor the ability to donate expensive imaging hardware to support research that may or may not yield a short to medium term commercial benefit. Nor can we agree to IP terms that price any arising IP beyond what would be commercially viable for our parent organisation. No doubt there are equivalent

[3] https://news.gov.scot/news/patients-to-benefit-from-new-technology
[4] https://www.supa.ac.uk/about_supa/cdt.php

bugbears from the academic point of view that Canon needs to understand better.

We also wonder if blurred lines between academic and commercial motivation increasingly exist within the university setting. Some of our academic colleagues seem solely motivated by a wish to conduct publishable research with potential to improve outcomes for patients. In these cases, we are generally able to work well together, recognising that Canon is the commercial partner and that commercialisation is typically a lengthy and expensive process. Other academics appear more interested in commercialisation potential, either on their own account or for the benefit of their host institution, and on occasion this has prevented us from being able to negotiate viable terms, and has therefore led to discontinued engagements.

In the current research landscape, what is the perception of, and role for, the pools?

Canon's engagement with Scotland's academic and NHS institutions stretches back well over a decade. However, over the past two years, it has deepened and widened markedly. We will soon have branch offices at both Glasgow and Aberdeen, we are working increasingly closely with Edinburgh, and additionally sponsor doctoral students at St Andrews, Heriot-Watt and Strathclyde. Through iCAIRD we have helped to secure £5.3m of UK Government funds for NHS Grampian and NHS Greater Glasgow and Clyde for AI infrastructure, £3.6m for related research at 4 Scottish universities, and have pledged £3.3m ourselves. While each of these engagements has at its core local, personal and institutional relationships, the funding has depended on a demonstrably joined-up Scottish ecosystem that has critical mass, both of researchers but also of patient population. These recent developments suggest to us that research pooling is beginning to bear fruit on a large scale and is therefore well worthy of ongoing and further support.

I appreciate the opportunity to provide this feedback and I'm happy to provide further comments and clarifications on what I've provided here if it would be useful to you.

Yours sincerely

Dr Ken Sutherland
President
Canon Medical Research Europe

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