



SICSA Annual Report 2012 - 2013

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1. Executive Summary

2012-13 was an excellent year for the SICSA Research Pool, and its 14 member institutions. The strengthening of the Scottish research base could be seen in the increased returns of members of academic staff in the 2013 REF (an average increase of 28% in the research-intensive SICSA institutions who received SICSA academic positions, compared with the RAE), despite the significantly more stringent quality demands. Many sites had significantly improved returns of funding (e.g. Edinburgh (70% increase), HW (127% increase), Aberdeen (130% increase), RGU (66% increase), Stirling (54% increase), GCU (51% increase) and in reported Ph.D. students (e.g. 60% increase in Edinburgh, 63% in St Andrews). The increased levels of trust among Scottish Computing Science Schools allowed SICSA REF champions to meet to openly discuss REF strategy - something hard to imagine prior to SICSA.

The communities engaged in the research themes are growing ever more cohesive and collaborative as more regular contact increases mutual trust and helps build new communities. SICSA has demonstrated its ability to adapt, with the introduction of a new research theme in Future Cities after a competitive bidding process, which received 7 proposals. We used ideas from these bids to create cross-cutting subtheme activities, supported by an extra investment of £10.9k, which brought new groups of researchers into the themes.

All research students at SICSA Schools have continued to be supported by the thriving Scottish Graduate Academy, with its sell-out Ph.D. conference for 160 students (organised by the students themselves), training events, successful summer schools, and an exciting Distinguished Visiting Fellowship programme. Analysis shows that the DVF programme is generating long-lasting academic collaborations (including successful joint-grants; jointly authored peer reviewed papers; visiting Professorships and further visits) among hosts and their visitors. All SICSA Universities have now recruited their quota of SICSA Prize Ph.D. Students, and they are producing over one hundred academic papers per year. Graduating SICSA students gained positions in top industry locations (3 at Google, 1 at the BBC, 1 start-up) and 3 academic posts.

All SICSA Staff appointments have been made as planned, with just a number of changes occurring during 2012-13 as detailed in Section 6. For reporting purposes, SICSA surveyed all SICSA-appointees for evidence of outputs during the reporting period and the results are very encouraging. The exercise also highlighted that SICSA-appointed staff are generally very well engaged with SICSA activities. The majority of successful SICSA Distinguished Visitor Fellowship applications during 2012-13 (over 60%) came from SICSA-appointed members of staff, and there were a number of examples of SICSA staff having been successful in being granted SICSA PECE funding. In part, this demonstrates that many SICSA staff are utilising SICSA support to foster research collaborations with academics outside of Scotland. SICSA appointed staff have also engaged with SICSA by undertaking deputy SICSA research theme leadership; organising research theme events; and SICSA sponsored Summer Schools, among other things.

SICSA has seen significant levels of further investment. SICSA has been the only Research Pool to partner an Innovation Centre proposal (the DataLab), as part of an industry-led consortium. SICSA institutions also supported, and are part of the Digital Health Institute and CENSIS ICs. SICSA Institutions were also part of Glasgow Council's successful £24M Future Cities bid. SICSA institutions won 3 Centres for Doctoral Training (CDT). The process of consulting with a wide range of Industrial and government partners on the DataLab and other IC bids has also positioned SICSA well to further promote and coordinate joint Scottish Industry/University bids in to Horizon2020. Our £410k restored pools funding early stage and early career researcher support mechanisms came on stream in 2013 and have seen a strong uptake.

SICSA, via Informatics Ventures is the only Pool to have promoted and established an Investor Conference to link start-ups in our area to investment opportunities - Engage, Invest, Exploit. This was so successful that two other sectors have been brought under its wing by Informatics Ventures –

Life Sciences and Energy/renewables. Further, the TechMeetUp series linking industry and academia is now running in 5 centres: Aberdeen, Dundee, Edinburgh, Glasgow and Inverness. The longer-established venues regularly have 50-100 participants, and the model is being expanded to a Mobile Apps meet-up. The annual DEMOfest to promote Industrial-Academia collaboration attracted ca. 200 attendees with ca. 60 different research groups presenting, and will expand to a DEMOfest North in Aberdeen in 2014.

SICSA views the provision of Computing Science education from School level upwards as a key area in promoting long-term and sustained research excellence in the subject area. We expanded our investment into improving and developing Computing Science education in Scotland, with the aim of sharing best practice and resources, to improve the quality of Undergraduate students feeding in to research studentships. SICSA has representatives on the Scottish Qualifications Authority "Technology" Curriculum Area Review Group and the "Computing" Qualifications Development Team, and on the RSE/BCS Exemplification Project Advisory Group.

SICSA institutions back the continuation of SICSA, and are prepared to contribute matching resource to SFC's contribution for the core tasks of the Research Pool. Given the levels of funding available it is anticipated that the Pool will necessarily be more research-focused, with the KE activities moving towards the Innovation Centres. The main concern in the coming years will be the coming imbalance of Ph.D. student funding among members associated with loss of SICSA and EPSRC studentships, and the lumpy nature of CDTs. The SICSA International Advisory Board expressed concerns about the looming drop off in Ph.D. support, and SICSA will continue to explore how to expand these numbers together with the SFC and other funders.

2. Future Sustainability

SICSA Committee members have unanimously agreed that the SICSA Research Pool has been a success and that it should continue beyond the initial funding period. The working plan is that this will be financed via a combination of SFC funding, direct cash contributions from SICSA members and institutional contributions in staff time. Direct industrial support will tend to enter via the new SICSA supported Innovation Centres (The DataLab, and Digital Health Institute).

The exact level of SFC contribution has not yet been determined, but given SICSA's success at meeting or exceeding all of the criteria laid out in RKEC/13/31¹ and the large scale of the Pool, involving 14 Universities, we are working on the assumption of the top level of £150k SFC funding per year, which will be matched by SICSA institutions. Given this level of funding we will focus on the research elements of the Pool. KE will tend to be the role of the Innovation Centres.

This will support the continuation of the existing administrative staff, and the same level of support as used in recent years for Research Themes, Graduate Academy, Student Summer Schools and Training, Distinguished Visiting Fellows, Conference support and Education. A larger percentage of the academic Directorate resource and Theme leader resource will come in the form of institutional contributions of academic time. The sustained SICSA structure will retain its simple, open access to these resources and events to all members, and that the Director can come from any SICSA institution with an internationally excellent research quality profile.

If, in future, SICSA wins significant resources for staff or Ph.D. students, we anticipate that these would be managed in a separate budget, and distributed proportionally to the proven research excellence (scale and quality) of each institution, in line with Government and SFC goals.

3. SICSA Research Themes

Each of the SICSA research themes has continued to actively support and organise a variety of events, ranging from research group meetings; to workshops and seminars; and in some cases to multi-day residential courses, such as the Tiree Tech-Wave and CIAO 2013 events.

During 2012-13 there were 32 events which were either primarily organised by and/or funded by the SICSA research themes. A summary of all research theme related events during 2012-13 can be found in Appendix III.

A summary of the main activities and developments during the reporting period within each theme follows.

3.1. Complex Systems Engineering

The SICSA Complex Systems Engineering (CSE) theme continued to organise and sponsor a range of activities throughout the reporting period. The well-established Self-Adaptive Emergent Autonomous Bio Inspired Systems (SEABIS) workshop series received funding from CSE for all three workshops, held in January, May and June 2013. Notably, the May meeting was a collaboration between the SICSA Complex Systems Engineering and Modelling and Abstraction Themes. The meetings comprised of Keynote talks, poster sessions and a panel session and topics covered within the series included Evolutionary algorithms, Hyper-heuristics, Self-Adaptive Systems, Machine Learning, Particle Swarm Optimisation, Ant Colony Optimisation, Artificial Immune Systems, and Artificial Life.

The theme also provided sponsorship in April for 5 Scotland-based Ph.D. students to attend a residential workshop, CIAO 2013, organised by the Mathematical Reasoning Group at the University of Edinburgh. The workshop itself took place over 2 days at a rural conference centre in Angus. Each funded Ph.D. student was required to give a talk, all of which were very well received and in

¹ http://www.sfc.ac.uk/web/FILES/CMP_RKEC14November2013_14112013/RKEC_13_31_Item_5_Pools.pdf

many cases promoted greater potential links between SICSA universities. The students chosen for funding were from the Universities of Dundee, Heriot-Watt and Edinburgh. All commented in their post-event reports that the event was an excellent opportunity to keep up-to-date with developments in the field and to network with researchers from other universities.

In December 2012, the CSE theme sponsored a networking event at the University of Edinburgh for academics working in Quantum Computing as well as representatives from Scottish Enterprise and a number of industrial organisations including D-Wave systems and Lockheed-Martin.

Other sponsored activities during the reporting period included MMnet'13: Language and Runtime Support for Concurrent Systems workshop in May 2013; Foundations and Applications of Parametricity workshop in May 2013; and High level methods in Quantum Information workshop in June 2013.

3.2. Multimodal Interaction

The SICSA Multimodal Interaction (MMI) theme was particularly active during the reporting period, sponsoring and organising a total 11 events. The programme of events for 2012-13 was broad in scope and included master-classes led by one of the SICSA Distinguished Visiting Fellows; workshops; group meetings; networking events; a residential workshop on a remote Scottish island; and a Doctoral Consortium, which was organised in conjunction with the SICSA Ph.D. Conference 2013.

Highlights included:

Sponsorship of academic and student registrations for Tiree Tech-Wave, March 2013

This was the fifth Tiree Tech Wave, and the biggest to-date with 34 residential attendees. The Tech Wave has dual aims:

- To create an environment where those interested in technology and its impact (including technologists, artists, social scientists, and designers) can gather in an open environment, and with an open agenda to enhance creative insight and establish new connections
- To bring technological expertise to the island for the benefit of the islanders.

Sponsorship and organisation of Pre-CHI 2013 (Conference on Human Factors in Computing Systems) meeting, April 2013.

This event was organised to allow those from across SICSA who presented papers at CHI2013, the top HCI Conference, in Paris to practice their presentations in an informal environment and to provide opportunities for networking among Scottish researchers in advance of the event. SICSA had a very successful year the CHI2013 Conference itself.

Sponsorship and organisation of the MMI Doctoral Consortium, June 2013.

As a precursor to the SICSA Ph.D. conference, the MMI theme ran a Doctoral Consortium at the University of Stirling on 11 June, 2013. The event was designed to help Ph.D. students in the Multimodal Interaction theme to present their ideas and to get feedback from experienced researchers in a friendly environment. The day concluded with an open discussion about the process of the Ph.D. and the students took the opportunity to debate matters such as: the structure of the thesis; strategies for proofing the thesis and handling the viva and finally, dealing with time pressures when writing up. The event was very successful and informative for all that took part and most importantly it was a timely reminder that Ph.D. students across all of the SICSA institutions have a wealth of experience that they can share with each other. In keeping with this idea the research theme leaders are already planning for a MMI DC in 2014 to run in conjunction with the SICSA Ph.D. Conference.

Sponsorship of the 1st Information Retrieval Workshop, May 2013.

The 1st SICSA Scottish Information Retrieval (IR) Workshop took place on May 31st 2013 at Glasgow Caledonian University. The event was co-organised by Glasgow Caledonian University and the

University of Glasgow. The focus and aim of this workshop was to bring together IR researchers from the various Scottish universities in order to facilitate more awareness and increased interaction. The workshop had a total of 41 SICSA attendees, comprised of 30 registered attendees and 11 SICSA speakers from 8 different SICSA institutions.

3.3. Next Generation Internet and Cyber-Security

The SICSA Next Generation Internet (NGI) theme continued to be the main sponsor for the SCOTTish Networking Events (SCONE); a series of meetings for networking and systems researchers working in Scotland. The goal of these meetings is to foster interaction between researchers from the SICSA member institutions and there were two meetings during the reporting period, taking place at Glasgow Caledonian University and the University of Edinburgh. The theme also co-sponsored the ESM master-classes in Glasgow and St Andrews with SICSA Distinguished Visitor, Professor Apu Kapadia. Furthermore, NGI provided sponsorship and organisational support for two other workshops- Unikernels: Functional Library Operating Systems for the Cloud, in February 2013; and the Open Science Data Cloud workshop in June 2013.

A new development for the NGI theme in 2012-13 saw the introduction of a Cyber-Security sub-theme, coordinated by Professor Ian Sommerville at the University of St Andrews. The SICSA Directors felt that this area of research required investment from SICSA in order to encourage researchers across Scotland to come together regularly at meetings and workshops. Primarily during the reporting period, the sub-theme sponsored a number of group meetings for Cyber-Security researchers. The meetings were well attended and topics of discussion included SICSA's role in Cyber-Security research and education; Government strategy in relation to Cyber-Security (discussion chaired by Professor Muffy Calder – Chief Scientific Advisor to the First Minister); as well as a number of presentations by researchers in the field. As well as the Cyber-Security meetings, the sub-theme also sponsored 10 places for Scottish Ph.D. students attending the "e-crime Scotland Summit", which was held in May 2013. SICSA also provided organisational support for a Cyber-Security Christmas lecture, held at the University of Edinburgh in December 2012 and attracting over 300 school pupils. Given the importance of this area, Cyber-Security funding and activities have been increased further from August 2013 and a full report on the progress in this sub-theme will be provided in the next SICSA Annual Report.

Theme leadership for NGI rotated in August 2013 to Dr Marwan Fayed, University of Stirling. Dr Fayed is a SICSA appointed member of staff and recently chaired the SICSA Ph.D. Conference 2013, held in Stirling.

3.4. Modelling and Abstraction

Under the stewardship of the new Modelling and Abstraction theme leader, Dr Carron Shankland (University of Stirling), the Modelling and Abstraction theme has continued to invest funding and energy into a diverse range of activities.

The theme sponsored and provided organisational support for the workshop on Compositional Modelling and Analysis of Quantitative Systems, held in September 2012. The aim of the workshop was to bring together researchers working on quantitative modelling and analysis of computer systems, focusing on research using compositional techniques and encouraging interaction and collaboration between the attendees. The workshop was attended by approximately 30 participants, with 15 coming from SICSA institutions.

Funding was also granted for a Dynamics of Biological Networks Workshop, in June 2013. The scientific focus of the workshop was on integrating techniques and ideas from dynamical systems modelling with statistical machine learning models of network inference, with a particular focus to applications in systems biology and bioinformatics. The workshop was attended by 50 people and approximately 60% of the audience came from Scotland, with attendees from many SICSA member institutions (Edinburgh, Stirling, St Andrews, Heriot-Watt, and Glasgow). Other attendees came

primarily from England (Cambridge, Southampton, Aston, Warwick, and Exeter), Europe (Germany, France, Netherlands, and Italy) and the USA (Harvard, Princeton, and CMU).

The theme leader, Dr Carron Shankland, is passionate about addressing the gender imbalance within Computing Science and committed some funding in the reporting period to a “Senior Women in Computing Strategy Meeting”, held at the University of Edinburgh in July 2013.

The theme also sponsored The 20th Automated Reasoning Workshop in April 2013 and a Workshop on Cyber Physical Systems, held in May 2013.

As previously discussed, the M&A theme also collaborated with the SICSA CSE theme on a joint Self-Adaptive Emergent Autonomous Bio Inspired Systems (SEABIS) workshop, held in May 2013.

3.5. New Developments for the SICSA Research Themes

In an ever-changing research landscape, the SICSA Directors are keen to continue to explore the opportunities for adapting and developing the SICSA research themes. The Directors are also conscious that although many Computing Science academics and researchers in Scotland are engaged with SICSA and the research themes, there are a number that continue to engage with SICSA either infrequently or not at all. To address both of these issues, the Directors agreed in Summer 2013 to kick-start an initiative to develop new, short-term themes and research focuses. A general call was circulated around SICSA in June 2013, offering up to £4000 for those wishing to establish short-term research themes for a period of up to 12 months. The call generated positive interest within the community and a total of 7 proposals were received at the end of July 2013, including:

1. Practical Type Theory: new generation of programming languages for safety, security, and performance, Neil Ghani, Kevin Hammond, Katya Komendantskava,
2. Quantum Verification at the Physics - Computer Science Interface, QUISCO - Erika Andersson, Simon Gay, Elham Kashefi, Natalia Korolkova, Brendon Lovett, Sabrina Maniscalco, Patrik Ohberg, Daniel Oi,
3. CoCo: Communication-Based Computation, Simon Gay, Phil Wadler
4. Technology for Health and Well-Being (THAW), Lynne Baillie, Marilyn McGee-Lennon
5. Short-term Theme Proposal Bounded Rationality: Computational and Behavioural Aspects, Alan Bundy, Subramanian Ramamoorthy, Rahul Santhanam
6. Argumentation, Katarzyna Budznska, Mark Snaith.
7. Future Cities: A SICSA Short-Term Theme Proposal, Matthew Chalmers, Scott Sherwood, Craig MacDonald, John Williamson, Dave Robertson, Chris Speed, Jon Oberlander

After consideration by the SICSA Directors, one proposal - “Future Cities”, was offered full SICSA funding of £4K for a short theme to be delivered over 12 months (which will be reviewed in July 2014). A full schedule of meetings and activities for the new theme is confirmed at the time of writing. Whilst the other applications were unsuccessful in being granted full SICSA funding, the SICSA Directors took the step to increase funding by £11K within the current themes to allow for activities in relation to these specific research areas. It is hoped that this will help to support new research directions and collaborations between Scottish Computing Science researchers and to establish new activities in emerging areas, bringing in researchers from more Computing Science disciplines. In particular by providing funding for Technology for Health and Well Being (THAW) activities, SICSA is supporting a research community related to the applied work of the new Digital Health Institute Innovation Centre.

Similarly in 2013-14 a new short-term theme call in the area of Data Science has been released, to bring together the research community in Data Science, in preparation for the coming Data Lab IC.

A full report on the new theme and sub-theme activities will be provided in the SICSA Annual Report 2013-14.

4. SICSA and the Research Excellence Framework (REF)

SICSA created a working group of REF Champions who met to collaborate on REF CS issues, which provides evidence of the dramatic increase SICSA has brought about in levels of trust between institutions. SICSA investment and activity has significantly strengthened REF returns. The most directly measurable input has been in the increase in quantity returned academics and the quality of returned outputs (critical, given the significant increase in quality demands in REF 2013 compared to the RAE). Some institutions who did not benefit from new SICSA staff made reductions in numbers submitted to reflect the higher quality rewards. For SICSA members able to share this information:

University	SICSA staff as % of total returned	% increase in returned staff numbers since RAE.
St Andrews	22%	9%
Glasgow	19%	30%
Edinburgh	12%	0%
Aberdeen	11%	28%
Strathclyde	5%	50%
Stirling	7%	44%
Heriot-Watt	7%	38%

In some cases a SICSA appointee then attracted in further group members (e.g. a HW SICSA appointee brought in 63% of new recruits in the REF period and 20% of REF reported funding). SICSA appointees have not only improved collaboration between universities, but also with other Schools in their own university. In Abertay a SICSA appointment in cancer systems biology was returned in UoA5, as a key part of broader strategic investments. Reported funding increased at many sites (with the highest increases at: Edinburgh (70% increase), HW (127% increase), Aberdeen (130% increase), RGU (66% increase), Stirling (54% increase) GCU (51% increase)). Edinburgh also reported a 60% increase per annum in Ph.D. graduations and St Andrews saw a 63% increase.

The significant increase in the number of Ph.D. students helped invigorate Schools and improved publication rates. SICSA universities contributed the costs of International fees, giving Schools the chance to recruit more widely, attracting top talent. The timing of SICSA and the REF census date, mean that it had a relatively small impact on the number of students graduated within the REF period, but will feed through to the next REF.

For the REF 3 and REF5 documents, SICSA Graduate Academy activity such as summer schools and the Ph.D. Conference provided evidence of extensive support for Ph.D. students (especially important for smaller Schools), and the Research Themes and equipment investment for research staff. The funding for commercial engagement from SICSA and Informatics Ventures strengthened the case for mechanisms for achieving impact. REF3 & 5 support benefitted all SICSA members.

5. Graduate Academy

It is clear from our discussions with SICSA stakeholders that the SICSA Graduate Academy (SGA) continues to be one of the great success stories of SICSA. Throughout the reporting period, the SGA has invested funding and significant organisational support for a range of events and activities, which are aimed at providing Scottish based Ph.D. researchers with world-class training and skills; as well as opportunities for collaboration with other Scottish researchers and those outside of the country. SGA Activities are open to all (approx.. 750) Scottish based Computing Science Ph.D. researchers.

An overview of the programmes and activities within the SGA for the reporting period follows.

5.1. SICSA Prize Studentships

As of 2012-13 all of the SICSA institutions who were provided with funding for SICSA Prize Studentships have recruited their quota of SICSA Prize Students. The most recently recruited students all started their Ph.D.s in autumn 2012, apart from one, who begins his Ph.D. at the beginning of 2014.

There were 90 Ph.D. Studentships allocated across the institutions that were awarded SICSA Ph.D. studentship funding, as follows:

- University of Edinburgh: 30
- University of Glasgow: 15
- University of St Andrews: 18
- Heriot-Watt University: 7
- University of Strathclyde: 4
- University of Aberdeen: 3
- Robert Gordon University: 4
- University of Dundee: 2
- Abertay University: 3
- University of Stirling: 5

5.1.1. Studentship Outputs

During the reporting period 2012-13, SICSA has gathered data on outputs for the SICSA Prize Studentships, including: details of peer reviewed journal publications; conference publications; prizes; committee membership; and attendance at events. The full details of SICSA Prize Studentship outputs are available from SICSA upon request but a summary of the numbers and some notable details are included below:

During the reporting period 2012-13 SICSA funded students were authors on a total of 111 publications (including peer reviewed journal and conference publications and book chapters).

10 SICSA funded students were awarded prizes or awards during the reporting period.

Generally, many of the SICSA funded students have been involved in committees of one kind or another. This resulted in 24 incidences of committee membership among SICSA Prize Students during the reporting period 2012-13. This included membership of the organising committee for the SICSA Ph.D. Conference 2013, as well as membership of other conference organising committees, both in Scotland and abroad. Many of the students also attended and presented posters at conferences throughout the year.

6 SICSA funded students were involved in industrial placements or internships during 2012-13 at companies and educational institutions both in Scotland and abroad. Host organisations included: Amazon, Google, George Washington University, Intel Labs, Qualcomm Innovation Centre, and Freescale Semiconductor Ltd.

Many SICSA funded students have been involved in SICSA sponsored activities during the reporting period. For example, the majority of SICSA-funded students attended the SICSA Ph.D. Conference 2013, held in Stirling. A number also attended SICSA sponsored summer schools, such as the Big Data and Information Visualisation Summer School, held at the University of St Andrews. One student was involved in developing a bid for SICSA Distinguished Industrial Visitor funding.

5.1.2. Studentship Graduates

At the time of writing there are 9 SICSA Prize Studentship graduates. For the purposes of this report, those graduates were contacted to provide information about the date of graduation and their first destinations after graduating. In all cases, graduates were employed either in academia (4); world-class organisations, including the BBC and Google (4); and one went on to begin a successful start-up that was eventually bought by a multi-national.

- Xi Bai, University of Edinburgh. Graduated May 2013. Currently employed as a Software Engineer, British Broadcasting Corporation, London, UK.
- Heather Crawford, University of Glasgow. Graduated June 2013. Currently employed as Assistant Professor of Computer Sciences at Florida Institute of Technology, Melbourne, Florida, USA.
- Yanghui Wu, Robert Gordon University. Graduated July 2013. Currently employed as a lecturer at Northwest A&F University in Yanglin, China.
- Ali Khajeh Hosseini, University of St Andrews. Graduated 2012. Currently employed as founder and technical lead of Plan4Cloud, a Scottish company recently bought by Rightscale.
- Lars Kotthoff, University of St Andrews. Graduated June 2012. Currently employed as Postdoctoral Researcher, University College Cork, Ireland.
- Claire Maternaghan, University of Stirling. Graduated 23 November 2013. Currently employed as a Software Engineer, Google, London, UK.
- Iain McGuinness, University of Glasgow. Passed viva subject to corrections. Graduation expected summer 2014. Currently employed as a Software Engineer, Google, California, USA.
- John Pate, University of Edinburgh. Graduated summer 2013. Currently employed as a Postdoctoral Researcher, Department of Computing, Macquarie University, Australia.
- Sasa Petrovic, University of Edinburgh. Graduated December 2012. Currently employed as a Software Engineer, Google, Zurich, USA.

A further student, Matthew Dennis (University of Aberdeen), is shortly due to submit his thesis but has already secured a position of Research Fellow on the ASICA project at the University of Aberdeen.

The SICSA Administration will continue to collect information from graduating students and report on this in the Annual Report for 2013-14.

5.2. SICSA Ph.D. Conference

The SICSA Ph.D. Conference 2013 took place on the 12-13th June 2013 at the University of Stirling. This event, which is the main student-focussed event on the SICSA events calendar, attracted 160 delegates. Registration for the conference reached capacity within two weeks of the tickets becoming available, which is a positive reflection of the perceived value of the event among Ph.D. students. A full evaluation of the event was undertaken in the weeks after the conference and the feedback was extremely favourable, with high levels of satisfaction for all elements of the conference. A comprehensive evaluation report on the event is available from the SICSA Administration on request.

The organising committee was chaired by SICSA appointed Lecturer, Dr Marwan Fayed, of the University of Stirling. As in previous years, the organising committee was comprised of SICSA Ph.D. students and members of the SICSA Executive, including Steven Kendrick (SICSA Executive Officer)

and Nicola Hogg (SICSA Executive Assistant). There were 9 students on the Committee in total, representing 8 of the SICSA member institutions.

The theme for the 2013 conference was “Communication and Working Together” and the organising committee chose to focus broadly on encouraging greater interactivity between conference delegates and increasing communication between students during each session.

Session included:

- A Pitching Workshop where teams pitched business ideas to their peers and a panel of judges, culminating in a judged final on the second day.
- Poster sessions on both days, providing students with the opportunity to demonstrate their research to their peers and academics. There were 70 poster submissions in total.
- Three transferrable skills sessions aimed at developing skills of Ph.D. students at all stages of their research. These included: “knowing your discipline”; “scientific writing and research papers”; “thesis writing and vivas”.
- Technical workshops, including: “how do the big players do it?”, “security, privacy and trust”; “the future of programming languages”; and “user experience and mobile interaction”. Speakers included Dr. Stratis Viglas (University of Edinburgh), Prof Andy Gordon (University of Edinburgh and Microsoft Research), Dr Karen Renaud (University of Glasgow), Prof Lynne Baillie (GCU) and Andrew Richards (CEO, Codeplay) among many others.
- A Careers Panel aimed at debating the post-Ph.D., with a mix of panel members from academia and industry. Panel members included: Prof Muffy Calder (University of Glasgow and Chief Scientific Advisor for Scotland), Prof Andy Gordon (University of Edinburgh and Microsoft Research), Dr Ali Khajeh-Hosseini (Technical Lead, PlanForCloud and former SICSA funded student), Andrew Birkett (Senior Engineer, Amazon), and Dr Julie Williamson (University of Glasgow).

The conference also featured two keynote talks by two very high profile computing scientists. Prof Muffy Calder (University of Glasgow/Scottish Government) spoke about her own career and the work she does as Chief Scientific Advisor to the Scottish Government. Prof Ben Shneiderman (University of Maryland, USA and a world leader in HCI and information visualisation) gave the opening keynote on the first day of the conference on *Embracing HCI and Information Visualization: A Personal Story about Reshaping Computer Science*.

More details and a show-reel video are available on the SICSA Conference Web Site – www.sicsaconf.org.

Plans are currently underway for the 2014 SICSA Ph.D. Conference, which will be held at the University of St Andrews, from 9th-10th June 2014.

5.3. SICSA Funding for Summer Schools

SICSA continues to provide funding for academics within SICSA Universities who wish to organise summer (or winter) Schools. This source of funding provides organisers with significant financial resources for organising the events, as well as a commitment to providing organisational and event marketing support from the SICSA administration. SICSA provides the funding on the basis that a number of funded places are made available at the Summer School for Scottish-based Computing Science Ph.D. Students.

SICSA provided sponsorship and organisational support for the following Summer Schools in 2012-13:

SICSA Summer School: Towards an integrative computational neuroscience: Modelling across scales of analysis, 26 Aug-2 Sept 2012, University of Edinburgh

Course Organisers: David Sterratt, Matt Nolan and Michael Herrmann

Course Web Site: www.anc.ed.ac.uk/school

Each day of the programme of this Summer School had a theme that connects data acquired at multiple levels, such as genetic, proteomic, electrophysiological, neuronal ensembles, imaging, and behavioural. Morning lectures were followed in the afternoon by directly related hands-on tutorials, with instructors and Ph.D. demonstrators present. Keynote presentations in the evening highlighted recent high profile studies and in one case, was a stimulating “Dialogue” on the merits of “high-level” versus “low-level” modelling. This course gave a practical introduction into how to use modelling and simulation tools and how to decide on an appropriate level of abstraction when modelling.

There were 20 participants at the Summer School in total, representing 10 nations.

SICSA Summer School on Big Data & Information Visualisation, 8-12 July-2013, University of St Andrews

Course Organisers: Aaron Quigley, Adam Barker

Course Web Site: <http://sachi.cs.st-andrews.ac.uk/activities/summer-schools/big-data-info-vis/final-big-data-infovis-summer-school-projects-2013/>

This summer school was concerned with the processing, management and hence presentation of “big data”, in an intelligible form with information visualisation techniques and methods. Data-intensive researchers talk about the “three Vs” of Big Data: Volume, Velocity and Variety. The school attempted to demystify the concept of big data by introducing a systematic, scientific and rigorous approach to tackling it. The school took a blended theory and practice approach, by providing both theoretical underpinnings and practical use of the infrastructure to process big-data and the means to understand it with information visualisation.

The intended audience for this school was graduate students across SICSA, the UK and Europe who are either focused on research in this area or are seeking to use big data methods and information visualisation to make sense of voluminous data. There were 35 students at the Summer School, 25 of whom were Scottish-based Ph.D. students.

5.4. SICSA Funding for Student Attendance at Summer Schools

SICSA provides limited funding for Scottish-based Computing Science Ph.D. students to attend international summer schools. This funding is limited to a total of £500 for each student, to cover the Summer School registration fee and accommodation only. This source of funding is aimed at helping to provide access for Scottish-based Computing Science students to attend the world’s best Summer Schools in the field.

During 2012-13, SICSA granted this funding to 26 students from across the SICSA institutions who attended Summer Schools in 14 different countries. A summary of all successful applications during the reporting period is included in Appendix III.

5.5. SICSA Sponsored International Conferences

SICSA introduced a new programme during the academic period 2011-12 aimed at attracting large international conferences to Scotland. The programme provides up to £10,000 per year for funding large-scale Computing Science conferences. Where funding is agreed, organisers commit to

allocating a specific number of funded-places for Scottish-based Computing Science Ph.D. students. This programme therefore also has the benefit of opening up access for SICSA-based students to large-scale conferences held in Scotland.

In the reporting period 2012-13, SICSA granted a total of £2300 towards the sponsorship of international conferences. The SICSA Directorate agreed to roll-over unspent funds for the year to the academic period 2013-14 and at the time of writing the £16,000 allocated for this year has been committed – with 5 international conferences coming to Scotland during the period.

An overview of the SICSA Sponsored Conference in 2012-13 follows:

The 11th International Conference on Finite State Methods and Natural Language Processing (FSMNLP 2013), 15-17-July-2013, University of St Andrews

During the conference 17 peer-reviewed papers were presented on natural language processing applications, language resources, and theoretical and implementational issues with relevance to finite-state methods. In addition, there were two keynote lectures, by Alexander Clark (King's College London) and Bill Byrne (University of Cambridge), and three tutorials, by Ruth Hoffmann (University of St Andrews), Bevan Keeley Jones (University of Edinburgh) and Kousha Etessami (University of Edinburgh).

The conference was attended by 34 researchers and students from three continents. It also hosted a business meeting of SIGFSM (ACL Special Interest Group on Finite-State Methods). The social programme included a reception on July 14th, and a guided walk, a conference dinner in Lower College Hall and a concert in St Salvator's Chapel at the University of St Andrews on July 16th 2013.

SICSA funding enabled 8 students from SICSA institutions to attend the conference with no registration fees to pay.

5.6. Other Student Training/Courses

Through the SGA, SICSA funded a number of other events aimed specifically at Ph.D. student training. As in the previous year, SICSA provided sponsorship and organisational support for the well-established Research Ventures Entrepreneurship School, which took place in June 2013 at the University of Glasgow. This two day course is aimed at researchers with an interest in:

- Knowledge exchange, research impact and winning funding for academic career progression
- Exploring the commercial possibilities of a research idea and how your research might attract industrial funding or be used in setting up a spin-out company
- Future employment in industry
- Collaboration with researchers from other disciplines

The course included a mixture of practical activities and case studies and included talks from experts and entrepreneurs with inspiring stories and first-hand experience of bringing exciting ideas to life.

The SGA also provided sponsorship on request from the organisers, for the Future Connections Student Conference 2013 (FC2013), which was held in June 2013 at the University of Edinburgh. Future Connections was set up by a small group of Ph.D. students at the University of St Andrews who realised the need for a forum to enable interdisciplinary connections between researchers with a shared interest in sustainable development. The SICSA Directors felt that given the opportunities for interdisciplinary collaboration and the scope for Computer Science involvement within this broad area, that the provision of limited sponsorship towards 5 fully funded Ph.D. registrations and speaker expenses was extremely good value.

5.7. Distinguished Visitor Fellowships

5.7.1 Distinguished Visitor Fellowships in 2012-13

The SICSA Distinguished Fellowship programme has continued to attract academic talent from around the world to Scotland and there were 11 visitors during the reporting period 2012-13, as follows:

Visitor	Home Institution	Host Institution	Duration of Visit
Apu Kapadia	Indiana University	University of Glasgow	2 weeks
Giorgio Satta	University of Padua	University of St Andrews/University of Edinburgh	2 weeks
Wyatt Newman	Case Western Reserve University, Cleveland	University of Edinburgh	10 weeks
Mari Ostendorf	University of Washington	University of Edinburgh	2 weeks
Jost Berthold	University of Copenhagen	Heriot-Watt University	2 weeks
Pawel Sobociński	University of Southampton	University of Edinburgh	6 weeks
Khalil El-Khatib	University of Ontario	University of Glasgow	2 weeks
Ani Nenkova	University of Pennsylvania	University of Aberdeen	1 week
Jacob Eisenstein	Georgia Institute of Technology	University of Edinburgh	4 weeks
John Stasko	Georgia Institute of Technology	University of St Andrews	2 weeks
Eric Monteiro	University of Oslo	University of St Andrews	2 weeks

In all cases, SICSA Distinguished Visitors were involved in events at sites outside of the host institutions, and there were a total of 32 events associated with Distinguished Visitors across Scotland during the reporting period 2012-13, as detailed in Appendix III.

Full individual reports for the Distinguished Visitor Fellowships are available from SICSA upon request.

5.7.2 Continuing collaboration among hosts and previous Distinguished Visitors

During the reporting period, the SICSA Administration undertook a short study in order to gather evidence of continuing collaboration between hosts and Distinguished Visitors, for visits that took place in the first 4 years of operation. A total of 39 previous hosts were contacted and asked to provide examples of continuing collaboration with the Distinguished Visitor. Examples of continuing collaboration included:

- Collaborative funding bids
- Collaborative publications
- Reciprocal visits
- Continued contact and further collaborative work that might not yet have led to funding bids or publications

We received a positive response from the survey, with 71% of previous hosts providing data. The data demonstrated that 92% have maintained collaboration with their Distinguished Visitor to some degree since their visit took place. The level of collaboration among previous hosts and visitors varies but there is clear evidence that the programme is contributing to concrete outputs, and in lesser cases, to continued communication and cooperation between hosts and their visitors. The survey provided SICSA with the following evidence of outputs to date:

57% of respondents have either published or submitted papers for publication, resulting in a total of 25 collaborative papers between Distinguished Visitors and their hosts since the visits took place.

23% of respondents have submitted joint funding bids with their visitor since the visit, with a further number planning to do so in the near future.

30% of respondents have either taken part in further visits or plan to do so in the near future. Some respondents, such as Dr Simon Rogers at the University of Glasgow, have spent significant time in the visitors' institutions as visiting Professors themselves. Others have taken part in multiple, shorter trips. In other cases, the relationships have led to links with other researchers in the visitors' institution. For example, through his arrangement with Dr Steven Marsh, Dr Tim Storer of the University of Glasgow has now begun collaboration with Professor Babak Esfandiari and his research group, based at Carleton University, Canada. Dr Storer and Professor Esfandiari have begun to explore potential future collaborations concerning multi-agent systems and computational comfort. In particular, Dr Storer and Professor Esfandiari are exploring postgraduate student exchanges for the future.

The data gathered during this short study was very encouraging; demonstrating that the programme is facilitating academic collaboration to various degrees as originally conceived. The SICSA Administration will continue to collect data for more recent visits during the current Academic Year and report on these in the Annual Report 2013-14.

5.8 Linkages with the EPSRC Centres for Doctoral Training

SICSA provided comprehensive letters of support for all CDT bids coming from SICSA Universities, outlining the linkages and supports available. The Graduate Academy has already initiated discussions with the successful CDT sites to explore how the SGA and CDT training programmes can interact so that students beyond the CDT can benefit from training events for CDT students, and similarly how CDT students can benefit from resources beyond the training centre itself.

6. Knowledge Exchange Activities

6.1. Knowledge Exchange Strategy

Since the inception of SICSA we have seen a step change in the nature, level, quality of engagement and focus on knowledge exchange across our partner Universities. This can be seen in multiple SICSA partners coming together on SFC Horizon grants, proposed EU KE activities and at a nationwide level the DataLab innovation centre. SICSA KE relies on the support of tech transfer offices within SICSA and Informatics Ventures. Within SICSA we support and rely on emerging cross-institutional themes and harness local knowledge exchange activities for national advantage across SICSA. Improving the potential for impact of both people and knowledge capital is a recognised imperative for academia. Knowledge exchange has an important role to play in informing research and research strategy and ensures both the shorter and longer term health of the research community. Within SICSA our support ranges from the early stage and early career research grants to engage with industry to the ongoing linkage programs Informatics Ventures makes available across all SICSA partners.

KE in SICSA is built on four key elements which allows us to inspire, equip, exchange and nurture researchers. We can inspire through the AspeKT program including, iVenture Tuesday Seminars, CEO Master Class, and promotion of outputs from DemoFest. We equip with Master Class, EDP/Ignite bursaries, Start-up Summer School and our new Elevate program. We exchange with Industrial internships, industry visitors and proof of concept supports to facilitate early career researchers' exchanges with business and industry. And we nurture with encouragement and support to 'Converge', business development support in cyber security, data science and smart tourism along with events to bring relevant researchers and local industry together.

Our long term KE strategy is to place these key elements within every aspect of the Universities business from undergraduate to postgraduate education to equip the next generation with the skills and experience needed for the future.

6.2. Pools Engagement in European Research (PEER) Funding

6.2.1 Report on use of funding (funds allocated 2011-12 & 2012-13)

To-date, take-up of this funding across SICSA has been somewhat limited, but this is expected to change as H2020 comes on-stream in 2014. After receiving no applications for funding in the period 2011-12 the SICSA Directorate were keen to increase SICSA-wide engagement with this funding by making a number of amendments to the programme. In March 2013, SFC agreed to a proposal by the SICSA Directorate to make the following changes to the funding guidelines:

- Introduction of a tiered funding structure: small (£1,000), medium (£5,000), large (£10,000) and single bid (entire budget).
- Expand funding eligibility to the following activities: travel funding for academics attending consortium meetings where they introduce a Scottish SME; consortium development meetings; cost of a specialist consultant support for bids; support for SICSA academic's time to develop proposals; or admin time to coordinate bids and meetings.
- Expand funding eligibility to include support for SICSA involvement in Horizon 2020 Advisory Groups.
- Expand funding eligibility to include support for SICSA involvement in Royal Society of Edinburgh visit to European Parliament in relation to the EU Horizon 2020.

Subsequent to these agreed amendments, funding was granted under the SICSA PEER programme for SICSA representatives to join a Royal Society of Edinburgh fact-finding trip to the EU Parliament in relation to Horizon 2020. The visit took place on 30th May 2013 and SICSA sponsored three academics; one from Glasgow Caledonian University; one from the University of Edinburgh; and another from the University of St Andrews. During the visit, the group of 25 academics in total met with three of the six Scottish MEPs and learned how the European Parliament operates and its relationship with the Council of the European Union and the European Commission. The group then had a series of meetings which included presentations from: John Smith, Deputy Secretary General (Research & Innovation) of the European University Association (EUA); Benjamin Turner, Policy Analyst in the Support to the Scientific Council unit of the European Research Centre (ERC); Scottish Government EU Office officials; Luca Polizzi and Charles Abbott of Scotland Europa; and Brendan Hawdon, Head of Unit – Framework Programme, DG Research and Innovation, European Commission.

A further proposal was awarded funding in November for 5 SICSA delegates to attend the Security Research Conference and Horizon 2020 Security launch event incorporated in Milipol, Paris, November 2013. The delegates attending this event represented University of Abertay; University of Edinburgh; Glasgow Caledonian University; and Edinburgh Napier University. SMEs and external collaborators in respect of this trip were identified as IDInquiries, KLipCorp and Police Scotland.

At the time of writing there are a further 4 proposals which have recently received funding.

It is clear that the recent release of Horizon 2020 calls by the European Commission, coupled with the agreed amendments to the PEER Funding guidelines has led to an upsurge in applications and interest for this funding, which we predict will only increase. The SICSA Directors would therefore be very keen to extend the remaining funds into 2013-14.

6.2.2 Financial Statement for funds allocated in 2011-12 & 2012-13

A financial statement of all funded applications to-date for the Pools Engagement in European Research (PEER) Funding follows:

Name of applicant	Institution name	Title of EU Framework Programme call	Amount Requested	Amount Granted
Lynne Baillie	GCU	Horizon 2020 Meeting	£225.31	£225.31
Simon Dobson	St Andrews	Horizon 2020 Meeting	£214.36	£214.36
Ian Ferguson	Abertay	Horizon 2020: Security in 2020	£2,220.00	£2,220.00
Heriberto Cuayahuitl	Heriot-Watt	H2020 – Robotics & H2020 Multimodal & Natural Interaction	£545.00	£545.00
Oliver Lemon	Heriot-Watt	Horizon 2020 ICT: Unit CNECT G3 "Data Value Chain"	£425.00	£425.00
Simon Keizer	Heriot-Watt	Horizon 2020 call: ICT 22a "Multimodal and Natural computer interaction"	£550.00	£550.00
Aaron Quigley (with 3 others re: Datalab and H2020	St Andrews (on behalf of St Andrews, Glasgow, Edinburgh and Dundee)	Information and Networking Day - Horizon 2020 Work Programme 2014-2015, Connecting Europe Facility - 15-16 January Luxembourg	£2,280.00	£2,280.00
			Total Granted	£6,459.67

6.3. Postdoctoral and Early Career Researcher Exchanges (PECE) Funding

6.3.1 Report on use of funding (funds allocated 2011-12 & 2012-13)

Uptake for the Postdoctoral and Early Career Researcher Exchanges (PECE) programme has been extremely positive, with a steady stream of proposals received throughout the periods 2011-12 and 2012-13 – 13 in total. To-date, SICSA has funded a total of 11 high quality proposals and as the financial statement in point 4.3.2 outlines, the majority of the funds granted by SFC are now committed. The SICSA Directors plan to hold one further call for this funding in February 2014.

Individual Exchange Reports

In order to demonstrate the details and outcomes of some of the exchanges that have already taken place, we include in Appendix IV a number of detailed individual visit reports from researchers that have completed their visits during the period 2012-13.

6.3.2 Financial Statement for funds allocated in 2011-12 and 2012-13

Name of applicant	Institution name	Amount Requested	Amount Granted
Adam Barker	St Andrews	£3,997.00	£4,155.00
Adam Barker	St Andrews	£7,500.00	£3,345.00
Martin Halvey	Glasgow Caledonian University	£5,750.00	£4,850.00
Ilias Diakonikolas	Edinburgh	£6,000.00	£6,000.00
Rik Sarkar	Edinburgh	£4,900.00	£4,300.00
Tim Storer	Glasgow	£3,500.00	£3,500.00
Marwan Fayed	Stirling	£5,400.00	£5,400.00
Michele Sevegnani	Glasgow	£4,200.00	£3,650.00
Changyu Dong	Strathclyde	£2,900.00	£2,900.00
David Flatla	Dundee	£5,655.05	£3,000.00
Davi Flatla	Dundee	£5,432.00	£3,000.00
		Total Granted	£44,100.00
		Total Processed to-date	£22,371.86

6.4. Restored Funds – SICSA Knowledge Exchange programmes

6.4.1 A statement on the use of restored funding to-date

Subsequent to SFC approval of our planned use of restored pools funds (totalling £410K), SICSA launched 6 new KE Programmes in January 2013.

As requested by SFC, our Early Stage and Early Career Research KE programme “should be used to facilitate early career researchers’ exchanges with business and industry, both within Scotland and internationally” and that they should “support exchanges of an extended duration, increasing the likelihood of lasting engagement with industry. Where appropriate, placements into organisations responsible for public policy development will be permitted”. An early career researcher is postdoc, or academic who has only been in their field of research for a few years. While an early stage researcher is a Ph.D. student (or research masters student for Elevate). Our six programmes include: Industrial Internships, Industrial Visitors, Proof of Concept, Team Placement, a SICSA Elevate program and Fellowship support.

Industrial internships are either fully supported or part funded by industry. To date all successful applicants have been part-funded by the industrial host. The level of support offered is equivalent to up to nine months of a Ph.D. scholarship, along with standard travel support and a supplement to cover increased living costs due to the placement. We expect to allocate approximately 24-32% of the budget to the SICSA Internship Program. As of July 31 2013, 7 applications for Industrial Internships had been awarded funding.

Our Fellowship program was not open for applications during the reporting period 2012-13. In addition to our own funds we are discussing with Scottish Enterprise the use of other funds to supplement this program. The Fellowship program is aimed Early Career SICSA academics that want to work on a collaborative project with industry. We expect to allocate approximately 15-20% of the budget to the SICSA Industry Fellowship.

Modelled on our successful Distinguished Visiting Fellowship program, our Distinguished Industry Visiting Fellowship offers support to eminent members of industry (researchers, developers, entrepreneurs etc.) who would like to come and work in Scotland with early career researchers. We expect to allocate approximately 4-6% of the budget to this scheme.

Our Proof of Concept program is now referred to as a “pre-PoC” within our contacts in Scottish Enterprise. The aim is to offer early-career researchers lightweight mechanisms and access to small amounts of funding to facilitate exchanges and connections with business and industry, both within Scotland and internationally.

The SICSA Elevate concept is an applied research accelerator program, supporting early career researchers from across SICSA to accelerate promising research ideas into sound business start-ups, transfer or licensing over a 12-week period.

In addition we have been able to employ enhanced ES-ECR supports within themes and SICSA such as ES-ECR support to attend the Turing Festival and Girl Geeks and Green Computing initiatives.

Since the start of the £410k programme and during the reporting period 2012-13 we have held 3 funding calls encompassing all of the programmes with the exception of Industry Fellowships and Team Industrial Placements.

A summary of each programme, with funds committed as of July 31 2013 is included in Appendix V:

6.4.2 Participant Feedback

The SICSA team continue to invest energy and time into publicising the KE programmes across SICSA and beyond and as a part of this activity we have been gathering case studies and feedback from those who have already been involved in the programmes. For information we provide some of these below:

Postgraduate Industry Internship

Jakub Dostal, University of St Andrews - 8 month internship, Microsoft Research Cambridge

“This internship offered me the opportunity to work with leading researchers on great projects as well as networking and building relationships for the future. Experience of working in a different environment has allowed me clarify my own views on how I want to proceed with my professional and personal life.”

Jakub co-authored a paper that was accepted to CHI2014, based on this internship.

Mark Sinclair, University of Edinburgh - 9 month industry internship, Quorate Technology Ltd

“The opportunity to apply my research in a commercial setting has allowed me to develop many skills that I believe will benefit me as a researcher. Many of these problems have not yet been considered by the academic community and as such I have been given the opportunity to experiment with novel research problems. I would urge students to consider searching for start-ups related to their research as this can often be where you can find the most exciting, enjoyable and beneficial opportunities.”

Nick Rankin, CEO, Quorate Technology Ltd – *in relation to the above*.

“Mark has been a hugely valuable addition to our team during his internship. As a recent spin-out, Quorate appreciates the value of having access to the latest academic research in order to innovate. The SICSA internship programme provides an excellent mechanism for companies to forge relationships with academia and employ knowledgeable researchers with minimal administrative hassle.”

Distinguished Industry Visitor Fellowship

Julie R. Williamson, Post-Doctoral Research Assistant, University of Glasgow - hosted Piotr Wiechno, Orange Labs

“I began collaborating with Piotr after a chance meeting at an International Conference. This visit helped us successfully continue our collaboration with Orange Labs, develop a new project and showcase SICSA research, making possible visits to a variety of research groups that would not have otherwise been possible.”

Proof of Concept Programme

Dr Katya Komendanskaya, Senior Lecturer, School of Computing, University of Dundee - funding granted over 7.5 months

“The main goals of applying for this funding were to get some initial funding to develop what looks like a promising idea, to build upon SICSA's reputation and to attract new industrial partners. I would advise anyone thinking of applying for this funding to think of it as a door opener to a new undiscovered area, with brand new partners and opportunities.”

SICSA Elevate Programme

Cosmin Dumitache & Emilian Radoi, University of Edinburgh – Participants of 12 week accelerator

“Elevate allowed us to start working on our business idea full time immediately, as opposed to working on it as a side project. The financial support was extremely useful because it freed us from having to worry about income, thus allowing us to invest a lot more time into the programme. Additionally, the mentoring support, and office space close to other start-ups, proved to be an invaluable asset as it was very useful to exchange ideas with other entrepreneurs and mentors.

If you are seriously considering starting your own business there is absolutely no reason why you shouldn't apply for the SICSA Elevate programme. The application process is not complex, the requirements are somewhat flexible, and you have a good shot at winning an amazing level of support. Other accelerator programmes similar to this require that you at least give up some equity in your company, but Elevate is essentially cost-free.”

6.5. Informatics Ventures Activities

Informatics Ventures is a knowledge exchange programme that runs across the Scottish Informatics and Computer Science Alliance (SICSA) and helps foster innovation and entrepreneurship within start-up and spin-out companies and develops strong relationships between industry and academia.

6.5.1. Cyber-Security

The main thrust on this project has been to build the community with the various academic research teams and a variety of potential collaborators both inside Scotland and internationally from industry and government agencies. The first Scottish version of the Cyber Security Challenge was held in August at Glasgow Caledonian university, helped by some £70,000 in sponsorship which we brought in from a number of industrial sponsors. We also helped set up a trip for some of the researchers in this area to the Horizon 2020 kick off session in Paris, assisted by PEER funding from SICSA. At Christmas 2013 we repeated the popular Schools Cyber security lectures with just under 3,000 School children attending and multiple lectures given in Aberdeen, Dundee, Edinburgh and Glasgow, with SICSA providing additional funding for Schools from areas where there was not adequate budget to cover travel costs.

6.5.2. Mobile Applications

There are now Mobile Apps meet-ups running at Glasgow, Napier and Edinburgh and winning teams from Edinburgh and Glasgow were invited to 11 Downing Street for a reception on student entrepreneurship.

6.5.3. IV Tuesdays

This is now established as one of the main Entrepreneurial talk series' in Scotland - held monthly during term time with a number of local entrepreneurs giving their stories. This is now streamed on the internet to include groups who cannot make it to the venues.

6.5.4. CEO Master Classes & Learning Lunches

These more focussed workshops for small groups of start-up CEO's with more experienced serial entrepreneurs focus on particular topic areas that will be of help to the emerging start-ups. These workshops alternate between Edinburgh and Glasgow.

6.5.5. Informatics Ventures Bursaries

We awarded bursaries to start-ups to send senior people to the MIT EDP one week workshop and the Cambridge Ignite one week workshop. We also ran our own 3 day School for Entrepreneurs in association with the Hunter Centre at the University of Strathclyde.

6.5.6. Engage – Invest – Exploit 2013

This event has grown so that it is now the largest Investor Conference ever held in Scotland. This year we had over 500 attendees and 60 exhibiting companies and over 130 investors. As another first this year we partnered with the Edinburgh Bioquarter to introduce a Life Sciences group and the Edinburgh Centre for Carbon Innovation to bring in an Energy/Renewables section. We also took 12 of the companies down to London for EIE London where they presented to 52 local investors.

6.6. SMART Tourism

During the reporting period, the Smart Tourism programme moved from its second into its third (and final) year of activity; an extension having been granted, the programme will complete and report by October 2014. The vision and objectives of the programme are being successfully realised by identifying tourism industry problems and providing solutions through Innovation Projects and Challenge Fellowships, bringing together the tourism problems holders, companies and academics. An effective delivery process has been implemented, using: workshops and events to build a community and identify problems; proposal calls to find the best solutions across Scotland; and an expressions of interest (EoI)/selection panel process with industry to award funds to the best proposals. 2013 saw a workshop and call in collaboration with the Dot Rural Digital Economy Research Hub, and a particularly fruitful workshop and call in partnership with Museums Galleries Scotland. By the end of the reporting period, a total of 11 projects and fellowships have been funded, with principal investigators from: Aberdeen, Edinburgh, Edinburgh Napier, Glasgow, Heriot Watt, Robert Gordon, and St Andrews. Relationships continue to develop between the stakeholders – tourism organisations, industry and universities – and there are good indicators that a subset of tested solutions will be exploited to everyone's benefit. The reporting period saw the final call for expressions of interest, and it was particularly satisfying to note that the majority of EoIs called forward for further development had strong industry leads.

6.7. DEMOfest

The annual SICSA DEMOfest, organised in partnership with Informatics Ventures and ScotlandIS, showcases some of the most exciting and innovative Computing Science research produced in Scotland; everything from projects to help tackle security problems and tourism experiences in rural environments; through to research which can help improve social interaction among older adults or children with autism - all of which could have significant commercial application.

The fifth annual showcase of the Scottish Informatics and Computer Science Alliance (SICSA) research was held at the Informatics Forum, University of Edinburgh on the 6th November 2012. This was the largest DEMOfest event to-date with over 243 people in attendance. There were 88 companies represented by the industrial guests and 57 academic exhibitors in total.

A show-reel video of the 2012 DEMOfest event can be viewed at the SICSA YouTube Channel: <http://youtu.be/GkvStYtaGEw>.

The SICSA Directorate, along with Informatics Ventures and ScotlandIS, made the decision in 2013 to organise two separate DEMOfest events in the academic year 2013-14. The first event was held on 6th November 2013 in Glasgow and a further event is planned in Aberdeen (Robert Gordon University) on February 11th 2014. An outline of both events will be submitted within the SICSA Annual Report for the reporting period 2013-14.

6.8 SICSA and the DataLab Innovation Centre Bid

During the reporting period 2012-13, the SICSA institutions have been collaborating to form part of the bid-team for the DataLab Innovation Centre. The process of consulting with a wide range of Industrial and government partners on the DataLab and other IC bids has also positioned SICSA well to further promote and coordinate joint Scottish Industry/University bids into Horizon2020.

The DataLab bid is seeking to establish a world-class Data Science Innovation Centre for Scotland, generating significant economic, social and scientific value. The bid has strong industry and public sector support, and with the Scottish Informatics and Computer Science Alliance (SICSA) backing makes for a world-leading consortium to deliver economic impact through demand led knowledge exchange and research activity.

The bid team includes: Amor Group, Brightsolid, SAS Memex, Scotland IS and SICSA. Following an industry review, the hub locations were selected as: University of Edinburgh, University of Glasgow and Robert Gordon University.

To-date, the bid has now undergone two review points (initially via an SFC panel and more recently at the SFC Board Meeting).

As part of this activity, Informatics Ventures will be launching a call for projects in January 2014 in data science. Project values will be around £20-30k and priority will be given to projects that go on and raise further investment from other sources, for example TSB or EU.

6.9 Tech Meet-ups

SICSA, via Informatics Ventures promoted and established the Tech Meet-Up series in 5 centres: Aberdeen, Dundee, Edinburgh, Glasgow and Inverness. The longer-established events in Edinburgh and Glasgow regularly have 50-100 participants.

7. SICSA Education

7.1. Summary of Education Activities and outputs

Following discussion with SFC in 2011-12, SICSA's remit was expanded in September 2011 to encompass Education, incorporating many of the activities of the informal Scottish Heads of Computing group (SHoC). Thanks to careful management of SICSA central funding, Education was allocated a budget comparable to that for SICSA research themes. Professor Greg Michaelson (Heriot-Watt University) became the first SICSA Director of Education, joining the SICSA Board. It was agreed early in the life of SICSA Education that it would necessarily be lean and lightweight rather than all-encompassing, with a focus on enhancing collaboration across the core activities of undergraduate and postgraduate provision. It was also agreed that SICSA Education should also seek to represent common interests to government, employer, professional and practitioner organisations, and to the wider education sectors. These include resourcing for University Computing programmes, secondary school qualifications, the transition from school to University, and graduate skills. Finally, it was agreed that an All Hands group would be established, which could co-opt representatives from beyond SICSA, for example from Computing in Schools (Scotland) and ScotlandIS.

Activities during 2012-13 included:

- SICSA New Lecturer Induction event aimed at all new lecturers appointed in SICSA Schools, 1st October 2012, University of Dundee.
- Engaging the Next Generation: A Scottish Computing Graduate Recruitment Showcase – An industry facing event, showcasing graduate skills, in April 2013.
- An event looking at models for final year projects in SICSA Schools.
- Senior Women in Computing, 8th May 2013, University of Edinburgh - An event focused on the gender imbalance in Computing, attended by 55 people. Panellists at the event included:
 - Sathya Smith, Head of Partner Solutions at Google, London
 - Marcia Rankin, Head of Health Information Services, NHS24, NHS Scotland
 - Jane Hillston, Professor and Director of the LFCS, School of Informatics, University of Edinburgh
 - Lexi Birch, Research Associate, ILCC, School of Informatics, University of Edinburgh

SICSA Education also provided sponsorship for a number of events and activities associated with addressing issues of Computing Science in education. These included:

- Sponsorship for Young Rewired State (YRS) events in Edinburgh and Aberdeen. YRS organises coding events across the UK for school-age children.
- Sponsorship of CoderDojo event, Glasgow Science Centre. CoderDojo is a volunteer led coding club aimed at getting young people enthused by computer programming.
- Sponsorship of Christmas Cyber-Security Lecture, University of Edinburgh. A SICSA sponsored and organised Christmas Cyber-Security lecture for high school children. The 2012 event attracted over 600 children.
- Sponsorship of the BCS/RSE Exemplification Project. A project to develop materials that will exemplify a subset of the computing science related outcomes of CfE at Levels 3 & 4 (which is applicable to S1 to S3 at secondary school in Scotland (broadly ages 11 – 14).

We continue to be embedded in the Scottish secondary school sector with representatives on the Scottish Qualifications Authority “Technology” Curriculum Area Review Group and the “Computing” Qualifications Development Team, and on the RSE/BCS Exemplification Project Advisory Group. We are also working closely to represent the views of SICSA Schools at a national level. Recent meetings have been held with Education Scotland and Skills Development Scotland. A meeting is scheduled with the digital strategy group of the Scottish Government in the near future.

7.2. Education Directorship rotation

Though it falls outside of the reporting period 2012-13, it is of note that the SICSA Education Directorship rotated at the beginning of 2013-14. Professor Greg Michaelson was replaced by Dr Karen Petrie of the University of Dundee. Professor Greg Michaelson continues to represent SICSA on the Scottish Government PLAN C - Computing Science Professional Learning Steering Group.

7.3. Planned Education activities for 2013-14

The next New Lecturer Induction event will be held on Monday 13th of January, 2014. There will also be an Education “all-hands meeting” in April 2014.

Dr Karen Petrie plans to personally visit all of the SICSA institutions between January and April 2014(before the all hands meeting) to spend at least a few hours with academics in order to find out more about their priorities for SICSA Education.

Discussions are currently underway to discuss the establishment of short-education themes, in order to release funding for collaborative working-groups and events in key areas of education strategy.

8. SICSA Appointed staff

There are currently 37 SICSA appointed academic staff across eight Universities. For the purposes of this report, SICSA appointed staff were requested to provide data on their outputs for the reporting period 2012-13. Full details for each member of SICSA appointed staff are available from SICSA upon request but a summary of the information provided follows in the sub-sections below.

8.1. Recruitment

As confirmed in the SICSA Annual Report for 2011-12, all SICSA institutions with provision to recruit SICSA funded staff have completed their recruitment. There were a few changes during the reporting period 2012-13 as detailed below:

University of Edinburgh recruited one further member of SICSA academic staff:

- Ilias Diakonikolas, Lecturer, from UC Berkeley, USA

University of Glasgow recruited two further members of SICSA research staff:

- Julie Williamson, Research Fellow, from University of Glasgow

- Yolanda Vasquez-Alvarez, Research Fellow, from University of Glasgow

University of Strathclyde:

- Andreas Lingnau left his position after completion of his contract

8.2. Summary of SICSA Appointee outputs during the reporting period 2012-13

8.2.1. Details of new research materials developed

A number of SICSA appointed staff developed new research materials during the reporting period 2012-13, including:

- Guido Sanguinetti (Edinburgh): MMDiff bioconductor package
- Simon Dobson (St Andrews): Citizen Sensing - a blog and technology project aimed at providing a ready-made toolset based on cheap and easy-to-find hardware and software components.
- Alessandro Vinciarelli (Glasgow): SSPNet Speaker Personality Corpus and SSPNet Conflict Corpus
- Dimitris Pezaros (Glasgow): Raspberry Pi-Cloud - a teaching and research project centred around the construction of a “scale-model” of a warehouse-sized computer using Raspberry Pi devices to provide insight into the inner workings of major cloud platforms
- Edwin Brady (St Andrews): Released a new version of the Idris programming language (<http://idris-lang.org>)
- Julie Williamson (Glasgow): Developed pedestrian tracking software for evaluation of public displays
- Per Ola Kristensson (St Andrews): KALQ thumb keyboard application released on Google Play
- John Thomson (St Andrews): A Java framework for Data Deduplication Research - Data Deduplication Environment for Research (DEDUPER)

8.2.2. New products or interventions produced and benefiting industrial sectors

Several SICSA appointed staff have referenced projects or products that they are involved with that have direct impact on industrial sectors, as follows:

- Simon Dobson (St Andrews): Sapere EU project (<http://www.sapere-project.eu/>)
- Julie Williamson (Glasgow): Pedestrian tracking software which has commercial value to novel display manufacturers, having already caught the interest of Pufferfish LTD, based in Edinburgh. Pufferfish produce spherical display units and the pedestrian tracking software allows them to quantify the number of passers-by that approach their displays, information which is valuable for their sales team.
- Per Ola Kristensson (St Andrews): Diff Displays: Attention-Aware Subtle Visualisations for Multi-Display Environments (patent-pending)
- Marwan Fayed (Stirling): Launched a community-driven ISP (Internet Service Provider) as a way to resolve the (business-related) lack of backhaul provisioning near rural communities.

8.2.3. New academic (including interdisciplinary) or business collaborations established, both national and international.

The vast majority of SICSA appointed staff have reported new academic collaborations starting during the reporting period 2012-13.

A number of the above cited SICSA funding or activities as a major catalyst in forming a new academic collaboration. In particular, the following SICSA appointed staff were able to develop productive research collaborations with academics overseas, as a result of the SICSA Postdoctoral and Early Career Researcher Exchanges (PECE) programme.

- Adam Barker – Visited and established new research collaborations with Prof Michael J. Franklin, Thomas M. Siebel Professor of Computer Science, UC Berkeley.
- Ilias Diakonikolas – Visited Professor Rocco A. Serevido, Columbia University, New York, USA
- Tim Storer – Visited Professor Babak Esfandiari, Carleton University; Professor Stephen Marsh & Professor Khalil El Khatib, University of Central Ontario. Also during the reporting period, Professor Khalil El Khatib, took part in a visit to Scotland (hosted by Tim Storer), as part of the SICSA Distinguished Visitor Fellowship.
- Marwan Fayed – Is currently on exchange, building a collaboration with Professor Mostafa Ammar, Georgia Institute of Technology. Prior to this, Marwan utilised PECE funding to visit Professor Jon Crowcroft, University of Cambridge.

Over 60% of successful applications for the Distinguished Visitor Fellowship programme came from SICSA-appointed staff. This is another example where SICSA programmes have contributed directly to the development of collaborative relationships between SICSA staff and academics from Universities from elsewhere in the UK and abroad. Of course, the Distinguished Visitor Fellowship programme also exposes other academics from across Scotland to high profile academics from outside the country and as detailed in Appendix III. Distinguished Visitors were involved in over 30 events across Scotland during the reporting period.

A summary of successful applications for the Distinguished Visitor Fellowship programme from SICSA-appointed staff follows:

Advaith Siddharthan (Aberdeen) visited by Prof Ani Nenkova (University of Pennsylvania)
 Tim Storer (Glasgow) visited by Prof Khalil El-Khatib (University of Ontario)
 Sharon Goldwater (Edinburgh) visited by Dr. Jacob Eisenstein (Georgia Institute of Technology)
 Aaron Quigley (St Andrews) visited by Prof John Stasko (Georgia Institute of Technology, Atlanta), who is now a visiting Professor at the University of St Andrews
 Vincent Danos (Edinburgh) visited by Dr Pawel Sobocinski (University of Southampton)

Aside from collaborations which have resulted as a direct impact of SICSA funding, there is evidence that most SICSA appointees are collaborating either with academics from other SICSA institutions; academics from other pools and other UK Universities; academics from EU and International institutions; and in some cases with Industry. Collaborative work evidenced includes research visits to other institutions and commercial organisations; successful joint grants; and co-authoring of papers.

8.2.4. Collaboration with the public sector

There is evidence to suggest a number of SICSA appointed academics have been engaged with public sector bodies and other organisations out-with academia and the commercial sector. These include:

- Advaith Siddharthan (Aberdeen): Collaborations with RSPB and the Bumblebee Conservation Trust (BBCT) around citizen science and nature conservation
- Eva Hornecker (Strathclyde): Collaboration with Glasgow's Riverside Transport Museum (Ph.D. student Loraine Clarke), investigating how multimodal interaction supports mindful engagement with museum exhibits
- Alex Voss (St Andrews): Collaboration with Open University on Understanding the Changing Cultural Value of the BBC World Service and British Council. This AHRC-funded project is carried out in direct collaboration with the BBC and British Council as partners and influences their audience research and social media strategies.
- John Thomson (St Andrews): Discussion of use of agile IT development and disruptive solutions within NHS Scotland, culminating in the event NHS Hack Scotland in March 13.
- Marwan Fayed (Stirling): On-going collaboration and planning with the Scottish Government and HIE with respect to rural broadband planning and deployment.

8.2.5. Research outputs during the reporting period i.e. Peer reviewed journal publications/conference presentations, both national and international.

The total number of publications (including peer reviewed journal publications/ conference presentations, both national and international; and book chapters) authored or co-authored by SICSA-appointed staff during 2012-13 was 201. Full details of the publications are available upon request.

8.2.6. National or international seminars, workshops, conferences organisation

Many of the SICSA-appointed staff members have been involved in the organisation of seminars, workshops and academic conferences, both at home and abroad. Full details for each member of staff are available upon request.

8.2.7. Other notable points

A number of SICSA-appointed staff have been very closely engaged with SICSA activities during the reporting period 2012-13. As previously mentioned the majority of successful Distinguished Visitor Fellowship applications were by SICSA-appointed members of academic staff; and a number of SICSA staff also took advantage of the SICSA PECE programme.

Professor Aaron Quigley continues as SICSA Deputy Director/Director for Knowledge Exchange and that Dr Sharon Goldwater was SICSA Graduate Academy Director until July 31 2013.

SICSA-appointed staff have been active in organising SICSA Research Theme events throughout the reporting period, with 6 events having been principally organised by one or more SICSA-appointed staff. Notably, SICSA-appointed member of staff, Dr Gethin Norman (Glasgow), is a deputy theme leader for the Modelling and Abstraction research theme.

Out of the two SICSA Summer Schools funded in 2012-13, one was organised by SICSA-appointed members of staff, Professor Aaron Quigley and Dr Adam Barker.

Dr Marwan Fayed (Stirling) very capably chaired the SICSA Ph.D. Conference 2013 and has since been appointed the role of Next Generation Internet research theme leader, which includes the Cyber-Security sub-theme.

9. SICSA communications, marketing and publicity, and public engagement

SICSA produced a detailed Communications Strategy document in November 2011, outlining our overall communications objectives and the main strategies to be employed to achieve those. Since publishing the SICSA Communications Strategy, the SICSA Directorate and Administration have continued to employ a focussed approach to marketing, communications and outreach activities – placing importance upon increasing SICSA brand awareness and delivering consistent messages about SICSA to the broad spectrum of stakeholders.

SICSA continues to utilise a range of media to deliver those messages including; targeted printed materials; regular targeted e-bulletins and newsletters; the SICSA web site; outreach events (such as “Engaging the Next Generation”, DEMOfest, Ph.D. Conference, Ph.D. Induction events); liaison with the media where appropriate; and social media.

During the reporting period 2012-13 the SICSA Administration undertook a SICSA-wide evaluation of the SICSA Communications Strategy. Two surveys were administered to the SICSA community on the 6th November 2012, via the SGA administrators at each institution. One was specifically aimed at Academic and Research staff and the other solely for Ph.D. students. A total of 178 responses were received for the academic survey, which represents approximately 33% of the Academic community. Ph.D. responses were slightly lower at 144, representing approximately 18% of the community. Other data was used to support the evaluation, including Google Analytics data in relation to the SICSA web site, as well as an analysis of social media channels. An evaluation report was produced following analysis of the data and the full version is available upon request to the SICSA Administration.

The evaluation and particularly the results of the surveys were extremely useful in highlighting some of the successes and failings of the SICSA Communication Strategy. The evaluation led to a number of recommendations, detailed in the paragraph below, and will inform a new version of the SICSA Communications Strategy to be written during the period 2013-14.

As a result of the evaluation findings, the SICSA Directorate agreed to invest in a full redevelopment of the SICSA web site, which will be launched in February 2014. Further to this there will be a number of other new smaller outreach initiatives, such as events for new SICSA Ph.D. students to encourage engagement with SICSA and the research themes; the production of new printed media; and the introduction of a monthly e-bulletin to support the tri-annual SICSA newsletters.

10. Governance Structures

SICSA continues to follow the governance structures as followed in previous years of operation. Day-to-day decisions continue to be made by the SICSA Directors, supported by the SICSA Administration as follows:

- Professor Rod Murray-Smith – SICSA Director
- Professor Aaron Quigley – SICSA Director for Knowledge Exchange / Deputy SICSA Director
- Dr Sharon Goldwater – SICSA Graduate Academy Director (*replaced by Professor Jon Oberlander on 1 August 2013*)
- Professor Greg Michaelson – SICSA Education Director (*replaced by Dr Karen Petrie on 1 August 2013*)
- Miss Nicola Hogg – SICSA Executive Assistant
- Mr Steven Kendrick – SICSA Executive Officer

The SICSA Directorate is overseen by the SICSA Committee, comprising Heads of School or senior members of staff from each of the SICSA member institutions (including SICSA associate members). The SICSA Committee met on three occasions during the reporting period and full minutes of those meetings are available from SICSA upon request.

The SICSA International Advisory Board (IAB) was established as a steering group for SICSA, advising upon future strategy making. The SICSA IAB did not meet during the reporting period. However, a meeting took place on 11th November 2013. Full minutes are available from SICSA upon request. As part of the ongoing regeneration of the IAB, some of the original members were rotated out of the board in 2013, with new members from both industry and academia taking their place.

Appendix I: Grants Data (Annexe B)

Grant income:	2012-13	Cumulative total (from 2012-13)	Pending applications
Awarded to a single institution within the pool	£16,471,406.41	£16,471,406.41	£29,975,366.21
Awarded jointly to two or more institutions within the pool	£7,754,802.20	£7,754,802.20	£1,346,221.00
Awarded jointly to two or more institutions across two or more pools	£7,429,331.80	£7,429,331.80	£2,356,920.40
Awarded to an institution within the pool and one or more institutions outside Scotland	£19,428,383.00	£19,428,383.00	£1,550,271.20
Total	£51,083,923.41	£51,083,923.41	£35,228,778.81

To note:

* Figures are for *Price paid* by Funding body and not FEC

** Includes data from 10 full SICSA members. Data from 4 Associate members is not included

*** Figures include the share awarded to SICSA Schools. Where a joint grant, the figure awarded to the institutions outside SICSA is not included

Appendix I Continued

Grant Source	Scottish		UK		European		Other international		Not stated	Total	
	AY2012-13	Cumulative	AY12-13	Cumulative	AY12-13	Cumulative	AY12-13	Cumulative	AY 12-13	AY12-13	Cumulative
Research Councils			28,017,933	28,017,933						28,017,933	28,017,933
European Framework Programmes					8,503,201	8,503,201				8,503,201	8,503,201
Other public bodies*	6,220	6,220	11,307,135	11,307,135	87,788	87,788	262,492	262,492	0	11,663,635	11,663,635
Charities	2,500	2,500	287,757	0	0	0	178,114	178,114	0	468,371	468,371
Industry	0	0	362,223	362,223	0	0	955,267	955,267	480,553	1,798,043	1,798,043
Other (Info withheld)	0	0	0	0	0	0	0	0	632,742	632,742	632,742
Total	8,720	8,720	39,975,047	39,687,291	8,590,989	8,590,989	1,395,873	1,395,873	1,113,294	51,083,923	51,083,923

Appendix II: SICSA Funded Staff (as of 31 July 2013)

University of Aberdeen

Matthew Collinson, Reader/Lecturer, from HP Labs
David Pym, Chair, from University of Bath
Advaith Siddharthan, Reader/Lecturer, from University of Cambridge

University of Abertay

Alexey Goltsov, Reader/Lecturer, from University of Edinburgh

University of Edinburgh

Ilias Diakonikolas, Lecturer, from UC Berkeley, USA
Vincent Danos, Chair, from CNRS, Paris
Sharon Goldwater, Reader/Lecturer, from Stanford University
Andrew Gordon, Chair, from Microsoft Research, Cambridge
Michael Herrmann, Reader/Lecturer, from Max-Planck Institute for Dynamics and Self-Organization
Elham Kashefi, Reader/Lecturer, from University of Oxford
Victor Lavrenko, Reader/Lecturer, from University of Massachusetts Amherst
Richard Mayr, Reader/Lecturer, from North Carolina State University
Iain Murray, Reader/Lecturer, from University of Toronto
Guido Sanguinetti, Reader/Lecturer, from Sheffield University
Rahul Santhanam, Reader/Lecturer, from University of Toronto
Charles Sutton, Reader/Lecturer, from University of California Berkeley

University of Glasgow

Gethin Norman, Reader/Lecturer, from University of Oxford
Dimitrios Pezaros, Reader/Lecturer, from Lancaster University
Simon Rogers, Reader/Lecturer, from University of Glasgow
Jeremy Singer, Reader/Lecturer, from University of Manchester
Fung Po Tso, SAF, from City University of Hong Kong
Alessandro Vinciarelli, Reader/Lecturer, from IDIAP, Martigny
David White, SAF, from University of York
Julie Williamson, Research Fellow, from University of Glasgow
Yolanda Vasquez-Alvarez, Research Fellow, from University of Glasgow

Heriot Watt University

Oliver Lemon, Chair, from University of Edinburgh
Hans-Wolfgang Loidl, Reader/Lecturer, from Ludwigs-Maximilians Universität Munich

University of St Andrews

Adam Barker, Reader/Lecturer, from University of Melbourne
Edwin Brady, SAF, from University of St Andrews
Simon Dobson, Chair, from University College Dublin
Per Ola Kristensson, Reader/Lecturer, from University of Cambridge
Dr John Thomson, Reader/Lecturer, from University of Innsbruck
Aaron Quigley, Chair, from University of Tasmania
Alex Voss, Reader/Lecturer, from University of Manchester

University of Stirling

Andrea Bracciali, Reader/Lecturer, from Istituto di Scienze e Tecnologie dell'Informazione "A. Faedo"
Marwan Fayed, Reader/Lecturer, from University of Ottawa

University of Strathclyde

Eva Hornecker, Reader/Lecturer, from Open University
Dmitri Roussinov, Senior Lecturer, from Arizona State University

Appendix III: KPI Information

1) Research income (biennial Other Activity Indicator (OAI) submission to the SFC (but only for Unit of Assessment 23)

As submission is biennial, the figures for this are the same as provided in the SICSA Annual Report 2011-12.

2) Research assistants biennial Other Activity Indicator (OAI) submission to the SFC (but only for Unit of Assessment 23)

As submission is biennial, the figures for this are the same as provided in the SICSA Annual Report 2011-12.

3) Research students biennial Other Activity Indicator (OAI) submission to the SFC (but only for Unit of Assessment 23)

As submission is biennial, the figures for this are the same as provided in the SICSA Annual Report 2011-12.

4) SFC KT metrics biennial Other Activity Indicator (OAI) submission to the SFC (but only for Unit of Assessment 23)

As submission is biennial, the figures for this are the same as provided in the SICSA Annual Report 2011-12.

5) Start-up/Spin out, Jobs created

During the census period: Numbers of new start-ups, spin outs, patents, licenses, Proof of Concept projects, SMART projects, KTP awards and other notable awards e.g. Intermediate Technology Institutes, Enterprise Fellowships (for UoA 23 or for the department/school if UoA 23 specific data not possible).

Aberdeen:

- IPO: Spin-off Data2Text was acquired by Arrai NLG, and subsequently an Initial Public Offering was made through the London Stock Exchange
- EPSRC award, WhatIf?: Answering "what if. . . ?" Questions for Ontology Authoring, October 2012 (Pan & Mellish)
- EPSRC award, Scrutable Autonomous Systems, August 2012 (Vasconcelos, Masthoff, Oren & Van Deemter)
- EPSRC/GCHQ award, Productive Security - Improving security compliance and productivity through measurement, October 2012 (Pym)
- 2 industry-funded Ph.D. studentships & consultancy, Selex ES, October 2012 (Norman)
- Founding Director, National Grid Cyber-Security Research Centre, February 2013 (Pym)

Abertay:

- Number of new start-ups, spin outs:
- 10 new graduate companies, with 50 jobs created (all Abertay's Prototype Fund).
- Patents: 3 new patents applied for.
- Abertay has established The Code Bar, with support from the Intellectual Property Office, to provide the computer games industry one-click access to innovative projects created by students in the University. The Code Bar is intended to unlock valuable intellectual property created by students at Abertay University and on the world-leading game development competition Dare to be Digital.
- Abertay Launched £100K Games for Film competition with Lionsgate UK and the British Film Institute to use computer games to launch film releases.

Edinburgh:

- Start Ups (x6): Tigerface Games Limited, Anamae Ltd, Trigah Ltd, Two Big Ears Ltd, Datagist Ltd, Dronedeploy Inc
- Licenses (x3): Samsung Beijing Telecom, Quorate Technology, A2Z Development Inc.
- Industry Ph.D. Student Sponsorship: Freescale Semiconductors (x1), Selex Galileo (x1), UCB Celletch (x1), Microsoft Research (x4)

Glasgow:

There are a number of other notable awards in Computing Science at Glasgow.

- 1 EPSRC Programme Grant, From Data Types to Session Types – A Basis for Concurrency and Distribution, March 2013 (Gay)
- 2 European Union FP7 collaborative small or medium scale research projects (Johnson, Chalmers)
- 2 EPSRC First Grant Scheme awards (Azzopardi, Pezaros)
- 1 Horizon Fund for Universities awards from UK Government Agencies (Macdonald)
- 3 industrially supported Ph.D. studentships
- 2 European and overseas industrial research donations.
- 7 consultancies, including the European Railway Agency (ERA) and Defence Science and Technology Laboratory (DSTL).
- 2 SFC innovation vouchers: Exploring the Effective Teaching of History at Age 16 Using Mobile Technology (Sherwood) and All ways on the move (Bell)
- 2 internally funded Impact Acceleration Account grants (Calder, Ounis).

*Please note that the identity of industrial partners cannot be provided as the contracts have confidentiality provisions which prohibit disclosure. The DSTL consultancy, identified above, is named only to demonstrate impact.

RGU:

No spin outs, patents or new licences.

KTP awards:

- Size and Shape of UK Offshore Workers (Stewart)
- Exploiting an Agile development methodology (Top up award) (McKay)
- Development and embedding of a programming capability for a bespoke CATI system (Wiratunga)
- Develop an internal software development capability (Bass)

St Andrews:

- 1 Start Up - Qraqrabox

Strathclyde:

- Innovation Vouchers Marc Roper - £4,843

6) Esteem indicators, e.g. Fellowships, Invitations, Conference Chairing etc. and 7) Prizes

In each department: Fellowships of learned societies, personal research fellowships (e.g. EPSRC), notable prizes (awarded to staff and students) and any other notable esteem indicators.

Aberdeen:

- Members of the EPSRC Peer Review College (Edwards, Mellish, Norman, Pan & Pym)
- Member of the ESRC Peer Review College (Edwards)
- Director of the RCUK *Digital Personhood* IDEAS Factory (Edwards)
- Strategic evaluation panel for the EPSRC IDEAS Factory Programme (Edwards)
- Pilot panel member EPSRC Shaping Capability exercise (Edwards)

- US/UK/Canada/Netherlands *Digging into Data Challenge* Panel, The Hague (Edwards)
- Senior Programme Committee, Int. J. Conf. on Artificial Intelligence (IJCAI) (Norman)
- Senior Programme Committee, Int. Semantic Web Conference (Pan)
- Area Chair (NLP Applications) at ACL (Reiter)
- Programme Chair UK Computational Intelligence Conference (Coghill)
- Programme Chair International Workshop on Trust in Agent Societies (Norman)
- Keynote at 2nd Web Science Conference (Pan)
- Editor, Int. J. on Semantic Web and Information Systems (Pan)
- Editorial Board Member, J. of Web Semantics (Pan)
- Editorial board member, J. of Autonomous Agents and Multi-Agent Systems (Sycara)
- Editorial Review Board Member of the J. of Artificial Intelligence Research (van Deemter)
- Associate Editor, J. Topics in Cognitive Science (Van Deemter)
- Editorial Board Member, J. of Computational Linguistics (Siddharthan)
- Corner Editor (Semantics), J. of Logic and Computation (Pym)

Abertay:

- Hosted the Digital Spark Conference at the University of Abertay Dundee to learn about the benefits and pitfalls of crowd-funding, and how it can be applied to your business.
- Organised and hosted Communicating Process Architectures 2012, the 34th WoTUG conference on concurrent and parallel programming. Proceedings (ISBN 978-0-9565409-5-9)
- Membership of the National Cyber Security Body
- Invited speaker at Launch of Scottish Cyber Security Strategy, Scottish Parliament
- Invited speaker at Scottish E-Crime summit at RBS Gogarburn
- Editorial Board: Journal of Biological Informatics & Biodiversity; Bioinformatics
- Editorial board of Int'l J on Universal Access in the Information Society
- Editorial board of J of Interaction Science.
- Fellow of the Royal Astronomical Society
- Guest Editing a Security issue of Frontiers in Neuroscience
- Invited speaker at European Biotechnology Congress 2013
- Chaired BioDundee Digital Media – Life Sciences “Molecules, Models, Memory and Mobiles” interface event with representations from industry, TSB, academia and Government.
- Hosted Dare Protoplay festival in Dundee
- Creative Scotland Student Media Award in Computer Games to Abertay student
- Ethical Hacking students at the Abertay were selected to speak to a major international conference, Security B-Sides London - a meeting of global experts in computer security and fighting malicious hacking.
- Abertay cyber security students hosted Secri-Tay, featuring high-profile industry experts from companies like Digital, MWR Labs, PwC, ScotSTS and Xiphos Research Labs.
- A team of students from Abertay Dundee took part in the finals of Make Something Unreal Live at the Gadget Show Live.
- Partnered with Stirling Business Crime Centre on Penetration Testing for SMEs.
- British Council supported project on innovation in the Energy Sector with Bilgi University, Turkey.
- 2 NCR funded RKE projects in Interactive Digital Media
- Several public engagement events through our Hannah MacLure Centre art gallery on interactive digital media, including “Blind art for the sighted” and “Finding Kinaesthesia”, a computer-controlled living sculpture.
- Two new industry partnerships on interactive media in the Food and Drink sector
- The V&A museum, in partnership with Abertay and Dundee Universities and UKie, appoints Sophia George, BAFTA winner and Chair of Swallowtail Games, as its first ever V&A Game Designer in Residence.

- IDEAScotland, a pioneering innovation centre to support start-ups in the digital, technology and creative media sectors is launching in Dundee. IDEAScotland is a collaboration of brightsolid, DC Thomson, University of Abertay Dundee and University of Dundee providing virtual networking, equipment, mentoring on business techniques, and introductions to potential customers, business partners and investors, as well as free workspace.

Edinburgh:

- Co-editor-in-chief of ACM Transactions on Speech and Language Processing (2010-2013) (Renals)
- Associate editor of IEEE Transactions Audio Speech and Language Processing (2010-2013) (Renals)
- Member of ISCA Advisory Council (2011-2014) (Renals)
- Member of advisory board ACM ICMI conference series (2010-date) (Renals)
- Scientific Advisory Board Member Swiss NSF NCCR IM2 (2007-2013) (Renals)
- Member of Scottish Enterprise Advisory Group on Informatics and Computing (2009-date) (Renals)
- Member EPSRC College of Computing (2006-date) (Renals)
- Organizing committee IEEE SLT 2012 workshop (Miami) (Renals)
- Invited keynote, NOLISP 2013, Mons, Belgium (Renals)
- Invited talk, Microsoft Machine Learning Summit (April 2013, Paris) (Renals)
- Invited talk, LT-Innovate Summit (June 2013, Brussels) (Renals)
- Invited talk, University of Sheffield (Jan 2013) (Renals)
- Pawel Swietojanski (supervised by Renals) won best paper award at IEEE SLT 2012 (Renals)
- Appointed visiting professor, Nagoya Institute of Technology, Japan (2012-2017) (Renals)
- Elected Fellow of the Association for Computational Linguistics December 2012 (Steedman)
- Keynote address, Glasgow Caledonian University. SICSA Workshop\Cross Stream Event Detection. May 2013. (Osborne)
- Keynote address, (SICSA Workshop). Robert Gordon University. May 2013. (Osborne)
- 3rd Lisbon Machine Learning School. (Two talks). July 2013
- Invited talk, Sydney University. May 2013 (Osborne)
- Invited talk, Capital Markets Cooperative Research Centre (Sydney) May 2013 (Osborne)
- Invited talk, Macquarie University. May 2013 (Osborne)
- Invited talk, Melbourne University. April 2013 (Osborne)
- Invited talk, Melbourne University. May 2013 (Osborne)
- Editorial Board Member, Interacting with Computers, 2013-2016 (Wolters)
- Associate chair, ACM Conference on Computer-Human Interaction (SIGCHI), 2013 (Wolters)
- Invited keynote speaker, EACL conference in 2014 (King)
- Invited visiting Professor at Universidad de Chile Nov 2013 - Jan 2014 (King)
- Chair of the Blizzard Workshop, 2013 (King)
- Editorial board of Computer Speech & Language (King)
- Guest editor on IEEE Signal Processing Letters (King)
- Director of the SICSA Graduate Academy, 2012-2013. (Goldwater)
- Invited speaker/discussant at the US NSF Science of Learning Workshop, Oct 2013 (Goldwater)
- Program chair for the 2014 Conference of the European Chapter of the Association for Computational Linguistics. (Goldwater)
- Invited to participate in "International Classroom" program sponsored by the Computer Society of India. Four-day lecture tour of Coimbatore, India. (Goldwater)
- Editorial board of Computational Linguistics (Goldwater)
- Editorial board of Transactions of the Association for Computational Linguistics (Goldwater)

- Appointed to the Editorial board for The Encyclopedia of Computational Neuroscience (Springer), responsible for all articles on the Visual System (Bednar)
- Appointed a member of the Royal Society Selectional Committee 4 (Engineering) (Bundy).
- Appointed chair of the Royal Academy of Engineering Panel 10 (Computing and Communications) (Bundy).
- A Formal Representation of Business Process Models to Enable Virtual Workflow Execution and Self-Governed Supply Chain Management, NCHC (National Centre for High-performance Computing), Taiwan, 25 April, 2013 (Chen-Burger).
- Business Process Modelling, Logic, Semantics based Reasoning and Intelligent Workflow. Bridging Big Data Infrastructure Workshop – Expedition on the Network Science Landscape, NCHC, Taiwan, 3-6 December, 2012 (Chen-Burger).
- Member of Editorial Board, “International Journal of Knowledge Engineering and Soft Data Paradigms” (KESDP) (Chen-Burger).
- Member of Editorial Board, “International Journal of Distributed Systems and Technologies (IJDST)”, IGI Global (Chen-Burger)
- Conference Programme Committee: The 27th Conference of European Colloid and Interface Society (ECIS), Sofia, Bulgaria, 1-6 September, 2013 (Chen-Burger).
- Conference Programme committee: 2nd International Workshop on Multimedia Analysis for Ecological Data, Barcelona, Spain, Oct 21, 2013 (in conjunction w/ ACM Multimedia 2013) (Chen-Burger).
- Area chair for Neural Information Processing Systems, “NIPS” (Murray).
- Second place in the Kaggle/Winton "Observing Dark Worlds" challenge out of 353 teams. <http://www.kaggle.com/c/DarkWorlds> (Murray).
- Membership of EPSRC Strategic Advisory Team for ICT (Robertson)
- Membership of UK Computing Research Committee Executive (Robertson)
- Invited tutorials at EASSS and CretaMASSS Summer Schools, July 2013 (Rovatsos)
- Invited talks at King's College London, Technical University of Crete, July 2013 (Rovatsos)
- Accepted for the Cold Spring Harbour Vision Course (Stevens, Rudiger -- Ph.D. students)
- ERC starting grant, value 1.4M Euros (Sanguinetti)
- Cozzarelli Prize in Engineering and Applied Science, awarded by the U.S. National Academy of Sciences to the best paper published in PNAS in the previous year, “Point process modelling of the Afghan War Diary”. Factoids perhaps worth reporting about this prize: first time it was won in Scotland, first time it was won in Informatics/ Computer Science (Sanguinetti)
- QEST 2013 best paper award to the paper "Learning and designing stochastic processes from logical constraints", joint with L. Bortolussi, University of Trieste (Sanguinetti).
- Keynote speaker, Workshop on Collective Learning and Inference on Structured Data (CoLISD). Bristol, UK. September 2012 (Sutton).
- Awarded FREng and FRSE (Tate)
- VÂN ANH HUYNH-THU has been awarded one of two Scientific Prizes IBM Belgium for Informatics 2013. This annual prize is awarded by IBM Belgium and the Belgian National Fund for Scientific Research. VÂN ANH will receive the award for the best doctoral thesis to have made an original contribution to computer sciences or its applications.
- Invited tutorial, CIFAR NCAP summer school, Toronto, Canada (Williams)
- Elected to Fellow - Association for Computing Machinery, Dec 2012. (Fan)
- Elected to Fellow - Association for Computing Machinery, Dec 2012. (Libkin)
- Editorial Board Member - Association for Computing Machinery Trans. On Database System (Fan)
- Editorial Board Member - Theoretical Computer Science. (Fan)
- Editorial Board Member - Logical Methods in Computer Science. (Libkin)
- Editorial Board Member - Journal of Applied Logic. (Libkin)

- Editorial Board Member – Journal of Algorithms in Cognition, Informatics and Logic. (Libkin)
- Editorial Board Member - Theoretical Informatics and Applications (RAIRO). (Libkin)
- Editorial Board Member - The Proceedings of the VLDB Endowment (VLDB.) (Viglas)
- Advisory board member - Theory and Practice of Logic Programming. (Libkin)
- Editorial Board Member -Theoretical Computer Science, track B (2008-present). (Stevens)
- Chair of Association for Computing Machinery Symposium of Database Systems (PODS), 2013. (Fan)
- Program Chair - WoLLIC 2013 (20th Workshop on Logic, Language, Information, and Computation, Aug 2013). (Libkin)
- Programme Committee Member – DBPL 2013. (Wadler)
- Programme Chair -Second International Workshop on Bidirectional Transformations. (Stevens)
- Programme Chair - EduSymp'13, the Educators' Symposium of MODELS. (2013). (Stevens)
- Member of EPSRC College of Peers (2000-present.) (Stevens)
- Member of BCS Distinguished Dissertation Committee (2013). (Stevens)
- Member of DIGITEO Scientific Council (2008-present). (Stevens)
- Programme Committee Member/Chair – Winter Simulation Conference 2012. (Gilmore)
- Invited Talk – The 29th British National Conference on Databases (BNCOD, invited tutorial), 2013. (Fan)
- Invited Talks – Vienna University of Technology; Universitat Politecnica De Cataluña – BarcelonaTech; Universita Di Roma – Sapienza; University of Calabria; University of Paris – Diderot (Libkin)
- Invited Talk – ICFP 2013. (Wadler)
- Invited talk – Workshop on Secure Cloud and Reactive Internet Programming (SCRIPT), Vrije University, Brussels, 12-13 Nov. (Wadler)
- Invited Talk - ROCKS Autumn School 2012, Fluid Approximation for Stochastic Process Algebras, Bressanone, 24th October 2012.
- Invited Talk - Hamming seminar, Rigorous and Random Adventures in Time and Space, Edinburgh, 21st November 2012.
- Invited Talk - TGC 2013, Challenges in Quantitative Analysis of Collective Adaptive Systems, Buenos Aires, Argentina, 31st August 2013.
- Invited Lecturer - International Summer School on Trends in Computing (SSTC 2013), Tarragona, 22–26 July 2013. (Wadler)
- Invited Lecturer - Midlands Graduate School in the Foundations of Computing Science, 8–12 April 2013, (Topics in Lambda Calculus and Life). (Wadler)
- Invited Lecturer - Programming Languages Mentoring Workshop (PLMW), workshop at POPL, 22 January 2013, (You and Your Research and The Elements of Style). (Wadler)
- Keynote Speaker - Tech Mesh, London, 4–6 December 2012, keynote speaker plus Faith, Evolution, and Programming Languages. (Wadler)
- Keynote Speaker - Data Driven Functional Programming (DDFP), workshop at POPL, 22 January 2013, (The essence of language-integrated query). (Wadler)
- Keynote Speaker - Fourth Annual Scala Workshop, Montpellier, 2 July 2013. (Wadler)
- Keynote Speaker – Colin Runciman Celebration – York – Keynote speaker - October 2013. (Wadler)
- Keynote Speaker - The 15th International Conference on Database Theory (EDBT/ICDT), 2012. (Fan)
- Keynote Speaker – FP Days – Cambridge - 24th October 2013. (Wadler)
- Keynote Speaker – The 9th IEEE International Conference on e-Science, 2013. (Fan)
- Keynote Speaker - The 1st International Forum on Big Data, 2012. (Fan)
- Keynote Speaker, RR'13 (7th International Conference on Web Reasoning and Rule Systems, July 2013). (Libkin)

- MBE in the New Year Honours list for services to data systems and computing. (Buneman)
- Award - Royal Society Milner Award for "his fundamental research into programming semantics with lasting impact on both the principles and design of programming languages". (Plotkin)
- Award - Matteo Mio (Ph.D. student of Alex Simpson) won the 2013 Ackermann Award for his Ph.D. thesis "Game Semantics for Probabilistic mu-Calculi". (Simpson)
- Microsoft Research Ph.D. Scholarship (Dubach, Christophe/ICSA)
- Oracle Donation (Ph.D. Student Funding) (Dubach, Christophe/ICSA)
- Organizer of International Workshop on Adaptive Self-tuning Computing Systems (ADAPT), co-located with the HiPEAC conference (Dubach, Christophe/ICSA)
- Invited talks at Oracle Labs (California), Microsoft Research (Cambridge), ETHZ (Switzerland) (Dubach, Christophe/ICSA)
- Programme Committee member HLPP13 (Cole, Murray/ICSA)
- Area Chair for CVPR 2013 and ICCV 2013 (Ferrari, Vittorio/IPAB)
- Google Research Award of about USD 60k for research in learning visual models from video (awarded in February 2013) (Ferrari, Vittorio/IPAB)
- ECCV 2012 best paper award (Ferrari, Vittorio/IPAB)
- Programme Committee Chair of ETAPS CC 2015 (Franke, Bjoern, ICSA)
- HiPEAC paper award (Franke, Bjoern/ICSA)
- Intel Ph.D. Fellowship (Tobias Edler von Koch) (Franke, Bjoern/ICSA)
- Invited keynote: MAED 2013 - 2nd ACM International Workshop on Multimedia Analysis for Ecological Data (Barcelona, Spain, Oct 2013) (Fisher, Robert/IPAB)
- Invited keynote: 2nd IEEE International Conference on Image Information Processing (Simla, India, Dec 2013) (Fisher, Robert/IPAB)
- Editorial Board of ACM TACO (O'Boyle, Mike/ICSA)
- General Chair PLDI (O'Boyle, Mike/ICSA)
- Invited Keynote Intel Compiler Conference Haifa (O'Boyle, Mike/ICSA)
- Invited Keynote Parallel and Distributed Computing Conference Innsbruck (O'Boyle, Mike/ICSA)
- Proceedings Editor for PVLDB 2013 (Viglas, Stratis/ICSA)
- Programme Committee Area Chair for ICDE 2014 (Viglas, Stratis/ICSA)
- Invited talks at NEC Laboratories Europe, Germany (Apr. 2013), Technical University of Darmstadt, Germany (Apr. 2013), Paris Descartes University, France (May 2013), Centre Tecnologic de Telecommunications de Catalunya, Spain (Jun. 2013) (Patras, Paul/ICSA)
- Programme Committee member: IFIP Wireless Days 2012, IEEE VTC 2013 Spring, IEEE WoWMoM 2013 (Patras, Paul/ICSA)
- "Premio Extraordinario de Doctorado, 2012" - University Carlos III of Madrid award for quality Ph.D. Thesis (Patras, Paul/ICSA)
- The Cabaret of Dangerous Ideas, Edinburgh Festival Fringe, 16 August, 2013 (Ramamoorthy, Subramanian/IPAB)
- BBC Radio Click, Panel Discussion on Human-Robot Interaction (including live demonstration of our learning agents), 29 January 2013 (Ramamoorthy, Subramanian/IPAB)
- Inducted as a Member of Young Academy, Royal Society of Edinburgh, in Apr 2013 (Ramamoorthy, Subramanian/IPAB)
- Keynote address, 22nd International Electronics Industry Forum, Dublin, Ireland, 3 Oct 2014 (Ramamoorthy, Subramanian/IPAB)
- Co-organizer, Workshop on Humanoid Soccer Robots, IEEE-RAS International Conference on Humanoid Robots, 2013 (Ramamoorthy, Subramanian/IPAB)
- Local Arrangements Chair for PLDI-14 (Leather, Hugh/ICSA)
- General Chair of ParCo-15 (Leather, Hugh/ICSA)

- Invited speaker at the British Science Festival (organised by the British Science Organisation) in Aberdeen September 2012 to give a lecture on "Speckled Computing" (Arvind, DK/Speckled)
- Invited talk, Symposium on Non-Linear Dynamics, 06.-09.04.2013, Mandarfen, Austria (Herrmann, Michael/IPAB)
- Invited talk, NeuroBioTheory Seminar, FIAS, Tuesday, June 4, 2013, Frankfurt, Germany (Herrmann, Michael/IPAB)
- Invited speaker, The Brain: Criticality, Dynamics, Networks and Function, September 2-6, 2013, Villa Orlandi, Anacapri, Capri, Italy (Herrmann, Michael/IPAB)
- Plenary speaker, Complex Nonlinear Systems: From Basic Science To Applications, October 7 -11, Samarkand, Uzbekistan (Herrmann, Michael/IPAB)
- Invited talk, Neuroinformatik-Kolloquium, December 4, 2013, University Ulm, Germany (Herrmann, Michael/IPAB)
- EPSRC ROBOTARIUM (Capital Equipment grant) with Heriot-Watt University (Vijayakumar, Sethu/IPAB)
- Intel early career faculty honour awardee (Nagarajan, Vijayanand/ICSA)
- Pact 2013 registration chair (Nagarajan, Vijayanand/ICSA)
- Invited talk at Intel research, santa clar (Nagarajan, Vijayanand/ICSA)

Glasgow:

Fellowships and memberships

- Elected fellow of RAE (Calder)
- Elected member of UKCRC (Brewster)
- Elected member of UKCRC (Calder)
- Elected member of UKCRC (Murray-Smith)
- Elected member of UKCRC Executive Committee (Sventek)
- Member of Nokia Scientific Board (Murray-Smith)
- Member of IETF Transport Area Directorate (Perkins)
- Member of IFIP Working Group 2.11 on Program Generation (O'Donnell)
- Member of the NASA/ESA/IAASS Sub-Orbital Safety Committee (Johnson)
- Member of Scottish Qualifications Authority's Qualification Design Team for Computing Science (Cutts)

Editorships

- Associate Editor of Discourse, Context and Media, Elsevier (Vinciarelli)
- Associate Editor of IEEE Signal Processing Magazine (for the Social Sciences) (Vinciarelli)
- Editorial board member for Personal and Ubiquitous Computing journal (Brewster)
- Editorial board member for Communications in Mobile Computing journal (Brewster)
- Editorial board member for Universal Access in the Information Society journal (Brewster)
- Editorial board member for The International Journal of Mobile HCI (Brewster)

Other

- Chair and member of the Scientific Advisory Committee for the €3 Billion EC SESAR Programme (Johnson)
- Chief Scientific Adviser for Scotland (Calder)
- Co-chair of the RAE UK Forum for Computing Education (UKforCE) (Cutts)
- Member of 2014 Computer Science REF Panel (Sventek)
- Member of panel for DFG (German science funding council) Excellence initiative, allocating B€27 for science research in Germany (Brewster)
- Scientific adviser to NATO on Cybersecurity Simulations in the MNE7 programme (Johnson)
- Scientific adviser to the European Railway Agency on Accident Investigation across Member States (Johnson)
- Scientific adviser to the European Network and Information Security Agency on the new European Cyber Incident Reporting System (Johnson)
- Scientific adviser to the Civil Aviation Authority on Future Safety Concerns (Johnson)
- Scientific adviser to EUROCONTROL on Safety and Security (Johnson)
- SICSA Director (Murray-Smith)

Heriot-Watt:

- Wright-Hastie and McNeil both became members of the RSE Young Academy
- Chantler became a member of the EPSRC Strategic Advisory Team for ICT
- Chantler appointed to the Programme Advisory Board for RCUK's Digital Economy theme
- Rieser's became a member of the board (one of five) of the Association for Computational Linguistics (ACL) Special Interest Group on Natural Language Generation.
- Rieser became a member (one of five) of the Scientific Advisory Committee of SIGDIAL (Special Interest Group on Discourse and Dialogue).
- Georgieva was appointed by the European Commission to the Horizon 2020 Marie Skłodowska-Curie Advisory Group (she is one of only 22 members from across Europe).

- HWCS recruited seven new Lecturers in the period: Chen-Burger, Fensch, Gray, Lohan, Lones, McGookin, McNeil. Chen-Burger, Fensch, McGookin and McNeil were PDRAs in other SICSA Depts (McGookin Glasgow, the rest Edinburgh), as had been Gray (Glasgow) but came via Manchester. Chen-Burger was submitted to REF by both HWCS and Edinburgh Informatics.

RGU:

- Senior Editor of Electronic Journal for Information Systems in Developing Countries (Bass)
- Associate Editor of the Journal of International Technology and Information Management (Allison)
- Member of Editorial Board for the Journal of the American Society for Information Science and Technology (Goker)
- Chair, GECCO EDA track 2013 (McCall)
- Co-Chair, UKCI 2013 (McCall)
- Session chair, IEEE WCNC, 2013, Shanghai (Tu)
- Keynote: CMMI 2013 (Allison)
- Industrial Collaboration on Real Time Truck Operations Control with ARR Craib (McCall)
- Industrial Collaboration with British Telecom on Just In Time Inventory Management (McCall)
- Grant application assessor for the Swiss National Science Foundation (Gaber)
- Grant application assessor for Norwegian Research Council R&D (Goker)
- EU-IST R&D Project Reviewer (Goker)

St Andrews:

- Involved in the AHRC Cultural Value project . This involves the BBC and the British Council and, of course, is heavily interdisciplinary. (Voss)
- Partner in the ESRC Administrative Data Research Centre Scotland. (Kirby)
- Gave the opening keynote "Open Learning and the 3D Web: Applications and Challenges" at the IEEE sponsored 7th International Conference for Internet Technology and Secured Transactions (ICITST), London, 2012. (Allison)
- Chaired the FSMNLP 2013 conference (Nederhof)
- Member of the standing committee of the Formal Grammar conferences, in 2012 held in Opole, Poland: <http://mjn.host.cs.st-andrews.ac.uk/FG2012/>(Nederhof)
- Associated editor, ACM Transactions on Autonomous and Adaptive Systems. (Dobson)
- Member of the BCS Distinguished Dissertation panel, and appointed to chair the next two years' competitions.
- Proposal, project, and programme reviewer for the EU. (Dobson)
- Academic collaborations with St Andrews with the Schools of Management (on modelling sustainable development using complex networks), Physics (on 3d printing), and Earth Sciences (on high-resolution low-cost environmental sensing – the collaboration giving rise to Citizen Sensing, a toolset to simplify the generation of scientific-quality sensor networks from commodity hardware. (Dobson)
- ACM Interactive Tabletops and Surfaces Conference Program Co-Chair 2013
- User Interface Software and Technology Local Chair 2013 (Nacenta)
- Workshop on Distributed User Interfaces: Keynote Address (within ACM EICS conference) (Nacenta)
- Best Demo UIST 2013 work (Nacenta)
- ACM Interactive Table Tops and Surfaces Conference - Member of the Steering Committee (Nacenta)
- MIT Technology Review Innovator Under 35 (TR35) (Kristensson)
- Member of the Royal Society of Edinburgh Young Academy of Scotland (Kristensson)
- ACM Computing Reviews Notable Computing Books and Articles (Co-Author) (Kristensson)
- ACM SIGACCESS Best Student Paper Award, ACM ASSETS Conference (Co-Author) (Kristensson)
- Associate Editor, ACM Transactions on Intelligent Interactive Systems (Kristensson)
- Associate Editor, International Journal of Human-Computer Studies (Kristensson)

- Senior Program Committee Member, 19th ACM International Conference on Intelligent User Interfaces (IUI 2014) (Kristensson)
- Program Committee Member, CHI 2014 Workshops, 32nd ACM Conference on Human Factors in Computing Systems (CHI 2014) (Kristensson)
- Demo Co-Chair, 26th ACM Symposium on User Interface Software and Technology (UIST 2013) (Kristensson)
- Workshop Co-Chair, 15th ACM International Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI 2013) (Kristensson)
- Associate Chair, 31st ACM Conference on Human Factors in Computing Systems (CHI 2013) (Kristensson)
- Co-Organiser, CHI 2013 Workshop on Grand Challenges in Text Entry, held in conjunction with the 31st ACM Conference on Human Factors in Computing Systems (CHI 2013) (Kristensson)
- Associate Chair, 26th ACM Symposium on User Interface Software and Technology (UIST 2013) (Kristensson)
- Associate Chair, 15th ACM International Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI 2013) (Kristensson)
- Senior Program Committee Member, 18th ACM International Conference on Intelligent User Interfaces (IUI 2013) (Kristensson)
- Program Committee Member, 23rd International Joint Conference on Artificial Intelligence (IJCAI 2013) (Kristensson)
- Local Arrangements Chair, 7th ACM International Conference on Interactive Tabletops and Surfaces (ITS 2013) (Kristensson)
- Editor of the Journal of Software for Algebra and Geometry (Konovalov)
- Editor-in-Chief for the Journal Computers (Quigley)
- Scottish Chair of the BCS Interaction Specialist Group (Quigley)
- Associate Editor for the International Journal of People-Oriented Programming – IJPOP (Quigley)
- External member of the IDEAS Research Institute executive committee in Robert Gordon University Scotland (Quigley)
- Editorial Board member of the JPCC - International Journal of Pervasive Computing and Communications (Quigley)
- Committee Member for the Joint Steering Committee for UbiComp and Pervasive (Quigley)
- Board of Experts Member for the Bridging Research in Ageing and ICT development - EU FP7 Coordinating Action (Quigley)
- General Co-Chair, 26th ACM Symposium on User Interface Software and Technology (UIST 2013) (Quigley)
- General Co-Chair, ACM Interactive Tabletops and Surfaces conference (ITS 2013) (Quigley)
- Workshop Co-Chair, ACM CHI 2013 workshop on Blended Interaction: Envisioning Future Collaborative Interactive Spaces (Quigley)
- Short Paper Co Chair of HCI 2012 - 26th Annual Conference of the Specialist HCI group of the BCS, the BCS Interaction SG, Birmingham UK, 12 - 14 September 2012 (Quigley)
- Tutorials Co Chair for the ACM MobileHCI 2012 Program Committee - 14th International Conference on Human-Computer Interaction with Mobile Devices and Services, San Francisco USA, September 2012 (Quigley)
- Organiser Visions and visioning in CHI: CHI 2013 special interest group, Paris (Quigley)
- Associate Chair of the ACM MobileHCI 2012 Program Committee - 14th International Conference on Human-Computer Interaction with Mobile Devices and Services, San Francisco USA, September 2012 (Quigley)
- Program Committee Member UbiComp 2012 - ACM International Conference on Ubiquitous Computing, Pittsburgh USA, September 5-9 (Quigley)
- Program Committee Member MuM 2012 - 11th International Conference on Mobile and Ubiquitous Multimedia, Essen, Germany December. (Quigley)
- Program Committee Member, UbiComp 2013 - ACM International Conference on Ubiquitous Computing (Quigley)
- Associate Chair, 31st ACM Conference on Human Factors in Computing Systems (CHI 2013) (Quigley)
- Associate Chair of the ACM MobileHCI 2013 Program Committee - 15th International

Conference on Human-Computer Interaction with Mobile Devices and Services, Germany (Quigley)

- Guest Editor for the UMUI special issue call for papers on ubiquitous and pervasive user modelling (Quigley)
- Organiser SICSA BigData InfoVis summer school with Dr Adam Barker (Quigley)

Stirling:

- Won the University of Stirling's top prize for research supervision. This is adjudicated by senior staff and students. (Fayed)
- Associate editor of the Journal of Evolutionary Computation, MIT Press (Ochoa)
- Chair for 14th European Conference on Evolutionary Computation in Combinatorial Optimisation (EvoCOP 2014) (Ochoa)
- Chair of the Genetic and Evolutionary Computation Conference (GECCO 2011, 2012 and 2013) Self-* Search Track (Ochoa)
- Tutorial Chair for the Genetic and Evolutionary Computation Conference (GECCO 2012 one 2013) (Ochoa)
- Invited Talk 28th CREST/DAASE Open Workshop on Genetic Programming Software Engineering, UCL, London, October, 2013 (Ochoa)
- Invited Talk GECCO Workshop on Bridging the Gap between Industry and Academia in Optimisation, UCL, Amsterdam, July, 2013 (Ochoa)
- Invited talk 27th CREST/DAASE Open Workshop on Dynamic Adaptive Automated Search Based Software Engineering, UCL, London, April, 2013 (Ochoa)
- Invited tutorial International Artificial Evolution Summer School, Quiberon, France, June, 2013. (Ochoa)
- Invited tutorial DAASE Project Cumberland Lodge kick-off meeting, October, 2012. (Ochoa)
- Awarded a University of Stirling IMPACT Research Partnership Studentship. (Ochoa)
- Named investigator at the EPSRC Dynamic Adaptive Automated Software Engineering (DAASE) project, a major £6.8M initiative across 4 Universities (UCL, Stirling, York and Birmingham) (Ochoa)
- Track chair of PDP2014 22nd Euromicro International Conference on Parallel, Distributed, & Network-Based Processing (<http://www.pdp2014.org/>) for a special track on Advances in High-Performance Bioinformatics, Systems and Synthetic Biology (HPC4BSSB) (Bracciali)
- Editor cHiPSet COST ACTION proposal. One of two presenters at COST - ICT Open Call Hearings Meeting, 12 09 2013, Brussels. This is an international academia/industry collaboration, with a core group of 33 universities and 6 companies over 15 countries. The proposed COST ACTION has been invited to the final hearing, with results in November. (Bracciali)
- Guest editors for special issue of Computer Networks on Feature Interaction (K. J. Turner and E. H. Magill, 2013)
- Gave an invited talk to the EU-funded Usefil project (<http://www.usefil.eu/>) on 23/24 May 2013. (Magill)
- Gave an invited talk at UKCI 2012, 5-7 Sept 2012, Heriot-Watt University, Edinburgh. September 7, 2012 – “Can we put Intelligence into Computational Intelligence?” (Smith)
- PI on a EPSRC funded cross disciplinary MEDIC grant: <http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/K039342/1> valued at £1.2 M to investigate combined therapies for cancer, using a combination of mathematical and computational models at a variety of scales, underpinned by biological experiments. (Shankland)
- SICSA M&A Theme Leader (Shankland)

Strathclyde:

- The Strathclyde Combinatorics group organised the Permutations Patterns conference in 2012

8) Cross-SICSA institutional research funding

See Appendix I (Annexe B) for full details.

9) Other notable activities

Any other notable activities e.g. cross disciplinary funding or activities, international collaborations, industrial collaborations. Activities may be notable due to the scale of the funding or the novel nature of the funding source, the nature or prestige of the company or institution involved or because it represents a new or novel activity for the department.

Abertay:

- Purchased Tobii Eye Tracker for analysis of interactive media, £30,000.
- Purchased Cellular analysis equipment to support our Cancer Systems Biology, £5,000.

Edinburgh:**Industrial Collaborations (x14):**

- Cassidian SAS, Samsung, Skyscanner, Red Review, Amazon Development Centre, Red Hat, Euronews, Greater Glasgow Health Board, Research in Motion, Contemplate, Google, Metaforic, Kotikan, McAfee

Euphoria Launched

Euphoria, a new European lab for next-generation, many-core systems was announced with Michael O'Boyle, Professor at the School of Informatics as Director. The lab will bring world-leading researchers and industrial partners together to tackle a number of grand challenges facing the sector over the next 7 to 15 years. Academic partners are: University of Edinburgh, Barcelona Supercomputing Center (BSC) together with Universitat Politècnica de Catalunya (UPC), University of Ghent, INRIA and RWTH Aachen. Industry collaborators include: Agilent, ARM, Codeplay, Critical Blue, Freescale, Herta Security, Imagination Technologies, Samsung, Wolfson MicroElectronics, and Vector Fabrics. Euphoria will tackle the central challenge of how to design and use heterogeneous many-cores.

MultiMemoHome

Researchers at the Edinburgh School of Informatics and Glasgow University's School of Computing Science develop a vibrating wristband which acts as a reminder device and a bowl which lights up when easily-lost items such as keys are placed in it. The MultiMemoHome project, which began in 2009 and is funded by the Engineering and Physical Sciences Research Council (EPSRC), is designed to help older and disabled people live more independent lives.

UK's Second Cyber Research Institute launched

Academics at the Edinburgh School of Informatics form part of a new UK 'Cyber Research Institute' which will investigate new ways of automatically analysing computer software to reduce its vulnerability to cyber threats. The second Research Institute will carry out world-leading research into techniques for Automated Program Analysis and Verification of computer software. The outputs from the Research Institute will provide businesses, individuals and government with additional confidence that software will behave in a secure fashion when installed on operational networks. Funded by a £4.5 million grant, the new Research Institute is made up of teams from six Universities including the School of Informatics. It has been established by GCHQ in partnership with the Engineering and

Physical Sciences Research Council (EPSRC) through the Research Councils UK (RCUK) Global Uncertainties Programme and the Department for Business, Innovation and Skills (BIS).

.Other Staff Awards:

- Peter Buneman of the School of Informatics awarded an OBE in the New Year Honours list "for services to data systems and computing".
- Christophe Dubach, wins the Intel 2012 Early Career Faculty Honor Program Award.
- Professors Leonid Libkin and Wenfei Fan named as Association for Computing Machinery (ACM) Fellows.
- Bonnie Webber and Mark Steedman from the School of Informatics named as fellows of the Association of Computational Linguistics (ACL).
- Sethu Vijayakumar elected as a Fellow of the Royal Society of Edinburgh (RSE).

Events:

Engage Invest Exploit 2013 (9 May 2013)

Informatics Ventures, the Edinburgh BioQuarter and the Edinburgh Centre for Carbon Innovation (ECCI) join forces to create the largest ever investor showcase in Scotland. Engage Invest Exploit (EIE) is an annual event which brings together a selection of the most talented young high growth companies in Scotland and introduces them to a wide range of investors from across the world. Companies are able to meet and pitch to Entrepreneurs and Investors in the technology, energy and life science sector. Speakers were Sir Tom Hunter, seasoned entrepreneur and philanthropist and the angel investor Sherry Coutu. BBC Radio 4 presenter, Quentin Cooper, was MC for the event.

Informatics Innovative Learning Week 18th to 22nd February 2013

Innovative Learning Week (ILW): a week-long programme of creative and experiential learning events that gave students a chance to develop new skills. During ILW regular lectures and tutorials were replaced with exciting opportunities to gain a new perspective on Informatics.

DEMOfest 2012 (Informatics Ventures for SICSA – held 6/11/12)

An Informatics Ventures event for The Scottish Informatics & Computer Science Alliance (SICSA) in association with ScotlandIS; a technology showcase that brings together industry and academia in the SICSA research community. Scottish Universities can be considered to have the largest ICT research cluster in Europe and DEMOfest demonstrates the best of Informatics and Computing Science state-of-the-art research in Scotland.

Informatics Ventures Tuesday (7 events held Sept 12 to Apr 13)

The iV Tuesday Speaker Series featured a new programme of talks given by prominent members of the business community. The programme seeks to inspire and motivate those who wish to develop their careers in different directions or have entrepreneurial ambitions.

Heriot-Watt:

- Outputs from Chantler and Corne's 'ICT Perspectives' EPSRC project were used in the EPSRC ICT 'Towards an Intelligent Information Infrastructure' (TI3) theme meeting at Birmingham (2012). This led directly to shaping the TI3 web presence and the EPSRC TI3 call for proposals in 2013. In the same way, the ICT Perspectives project enabled the June 2013 workshop of the EPSRC £1.5m 'New Economic Models in the Digital Economy' (NEMODE) network to yield community driven definition of the Digital Economy landscape and research priorities, directly shaping NEMODE's call for proposals to distribute £1m of research funding from late 2013. Finally, representing accelerating adoption for the ICT

Perspectives tools, they are due to be exploited in early 2014 as part of three EPSRC meetings to scope health-care technologies research.

- Michaelson, along with Cutts (Glasgow) made important contributions this period to the evolution of Computing education in Schools. Their 'Haggis' language, optimised for learning programming and emphasising computational thinking has now been adopted, The first CPD courses for teachers were run in 2013, and Haggis will be used in all Scottish Computing exams from 2014 onwards.
- Robertson's work, also enhancing computing education for younger pupils, also made significant progress in the period, underpinning new National Qualifications in Computer Games at various levels.

RGU:

In July 2013, Computing at RGU moved to the new £120M Riverside East Building at the Garthdee Campus. The new state-of-the-art facility offers new IT facilities for all staff and students and a dedicated Research Hub. Other equipment purchased in 2012-13 include a £10.5K server supporting the EU SocialSensor project and a £20K Eye Tracker.

St Andrews:

International Collaborations:

- An international project with the University of Versailles, France, funded by the Royal Society from the UK side and CNRS from the French side
- New EU FP7 project (ADVANCE) with UvA (the Netherlands), TWENTE (the Netherlands), SAP (Germany), several companies in Austria, one Israeli collaborator and one from the USA to commence February 2010
- EUFP7 STREP proposal (title: VIRTSEC) that was rejected. The other partners were RU Bochum (DE), TU Darmstadt (DE) and University of Oslo (NO).
- With Univ of Hamburg, research collaboration and possible Master exchange program
- With Curtin Univ of Technology, Perth WA, Staff and student exchange
- Ongoing cooperation with Ludwig-Maximilians University, Munich, (Prof Hofmann) on resource analysis for embedded systems.
- Collaboration with the Functional Programming Group from the University of Marburg, Germany (Prof Rita Loogen et al) to useEdenTV (the visualisation tool to analyse performance of Eden parallel programmes) to analyse performance of parallel computations in GAP (open-source software, released in 2009)
- There were also visits by Graham Ellis from Galway and from Belgian mathematicians We started new collaborations under the auspice of the HPC-GAP project, so we may state the following
- Collaboration with the Computational Homological Algebra group at NUI Galway, Ireland, in the area of high-performance homological algebra computations.
- Collaboration with the group of experts in finite geometry from Ghent University and Vrije University Brussels (Belgium) in the area of high-performance computing in finite geometry.

Stirling:

Ken Turner opened a home care lab at Stirling. The lab was set up in 2012 and is of course still operational. This was funded by SFC on the MATCH project which included SICSA partners Dundee, Edinburgh, and Glasgow. The lab is a fully furnished flat with a bedroom, living room, kitchen, hall, and bathroom. Although MATCH funding has now finished this remains an active resource and improves our capacity for homecare research.

10) Recruitment success against world-class international competition

Number of SICSA funded staff appointments and the previous institution (if any) of appointees.

University of Edinburgh recruited one further member of SICSA academic staff - Ilias Diakonikolas, Lecturer, from UC Berkeley, USA

11) Distinguished Visiting Fellows (DVF)

Number and home institution of DVF. Duration of DVF visits.

Full details of all Distinguished Visitors and visit durations during 2012-13 below:

Visitor	Home Institution	Host Institution	Duration of Visit
Apu Kapadia	Indiana University	University of Glasgow	2 weeks
Giorgio Satta	University of Padua	University of Andrews/University St of Edinburgh	2 weeks
Wyatt Newman	Case Western Reserve University, Cleveland	University of Edinburgh	10 weeks
Mari Ostendorf	University of Washington	University of Edinburgh	2 weeks
Jost Berthold	University of Copenhagen	Heriot-Watt University	2 weeks
Pawel Sobociński	University of Southampton	University of Edinburgh	6 weeks
Khalil El-Khatib	University of Ontario	University of Glasgow	2 weeks
Ani Nenkova	University of Pennsylvania	University of Aberdeen	1 week
Jacob Eisenstein	Georgia Institute of Technology	University of Edinburgh	4 weeks
John Stasko	Georgia Institute of Technology	University of St Andrews	2 weeks
Eric Monteiro	University of Oslo	University of St Andrews	2 weeks

12) Number of applications for SICSA Prize Studentships

a) *Number of applications logged directly by SICSA for the Ph.D. Prize Studentships during the period 2012-13*

One application. University of Dundee.

b) *The nationality of applicants*

China

13) Prize studentships

Number of SICSA Prize studentships allocated and taken up.

One application allocated and taken-up as above.

14) Cross institution supervision

Number of SICSA Prize students who had a supervisor from out with their "home" University as at 31 July 2013

48% of current SICSA-funded Ph.D. students have a secondary supervisor from out-with their home institution.

15) International conferences attracted to Scotland

a) Notable conferences attracted to Scotland (i.e. which took place during the census period) where a substantial connection to a SICSA department can be demonstrated

Information unavailable.

b) Number of notable conferences which received an element of SICSA funding

One conference received significant SICSA funding during 2012-13 through the SICSA International Conference Sponsorship programme. SICSA also funded and organised the SICSA Ph.D. Conference 2013 at the University of Stirling.

16) SICSA Research Theme events

Number of SICSA supported research theme related events.

There were 32 SICSA supported research theme related events during the reporting period 2012-13 as illustrated in the table below.

Research Theme	Event Title	Date of Event	Location
Next Generation Internet	SCONE Meeting	05-Sept-2012	GCU
Next Generation Internet	SCONE Meeting	5-Sep-2012	GCU
Modelling and Abstraction	Joint Workshop on Compositional Modelling and Analysis of Quantitative Systems	8-Sep-2012	Edinburgh
Next Generation Internet	Cybersecurity Meetup	22-Oct-2012	Aberdeen
MultiModal Interaction	Information Visualisation Workshop	2-Nov-2012	St Andrews
MultiModal Interaction	SICSA Qualitative Data event	21-Nov-2012	Edinburgh Napier
Complex Systems Engineering	D-Wave Systems Event	11-Dec-2012	Edinburgh
Complex Systems Engineering	SICSA SEABIS Meeting	16-Jan-2013	RGU
Next Generation Internet	SCONE Meeting	8-Feb-2013	Edinburgh
Next Generation Internet	Unikernels: Functional Library operating systems for the cloud - CANCELLED	19-Feb-2013	St Andrews
Next Generation Internet	Cybersecurity Meetup	25-Feb-2013	Glasgow
MultiModal Interaction	Tiree Tech Wave	14-18-Mar-2013	Tiree, Scotland
MultiModal Interaction	SICSA MMI Visual Analytics Meeting	11-Apr-2013	Edinburgh Napier
Modelling and Abstraction	20th Automated Reasoning Workshop	11-12-April-2013	Dundee
MultiModal Interaction	Pre-CHI event	23-Apr-2013	St Andrews
Complex Systems Engineering	CIAO 2013 Workshop	23-24-April-2013	The Burn, Angus

Complex Systems Engineering/Modelling and Abstraction	SEABIS/M&A Joint Meeting	1-May-2013	Stirling
Complex Systems Engineering	MMnet'13 workshop: Language & runtime support for concurrent systems	8-May-2013	Heriot-Watt
Modelling and Abstraction	Cyber Physical Systems Workshop	16-May-2013	Edinburgh
MultiModal Interaction	SICSA MMI all hands theme meeting	17-May-2013	Edinburgh
Complex Systems Engineering	Foundations and applications of Parametricity workshop	22-23-May-2013	Strathclyde
MultiModal Interaction	Social Media Mining	24-May-2013	RGU
Next Generation Internet	e-crime Scotland Summit, RBS, Edinburgh (10 funded places)	28-May-2013	RBS, Edinburgh
MultiModal Interaction	Information Retrieval Workshop	31-May-2013	GCU
Next Generation Internet	SICSA Cybersecurity Meetup	6-Jun-2013	Abertay
MultiModal Interaction	SICSA MMI Doctoral Consortium	11-Jun-2013	Stirling
Complex Systems Engineering	SICSA CSE Lecture Series with Prof. Samson Abramsky	10-14-June-2013	Edinburgh
Next Generation Internet	OSDC PIRE Workshop	17-21-June-2013	Edinburgh
Modelling and Abstraction	Dynamics of biological networks: From nodes' dynamics to network evolution	25-26-June-2013	Edinburgh
MultiModal Interaction	Scottish Argumentation Day 2013	19-Jul-2013	Dundee
MultiModal Interaction	Rapid prototyping with .net Gadgeteer	24-26-July-2013	St Andrews
Modelling and Abstraction	Senior Women in Computing: Strategy Meeting	29-Jul-2013	Edinburgh

17) SICSA relevant KT events

Number of SICSA relevant KT related events.

Alongside the activities discussed in the main report relating to SICSA Knowledge Exchange Activity, Informatics Ventures were responsible for organising the following events during the reporting period 2012-13, which were all open to those working within SICSA member institutions.

Activity Title	Month	Reporting Yr	Location
iVentures: CEO Masterclass with David Farquhar	10-Sep-2012	2012-13	Edinburgh
iVentures: CEO Master Class on Negotiation Skills with Patricia Barclay - Founder, Bonaccord Ecosse	19-Sep-2012	2012-13	Edinburgh
iVenture Tuesday - Digital Media & Beyond - Alistair Brown, STV	25-Sept-2012	2012-13	Edinburgh
iVenture "So you're thinking of applying for a place on MIT EDP 2013?"	26-Sept-2012	2012-13	Strathclyde
iVentures: CEO Master Class with David Farquhar	10-Oct-2012	2012-13	Glasgow
iVentures: Life's a Pitch 1 - Workshop with Bill Joos 'The Pitch Doctor'	25-Oct-2012	2012-13	Edinburgh
iVentures: Life's a Pitch 1 - Workshop with Bill Joos 'The Pitch Doctor'	26-Oct-2012	2012-13	Glasgow
iVenture Tuesday - Venture Capital: views from both sides of the "Pond"	30-Oct-2012	2012-13	Glasgow
Cloud Computing Workshop	6-Nov-2012	2012-13	Edinburgh
DEMOfest 2012	6-Nov-2012	2012-13	Edinburgh
Smart Tourism PI meeting	6-Nov-2012	2012-13	Edinburgh
iVentures: CEO Master Class with Hugh Campbell, GP Bullhound -'What Investors Really Want'	8-Nov-2012	2012-13	Edinburgh
iVenture Tuesday - "The Sky's the limit " or is it?	27-Nov-2012	2012-13	Edinburgh
CEO Masterclass: Chris Lamaison - "Extracting Market Intelligence - Rapidly"	16-Jan-2013	2012-13	Edinburgh
iVenture Tuesday - The Ascent of Archangels with Barry Sealey	29-Jan-2013	2012-13	Edinburgh
MIT Entrepreneurial Development Program	27 Jan-1 Feb-2013	2012-13	Boston, USA
iVenture: Oxbridge Biotech Roundtable- Glasgow Launch Event	31-Jan-2013	2012-13	Glasgow
Mobile Apps group talk with Skyscanner	18-Feb-2013	2012-13	Edinburgh
iVTuesday - Paul Atkinson - Heads Up	26-Feb-2013	2012-13	Edinburgh
Horizon 2020 overview	5-Mar-2013	2012-13	Edinburgh
iVentures Learning Lunch with Robert Dewar	8-Mar-2013	2012-13	Edinburgh
CEO Masterclass: Gerry Docherty - Raising your company presence	13-Mar-2013	2012-13	Edinburgh
Mobile Apps as a platform for research	18-Mar-2013	2012-13	Edinburgh
ATM/NFC Mobile Payment challenges Industry	21-Mar-2013	2012-13	Edinburgh
iVTuesday - Richard Higgs - 10 things I wish I had known at the start	26-Mar-2013	2012-13	Dundee
iVentures: EIE13	9-May-2013	2012-13	Edinburgh

18) SICSA DVF events

Number of specific events involving Distinguished Visiting Fellows.

There were 32 events involving SICSA Distinguished Visiting Fellows in 2012-13 as illustrated in the table below:

Event Title	Date	Venue
Lecture by Apu Kapadia - Mobile User Studies Masterclass	2-Aug-2012	Glasgow
Lecture by Apu Kapadia - Mobile User Studies Masterclass	9-Aug-2012	St Andrews
Giorgio Satta: Introduction to grammatical formalisms for natural language parsing	05-Sept-2012	Aberdeen
Giorgio Satta: Introduction to grammatical formalisms for natural language parsing	07-Sept-2012	St Andrews
Giorgio Satta: Introduction to tabular parsing	11-12-Sep-2012	Edinburgh
Research Overview by Wyatt Newman: Progress towards autonomous robotics	21-Sept-2012	Edinburgh
Research Overview by Wyatt Newman: Progress towards autonomous robotics	27-Sept-2012	Glasgow
Research Overview by Wyatt Newman: Progress towards autonomous robotics	3-Oct-2012	Heriot-Watt
Innovation in Information Infrastructure (III) Workshop - Eric Monteiro	9-11-Oct-2012	Edinburgh
Master class by Wyatt Newman: Robotic Compliant Motion Control: Analysis and Design	15-16-Nov-2012	Edinburgh
Seminar by Mari Ostendorf: Parsing Spoken Language	19-Nov-2012	Edinburgh
Seminar by Mari Ostendorf: Representations of Prosody in computational Models for Language Processing	22-Nov-2012	Glasgow
Seminar by Mari Ostendorf: Rich Speech Transcription for Spoken document Processing	27-Nov-2012	St Andrews
Master class by Mari Ostendorf: Extraction of Social Meaning from Language	28-Nov-2012	Edinburgh
Dr Jost Berthold: High Level Computing in Finance Seminar	14-Mar-2013	St Andrews
Dr Jost Berthold: Parallel Programming in Eden - Guest Lecture	15-Mar-2013	Heriot-watt
Dr Jost Berthold: High Level Computing in Finance Seminar	18-Mar-2013	Heriot-watt
Dr. Pawel Sobociński - Algebars of Petri Nets Seminar	31-May-2013	Edinburgh
Professor Khalil El-Khatib: Countering SCADA - Specific Advanced Persistent Threats Using Layer-4 Fingerprinting Technologies	6-Jun-2013	Abertay
Prof. Khalil El-Khatib: Mobile devices for multi-factor authentication in online transactions	11-Jun-2013	Stirling
Prof. Khalil El-Khatib: Biometrics for access control master class	14-Jun-2013	Glasgow
Prof. Ani Nenkova - Reassessing the state of the art in multi-document news summarisation and its evaluation seminar	26-Jun-2013	Aberdeen
Prof. Ani Nenkova - Identifying elements of text quality automatically seminar	26-Jun-2013	Aberdeen
Prof. Ani Nenkova - Emotion analysis for Applications in Neuropsychiatry seminar	27-Jun-2013	Aberdeen

Prof. Ani Nenkova - Multimodal affect prediction using audio, lexical and video indicators seminar	1-Jul-2013	Edinburgh
Dr Jacob Eisenstein - A survey of statistical network models	11-Jul-2013	Edinburgh
Prof. John Stasko - The Value of Visualization for Exploring and Understanding Data	11-Jul-2013	Glasgow
Dr Jacob Eisenstein - Statistical models of language variation and influence	12-Jul-2013	Edinburgh
Dr Jacob Eisenstein - Language variation and influence in social media	15-Jul-2013	Glasgow
Prof. John Stasko - The Value of Visualization for Exploring and Understanding Data	16-Jul-2013	Napier
Dr Jacob Eisenstein - Interactive Topic visualization for exploratory text analysis	23-Jul-2013	St Andrews
Dr Jacob Eisenstein - Large scale analysis of language variation and change in social media	25-Jul-2013	Edinburgh

19) SICSA summer schools

a) Number of summer school events (for which SICSA has funded student attendance)

A total of 26 Scottish-based students received SICSA funded places to attend Summer Schools, as follows:

Student	HEI	Summer School	Location	Start date	Duration
Prabhat Totoo	Heriot Watt	Applied Functional Programming in Haskell	Utrecht, Netherlands	20-Aug-12	2 weeks
Stefan Ruae	Glasgow	ISCRAM 2012 Summer School in Tilburg	Netherlands	15-24 Aug 12	1 Week
Ying He	Glasgow	IEEE Technology and Security: the current scenario	Cagliari, Italy	27-31 Aug 12	1 Week
Negin Moghim	Heriot-watt	Machine Learning Summer School 2012	Kyoto, Japan	27-Aug-12	2 weeks
Carina Silberer	Edinburgh	Vision and Sports Summer School 2012	Prague, Czech republic	27-Aug-12	1 week
Desmond Elliott	Edinburgh	Vision and Sports Summer School 2012	Prague, Czech republic	27-Aug-12	1 week
Alireza Pourranjbar	Edinburgh	RigorOus dependability analysis using model CheckKing techniques for Stochastic systems	Vahrn, Italy	October 22-26, 2012	1 Week
Patrick Totzke	Edinburgh	GAMES Winter School 2013	Champery, Switzerland	04-08 Feb 2013	1 Week
Jan de Muijnck-Hughes	St Andrews	2013 Cryptography Winter School	Bar-Ilan University (Israel)	04-07 Feb 2013	1 Week
Anna Polychroniou	Glasgow	SSPNet Summer School on Social Signal Processing	IIASS in Vietri sul Mare, Italy	3 - 7 June 2013	1 week
Shahriar Bijani	Edinburgh	Software Testing Summer School	Sweden	3 - 5 June 2013	1 week
Anne-Marie Mann	St Andrews	The UBI Summer School	Oulu, Finland	10-15 June 2013	1 Week

Chris Banks	Edinburgh	13th International School on Formal Methods for the Design of Computer, Communication and Software Systems: Dynamical Systems	Bertinoro, Italy	17-22 June 2013	1 Week
Anastasis Georgoulas	Edinburgh	13th International School on Formal Methods for the Design of Computer, Communication and Software Systems: Dynamical Systems	Bertinoro, Italy	17-22 June 2013	1 Week
Amjad Ullah	Stirling	13th International School on Formal Methods for the Design of Computer, Communication and Software Systems: Dynamical Systems	Bertinoro, Italy	17 - 22 June 2013	1 week
Amy Guy	Edinburgh	Semantic Web Summer School	Cercedilla, Madrid	7-13 July 13	1 week
Paulo Pareti	Edinburgh	Semantic Web Summer School	Cercedilla, Madrid	7-13 July 13	1 week
Enrico Pellegrini	Dundee University	2 nd Biomedical Image Analysis Summer School : Modalities, Methodologies & Clinical Research	Paris, France	8-12 July 2013	1 week
Punyanuch Borwarnginn	Edinburgh	The 15th European Agent Systems Summer School	Kings College, London	1 - 5 July 2013	1 week
Ashkan Tousimojarad	Glasgow	PUMPS Summer School	Barcelona, Spain	2 - 6 July	1 week
Saray Shai	St Andrews	Lipari School on Computational Complex Systems	Lipari, Italy	6 - 13 July 2013	1 week
Prabhat Totoo	Heriot Watt	Domain specific languages (DSL 2013) summer school	Cluj-Napoca, Romania	8-20 July 2013	2 weeks
Malek Saleh	Heriot Watt	Domain specific languages (DSL 2013) summer school	Cluj-Napoca, Romania	8-20 July 2013	2 weeks
Silvia Pareti	Edinburgh	Lisbon Machine Learning School 2013	Lisbon, Portugal	24-31 July 2013	1 week
Timothy Revell	Strathclyde	Oregon Programming Languages School 2013	Oregon, USA	22 July - 3 Aug 2013	1 week
Federico Onsanigo	Strathclyde	Oregon Programming Languages School 2013	Oregon, USA	23 July - 3 Aug 2013	1 week

b) Number of attendees of SICSA sponsored/funded summer school events

There were two SICSA sponsored Summer Schools during 2012-13. There was a grand total of 55 students from around the world (including the Scottish-based contingent) who attended the two SICSA sponsored Summer Schools.

20) SICSA courses for Ph.D. students

a. Number of courses (including conferences but excluding summer schools which have been attended by students from more than one SICSA department.

It is difficult to quantify the total number of SICSA organised or sponsored events for Ph.D. students over the reporting period 2012-13, as many SICSA events are aimed at both students and academics. However, a review of the SICSA activities and events data for 2012-13 shows approximately 100 events that were open to students.

21) SICSA Prize Studentship cohort events

Number of events specific to (or primarily attended by) SICSA Prize students:

SICSA Prize Students are eligible to attend most SICSA sponsored or organised events, though some events are attended by application only. During the reporting period SICSA organised 1 event aimed solely at SICSA Prize Students. This was the SICSA Prize Student Induction, held on 26th November 2012 at the University of Edinburgh.

Appendix IV: Postdoctoral and Early Career Researcher Exchange (PECE) Reports

i) Dr Adam Barker, University of St Andrews

2 funded exchanges to University of California, Berkeley

From 20 July 2012 until 31 August 2012 Dr Barker visited the Algorithms, Machines and People (AMP) Lab at the University of California, Berkeley. His point of contact was Prof Michael J. Franklin, Director of the Algorithms Machines and People (AMP) Lab.

AMPLab is a World-leading authority on the emerging topic of big data and was a unique environment to conduct research. Along with traditional research funding agencies, AMPLab is sponsored by, and works with many of the world's leading technology companies and innovative start-ups. These companies participate in twice-yearly multi-day research retreats, provide advice and real-world insight, and interact closely with researchers on projects of mutual interest throughout the research process. AMPLab researchers (including faculty) share an open-plan collaborative research space that is designed to encourage interactions across the various areas of expertise in the lab.

This visit was highly successful. Dr Barker established initial connections to world-leading authorities on big data at UC Berkeley and a number of leading technology companies including Google, Yahoo!, Twitter and Groupon. This visit has resulted in a fellowship proposal submitted to the Royal Society and several publications that are in progress.

Aims of the exchange

This SICSA funded PECE exchange had the following initial aims:

1. Foster International collaboration with a World-leading authority on the topic of Big Data and Cloud computing.
2. Increase the excellence of Big Data and Cloud computing research within SICSA.
3. Raise awareness of SICSA abroad and set up a long-term collaboration between SICSA funded Universities and UC Berkeley.

With reference to aim 1:

During his month at AMPLab Dr Barker spent the majority of his time interacting with as many researchers as possible at UC Berkeley: faculty members, graduate and undergraduate students. Dr Barker met with the technical leads of each of the AMPLab's main projects including: Spark, Shark, Mesos, CrowdDB and MDCC. This was a very productive use of his time and has helped formulate long-term links for future collaboration.

Dr Barker also arranged visits with a number of leading technology companies including Google, Yahoo!, Twitter and Groupon. During these visits he discussed the work of SICSA, opportunities for collaboration and arranged follow up meetings. Twitter and Groupon were particularly successful visits and he made a number of important contacts that he intends to follow up on for future collaboration.

With reference to aim 2:

Dr Barker worked specifically with graduate students on Spark : an open source in-memory cluster computing system that can load data into memory and query it repeatedly much quicker than with disk-based systems like Hadoop MapReduce.

While he was at UC Berkeley the AMPLab were running AMPCamp: a 2-day Big Data bootcamp. Organized by the AMPLab, it featured hands-on tutorials teaching Big Data analysis using the AMPLab developed software stack, including Spark, Shark, and Mesos. These tools help accelerate Hadoop and other popular data management platforms. Dr Barker attended AMPCamp and through this event learned a great deal about some of the cutting edge big data tools through hands-on experience; he also met another diverse set of academic and industrial contacts.

With reference to aim 3:

Dr Barker presented his research and the work of SICSA at the UC Berkeley computing seminar series. During this talk he discussed SICSA initiatives aimed at fostering collaboration, including the Distinguished Visitor Fellowships programme. He also discussed SICSA during his industry visits at the headquarters of Google, Yahoo!, Twitter and Groupon.

During his time at Berkeley he was interviewed for a feature story on big data for Prism magazine; the flagship publication of the American Society for Engineering Education, a non-profit association of more than 12,000 engineering faculty members, U.S. colleges of engineering and engineering technology, corporations.

Outcomes of the exchange

- This PECE exchange was highly successful and helped Dr Barker establish links with world-leading authorities on the topics of distributed systems, cloud computing and big data. In particular this exchange helped facilitate the following outcomes:
- UC Berkeley has a unique academic environment; academics work very closely with leading technology companies in order to work at the leading edge. In systems' research this is especially important. Inspired by UC Berkeley Dr Barker has applied for a Royal Society Industry Fellowship that provides funding to work on collaborative research projects with leading industrial partners.
- In collaboration with Dr Ian Miguel, he co-authored an EPSRC grant that fuses together cloud computing and constraint programming research.
- The School of Computer at the University of St Andrews runs a Distinguished Lecture Series (DLS) and Dr Barker's host Prof Michael Franklin has been invited over to present at a future series.
- Based on some of the work he conducted at UC Berkeley Dr Barker is co-authoring a set of survey articles on the topics of: cloud computing research, autonomic systems and decentralised Web service coordination.
- This SICSA funded PECE exchange gave Dr Barker the space and time to formulate a set of new ideas around the big data space. These ideas are currently being written up into an EPSRC First Grant.
- In collaboration with Prof Aaron Quigley he applied to run a SICSA funded summer school on the topic of visualisation and big data. The summer school was subsequently funded by SICSA.

From 24 July 2013 until 14 August 2013 Dr Barker re-visited the Algorithms, Machines and People (AMP) Lab at the University of California, Berkeley. His point of contact was again, Prof Michael J. Franklin, Director of the Algorithms Machines and People (AMP) Lab. This shorter visit built upon the connections that he made during his visit in 2012.

This visit was highly successful; Dr Barker re-established the initial connections he made in 2012 to world-leading authorities on big data at UC Berkeley. This visit has resulted in an EPSRC First Grant proposal submitted and several publications that are in progress.

Outcomes of the exchange

This PECE exchange helped Dr Barker to re-establish links with world-leading authorities on the topics of distributed systems, cloud computing and big data. In particular this exchange helped facilitate the following outcomes:

- One of the main activities worked on during this visit was the **EPSRC First Grant**. The ideas in this grant evolved as a result of discussions with the hosts and their graduate students. This grant is currently under review.
- UC Berkeley has a unique academic environment; academics work very closely with leading technology companies in order to work at the leading edge. As a direct result of the trip in 2012 Dr Barker has been awarded a **Royal Society Industry Fellowship**. This Fellowship

provides funding for 2 years (2014-2016) to work on a collaborative research project with Cloudsoft Edinburgh.

- In collaboration with Dr Ian Miguel, the **EPSRC grant (EP/K015745/1)** on cloud computing and constraint programming was awarded in late 2012. The grant provides £630,000 worth of funding over 3 years. Dr Barker believes that the SICSA PECE exchange directly contributed to the success of this grant, as many of the ideas were a result of discussions with the exchange hosts at UC Berkeley.
- Dr Barker worked specifically with graduate students on Spark: an open source in-memory cluster computing system that can load data into memory and query it repeatedly much quicker than with disk-based systems like Hadoop MapReduce.
- Based on some of the work that Dr Barker conducted at UC Berkeley he is co-authoring a set of survey articles on the topics of: cloud computing research, autonomic systems and decentralised Web service coordination. These surveys will be submitted for peer review and to the open publication Archiv framework.
- The School of Computer at the University of St Andrews runs a Distinguished Lecture Series (DLS) and my host Prof Michael Franklin has been invited over to present at a future series in 2014.

ii) Dr Martin Halvey, Glasgow Caledonian University

Outline of exchange

This exchange was for Dr Martin Halvey to visit FX Palo Alto Laboratories (FXPAL), Palo Alto, California, USA to work with Dr Gene Golovchinsky. The exchange took place 26/02/2013 – 29/03/2013.

Aims of the exchange

- 1) Foster international collaboration with a world-leading authority in both information retrieval (IR) and human computer interaction (HCI).
- 2) Scotland has world leading research in both IR and HCI; one of the aims is to continue to improve this excellence and help SICSA institutions maintain a world leading research position in these communities.
- 3) In collaboration with FXPAL address a current research issues in interactive information retrieval i.e. we aim to address the problem of discounted gain from consecutive related queries.
- 4) Raise awareness of SICSA and Scottish universities abroad with FXPAL and other companies/universities that I plan on visiting.

Outcomes of the exchange

Aims 1, 2 and 3 are related to research that was conducted during the exchange and aims 1 and 4 are related to dissemination of research and information.

Research

One of the areas of research in FXPAL is exploratory search and this exchange was intended to concentrate on research in this area. The research to be conducted on the exchange aimed to address the problem of discounted gain from consecutive related queries. In order to conduct this research, logs of interactions with the Querium system [2, 4] were used. Querium is an exploratory search system that can be used for single user or collaborative search, and which supports many different modes of search e.g. keyword, relevance feedback etc. The logs were from a single evaluation which was conducted internally at FXPAL. An initial analysis of the Querium logs highlighted some differences in the numbers of different interactions when different numbers of new documents were returned during a query cycle. This type of analysis is quite common for IR systems, however as different systems can have different actions it is difficult to compare any two systems to see if the behaviour is universal across users or systems. Thus the researchers began to explore

ways to compare two systems in a more abstract way that does not rely on the interaction afforded by a system and our research aim changed and became developing a new methodology to compare search systems independent of possible interactions, so as to allow comparison of different users, interfaces etc. As part of this the researchers explored the use of search tactics, which capture different stages of the search process and are not reliant on the interactions that a system allows, popular search tactic models include the Marchionini Model [6] and Bate's Model [1]. The issue with using search tactics is that they require some sort of mapping from user actions to intentions. Recent work by Han et al. [5] has used Hidden Markov Models (HMM) to abstract from interactions to the search tactics in Marchionini's Search Tactics Model [6]. This work by Han et al. was extended; the approach they took could not easily match with some tactics as it did not allow for any time that a searcher might spend not using the search system e.g. considering the next action, reading, formulating a query etc. To overcome this, a pause was included as a possible interaction. As a comparison and example of difficulties in comparing systems there are more possible interactions with Querium than with the system in the paper by Han et al. [5]. HMM's were trained on the sequence of actions for each search session in the Querium logs, in total there were 78 search sessions. The models were compared using an approach put forward by Garcia-Garcia et al. [3]. This represented the beginning of this analysis, it is planned that this collaboration will be on going and future interactions are outlined below.

Dissemination

During the exchange Dr Halvey visited a number of companies to give talks, the purpose of these visits were to promote my own research, promote research at SICSA institutions and meet leading researchers from industry. Details of these talks and visits are below. In addition to those talks Dr Halvey also had further informal meetings with researchers from LinkedIn and Nominum Inc.

Where	Date	Host	Title
Samsung UX Innovations Lab, San Jose	01/03/2013	Daniela Busse	Designing Thermal Interfaces for Mobile Interaction
Yahoo! Research, Sunnyvale	19/03/2013	David Ayman Shamma	Multimedia information retrieval; helped or hindered by text?
FXPAL Xerox Research Lab, Palo Alto	27/03/2013	Gene Golovchinsky	Using Hidden Markov Models to Detect Search Tactics for Information Seeking

Future interactions to arise from the exchange

It is planned that this collaboration will continue over the next few months to complete this work. It is intended that the outcomes of this work will be published at a major conference in 2014 e.g. CHI or SIGIR.

References

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- [3] Garcia-Garcia, D., Hernandez, E. P. and Diaz de Maria, F. A New Distance Measure for Model-Based Sequence Clustering. *IEEE Transactions on Pattern Analysis and Machine Intelligence* 31, 7 (2009), 1325-1331. DOI=10.1109/TPAMI.2008.268.
- [4] Golovchinsky, G. and Pickens, J. Interactive information seeking via selective application of contextual knowledge. IiIX 2010, 145-154.

[5] Han, S., Yue, Z. and He, D. Automatic detection of search tactic in individual information seeking: A Hidden Markov Model approach. iConference 2013, 712-716.

[6] Marchionini, G. Chapter 3: Information-seeking perspective and framework. Information Seeking in Electronic Environments.

iii) Dr Rik Sarkar, University of Edinburgh

Dr Rik Sarkar carried out a research exchange visit to ETH Zurich between March 30 and May 9, 2013. The work done in this visit has already generated significant research achievement, and an article has been submitted to the annual Neural Information Processing Systems (NIPS) 2013 conference. In the following, we describe in brief, two main lines of investigation that were identified during the collaboration as significant topics of immediate and future research.

Distributed optimization and geometric data: Sub-modular optimization is the question of selecting the best possible subset of elements from a large dataset. For example, a user may have the question “What are the 5 news articles I should read today?” Such subset selections are sub-modular – they exhibit a diminishing returns property that reduces the value of future selections based on the subset that has already been selected. Diminishing returns and sub-modularity are common features that appear in many common and natural questions – ranging from selecting representative articles, to sensor placements and many sub-problems of machine learning and scientific computing.

In the modern age of massive datasets, such optimizations – even to an approximation – are difficult to carry out efficiently and in a reasonable time. Large datasets must be handled using clusters of multiple machines, and classical optimization procedures do not scale to such multiple machine architectures.

The researchers identified distributed submodular optimization as an important research topic, and made significant progress on distributed maximization problems. They carried out large experiments on a Hadoop cluster at ETH, on questions of selecting representative elements. They also analyzed the theoretical properties of distributed optimization, and obtained tight bounds for certain classes of algorithms. It was discovered that stronger results are possible when real data contain more structure than the basic maximization procedures require.

Many types of data carry underlying geometric structures. The researchers defined a type of Lipschitz functions that generalize many common types of submodular functions on such datasets, such as sensor selection and representative element selection, and proved that substantially stronger results can be obtained for such functions and large samples, using distributed data processing clusters. An article describing these findings has been submitted to NIPS.

Mobile-data, and structured sub-modularity. Based on the findings above, work is in progress on the questions of sub-modular optimization with respect to mobile objects. Mobility introduces a fundamental challenge of rapidly changing data, and the challenge in this scenario is to pre-process the data in a way such that representative subsets can be selected rapidly using the processed data, and can be updated at a low cost in face of changing locations of devices.

Classical methods of optimization do not adjust well to mobility and changing input. However, by using the properties of realistic problems, we can achieve the dynamic selection and updates. Geometric data of locations and Lipschitz functions are natural candidates for such mobile optimizations. In this category, the researchers are also investigating the question on in-network optimization, that is, instead of using just computing clusters, they also hope to develop methods to perform the computations on small scale mobile and sensor devices closer to the source of data.

Collaborations made during this exchange are therefore set to continue.

iv) Dr Tim Storer, University of Glasgow

This visit took place between 4th September and 14th October 2013 and comprised visits to the University of Ontario Institute of Technology (Professors El-Khatib and Marsh) and Carleton University, Ottawa (Professor Esfandiari). The purpose of the visit was to further a joint research programme developing the applications of computational comfort to information security management problems. The intuition behind the research is to leverage the inter-personal and social notion of comfort as a suitable abstraction for mediating interactions between computational devices and users when handling potentially sensitive information.

Direct outcomes from the visit were:

- Book chapter Foreground Trust as a Security Paradigm: Turning Users into Strong Links, accepted for Information Security in Diverse Environments.
- Paper Critical Infrastructure Situational Awareness Using VANETs in Smart Cities prepared for ITST 2013. This describes the application of comfort in the management of disruption in the transport network.
- The preparation of a research grant application to the TSB Secure working in insecure environments call, to be submitted at the beginning of March 2014. The proposed project will apply the notion of comfort to managing interactions between workers operating in insecure environments. This is a short term grant that may lead to longer term funding for the research, if successful.
- Complementary postgraduate student projects on experimenting with obstructive user interfaces (Glasgow) and adapting the comfort engine developed for the iOS platform (UOIT -Marsh). These projects will be supervised independently, but the two project teams will continue to collaborate through regular video conference meetings.

In addition, the visit led to the development of materials for a threat modelling summer school. During the visit, academics discussed that research students often struggle to develop focused, comprehensive threat models to evaluate their proposed solutions to security problems. Consequently, the academics involved have begun to develop a set of materials for a summer school on threat modelling to be trialled in 2014.

A final benefit of the visit was to initiate a further collaboration with Carleton University on workflow management for experiments based on scientific programming/computational science. This research was not specified in the initial proposal, but developed through common interest. A survey paper of challenges for software engineering in scientific programming is in preparation as a collaboration between Professor Esfandiari, Alan Davoust and Timothy Storer.

Appendix V: Outline of applications for £410K KE Funding

	Postgrad Industry Internship			Early Career Industry Fellowship			Distinguished Industry Visitor			Proof of Concept			Elevate			Team Industry Placements			Total Applications Funded	Total Funding Granted	
	Applications	Awarded	Granted	Applications	Awarded	Granted	Applications	Awarded	Granted	Applications	Awarded	Granted	Applications	Awarded	Granted	Applications	Awarded	Granted			
Aberdeen	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	0	0	-	
Abertay	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	0	0	-	
Dundee	-	-	0	-	-	0	-	-	0	-	-	1	1	£ 9,989.00	-	-	-	0	1	£ 9,989.00	
Edinburgh	5	3	£ 13,612.27	-	-	0	-	1	-	0	-	-	0	-	1	1	0	9,000.00	-	4	£ 22,512.27
Edinburgh Napier	-	-	£ -	-	-	£ -	-	-	£ -	-	-	0	-	-	1	1	£ 9,000.00	-	-	1	£ 9,000.00
Glasgow	2	2	£ 12,296.00	-	-	£ -	-	1	1	£ 1,030.00	-	-	0	-	1	1	£ 6,000.00	-	-	4	£ 19,326.00
Glasgow Caledonian	-	-	£ -	-	-	£ -	-	1	-	£ -	-	1	-	0	-	-	£ -	-	-	£ -	-
Heriot-Watt	2	1	£ 2,800.00	-	-	£ -	-	1	1	£ 980.00	1	-	0	-	-	0	0	-	-	2	£ 3,760.00
Robert Gordon	-	-	£ -	-	-	£ -	-	1	1	£ 2,980.00	-	-	0	-	-	0	0	-	-	1	£ 2,980.00
UHI	-	-	£ -	-	-	£ -	-	-	£ -	-	-	0	-	-	0	0	-	-	-	0	-
St Andrews	2	1	£ 9,320.00	-	-	£ -	-	-	£ -	-	-	0	-	-	0	0	-	-	-	1	£ 9,320.00
Stirling	-	-	£ -	-	-	£ -	-	-	£ -	-	-	0	-	-	0	0	-	-	-	0	-
Strathclyde	-	-	£ -	-	-	£ -	-	-	£ -	-	-	0	-	-	0	0	-	-	-	0	-
UWS	-	-	£ -	-	-	£ -	-	-	£ -	-	-	0	-	-	0	0	-	-	-	0	-
	11	7	£ 38,028.27	-	-	£ -	-	5	3	£ 4,970.00	3	1	£ 9,989.00	3	3	£ 24,000.00	-	-	£ -	14	£ 76,987.27